Information System Management (MIS)

Chapter One: The importance of The MIS

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46 Slides.

- We will be taking an overview of MIS.

Motivation

- Graduated students realize how valuable for the job market it is to have skills related to information systems.
- In this course you will learn what information systems are all about and why they are so fundamental to business and society.
- Our journey will be exciting filled with revelations about business strategies, technology trends and innovations, and also tips that will help you work smarter as a student

What is an Information System (IS)?

- At the heart of every organization is its information system.
- Either it is on the cutting edge of technology company like Google, Facebook …, or those that don't seem very high tech (family owned restaurant or a fitness gym
  - Can hardly survive without **information systems** or without **people** who know how to build and manage them.

Personal Info Sys. عبارة عن Google Account

★ حاليًا كلنا عنا ار IS الخاصة فيه (ار تبعه على

★ حاليًا إحنا منحتاج بدواغ متعلقة من ار (IS) أنت جزء منزار IS كطالب بالجامعة الأردنية

جزء من IS للأردن كدولتك أو Residence فيها

What is an Information System (IS)?

- A set of interrelated components that collect, manipulate, store, and disseminate data and information and provide a feedback mechanism to meet an objective (Stair and Reynolds, 2010).
- The Information Systems major is for people who want to solve problems businesses face and create new opportunities by using the latest computer technology. They help organizations use technology to operate more efficiently. They work with other business and IT people to build systems for executives and managers that support their decisions (*University of Arkansas*).

بتخزن

عرف Field معين وهي ار Businesses.

how?

التعريف IS وربط IT Tech ب IS تالبين

وربط بار IT People.

2 main components in any IT sys.

1 Tech

2 IT People

What is an Information System (IS)?

- The study of complementary networks of hardware and software that people and organizations use to collect, filter, process, create, and distribute data (*https://en.wikipedia.org/wiki/Information_system*).
- Combinations of hardware, software, and telecommunications networks that people build and use to collect, create, and distribute useful data, typically in organizational settings (*Information Systems for Business & Beyond, 2019*).

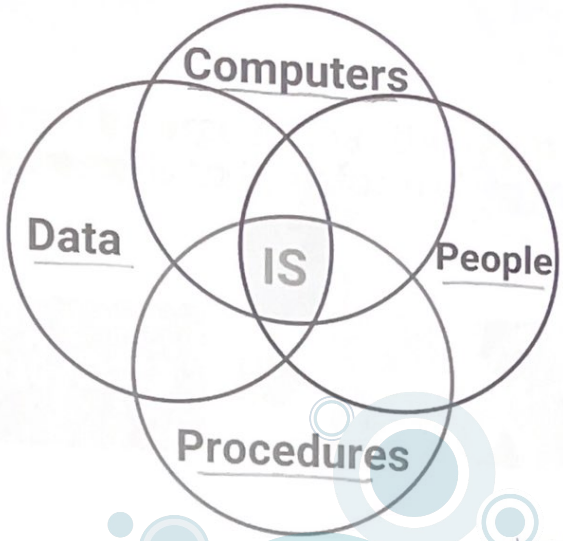
I have to have IT components & Human Components. Why? Is to utilize the hardware & software & the telecomm. networks. (IT components) to distribute, use, create, collect, useful data.

WHAT IS AN INFORMATION SYSTEM?

What are Information Systems (IS)?

- *"An **Information System** is a group of **components** that interact to produce **information**."*

COMPUTER INFORMATION SYSTEMS

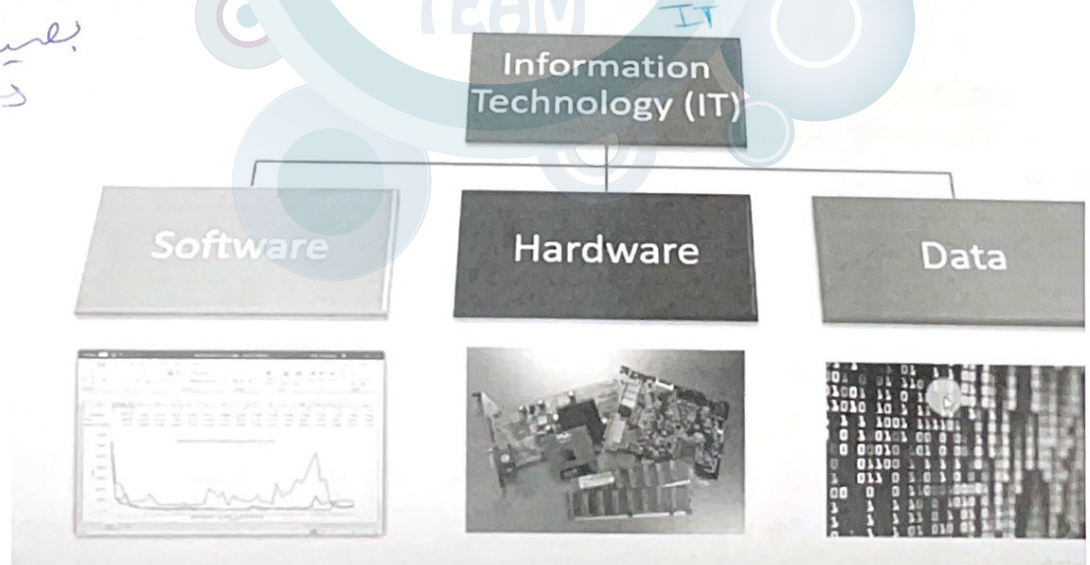


dept هي مايميز كل عن الثانية

هي نفسها
* الـData الي بدهم يعالجوها
* أحسن حالة متوسطة

كلهم رح يتعاونوا
To analyze & generate Data

بالصيغة الأخرى

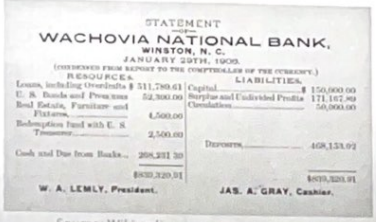


It can be argued that the main purpose of Information Systems is to transform *data* into *information*

Data – raw facts about the world

Information – Processed or summarized raw facts that can be used in decision-making

Knowledge – Information that leads to valuable actions



STATEMENT

WACHOVIA NATIONAL BANK,

WINSTON, N. C.

JANUARY 25TH, 1909.

(CONDENSED FROM REPORT TO THE COMPTROLLER OF THE CURRENCY.)

RESOURCES.		LIABILITIES.	
Loans, including Overdrafts	$ 511,780.61	Capital	$ 150,000.00
U. S. Bonds and Premiums	52,300.00	Surplus and Undivided Profits	171,167.90
Real Estate, Furniture and Fixtures	4,500.00	Circulation	50,000.00
Redemption fund with U. S. Treasurer	2,500.00	Deposits	468,153.01
Cash and Due from Banks	268,231 30		
	$839,320.91		$839,320.91

W. A. LEMLY, President. JAS. A. GRAY, Cashier.

Source: Wikipedia

أخذت هذا الشهر درجات الحرارة تبعه

لما جمعت درجات الحرارة وأخذت الوقت تبعهم هاي معلومة

قررت أطلع وأعمل فعاليات عشان الجو حلو

Remember

Data, Information and Knowledge

- Data are raw facts.
  - Data is pure values which themselves do not have much significance.
  - Data may be in the form of numbers, letters, characters, images and graphics, audios, or videos.
- Information is processed, manipulated, and interpreted data.
- Knowledge: is an interface or conclusion drawn from the information.

Example

- Transforming Data to Knowledge:
  - A patient's single high-temperature reading at a 24-hour walk-in clinic
  - But entered into the clinic's information system and combined with the patient's other symptoms and previous medical records, it becomes far more valuable as a diagnostic tool
  - Combining it with data from other patients entering all clinics that week.
    - The patterns may warn of a flu outbreak or even a major epidemic
  - Centers for Disease Control and Prevention draw on data like this to map the spread of diseases and take swift action to protect the public.

Data → Information → Knowledge

FIGURE 1-6
Examples of the continuum from data to information to knowledge, as meaning and usefulness grow.

Data	Information	Knowledge
Patient's temperature at walk-in clinic on Dec. 15 = 103.9° F.	Table showing flu diagnoses in region during month of December	Worldwide map of flu outbreaks suggesting pandemic
01010011 01001111 01010011	Binary code for SOS	HELP!!!
Microsoft (MSFT) closing stock price	Graph of Microsoft highs and lows for one year	Combined with analysis of other information, leads to broker's recommendation to buy, hold, or sell stock
CWOT	Complete Waste of Time (text messaging abbreviation)	May be interpreted as an insult
GPS coordinates	Map showing location with push pin	Location of Taj Mahal in India
Invoice #259 Total Amount = $139.23	Total Sales for Southern Region in First Quarter = $2,156,232	Fastest growing sales region; consider broader marketing campaign

IS → is a process in which input data is converted to output info.
↳ Info is processed & interpreted data.
↳ Conclusion → Info ... → ... (Knowledge).

What are the Characteristics of Information ?

- *Accurate*: Information must not contain errors
- *Accessible*: authorized users should be abel to access the information.
- *Complete*: Information must contain all important elements.
- *Economical*: Information should be economical to produce in terms of both time and cost. time & $
- *Format*: available in the desired format. (... charts, histograms etc.)
- *Flexible*: ability to transform information from one form to another and flexibility to be used for different purposes

... على شكل جداول أو رسم بياني ...

Characteristics of Information … Cont'd

ويمكن الاعتماد عليها

- *Reliable*: Information is dependable, should be generated using correct data
- *Relevant*: Information must be relevant can relate to it
- *Secure*: saved in safe places with appropriate access authorization
- *Simple*: Information must be easily understandable and usable.
- *Timely*: Information must be available when it is needed and up to date. → إله علاقة بالجدولة الاقتصادية للمعلومات
- *Verifiable*: there should be means to cross check the information → لازم يكون عندي Access للمعلومات والـ Sources تبعتها.

لحد هون عرفنا الـ IS

WHAT IS MANAGEMENT INFORMATION SYSTEMS

» **Management Information Systems (MIS)** comprise the development and use of information systems that help organizations achieve their goals and objectives.

* لما الـ Info تستخدم من orgs بغير عنى (MIS)

» **Key elements:**

- Development and use
- Information systems
- Goals and objectives

لو استخدام شخصي ↳ IS
استخدام organizational ↳ MIS.

DEVELOPMENT AND USE OF INFORMATION SYSTEMS

You need to:

* To utilize any IS I have to know if that IS covers my needs or NOT.

- Take an ***active role*** in order to ensure that system will meet your needs.
- Learn how to ***acquire*** information systems, by asking critical questions.
- Learn how to ***use*** information systems.

1. Will it meet my needs?
2. To aquire info Ask critical questions
3. How to use IS? correctly.

ACHIEVING BUSINESS GOALS AND OBJECTIVES

* هاد الهكي مكلف جداً

MIS aids businesses in achieving objectives:

- Organizations themselves don't do anything.
- People within an organization or business who: sell, buy, design, produce, finance, market, account, and manage.

MIS empowers users to reach goals:

- Exist to assist business people.
- **Need to be developed for right reason.**

ACHIEVING BUSINESS GOALS AND OBJECTIVES

- What questions would you ask?
- What would be the benefits/downsides of modernizing?
- Would you make the investment to update the system? Why?

بالتفصيل أكثر in Ch.2.

HOW DOES AN IS DIFFER FROM IT?

- **Information system (IS)** is a system of hardware, software, data, procedures, and people that produces information

* العنصر البشري إشي أساسي بأي IS (Skilled workers)

- **Information technology (IT)** represents raw technology, components of IS
  - Hardware
  - Software
  - Data components

* باقي الـ people والـ Procedures

→ IT is part of IS
BUT IS is NOT part of IT

HOW DOES AN IS DIFFER FROM IT?

INFORMATION SYSTEMS

Hardware	Software	Data	Procedures	People

INFORMATION TECHNOLOGY

تعريف الـ IS اللي نستخدمه - بشمل 5 components الـ

IS: is the info technology, that is utilized by people in organizations that are making Procedures to utilize data.

IS الـ components بتجمع setters

So, IT components
Human components
interaction الـ بين
Data: الـ

Six Major Roles of Information Systems

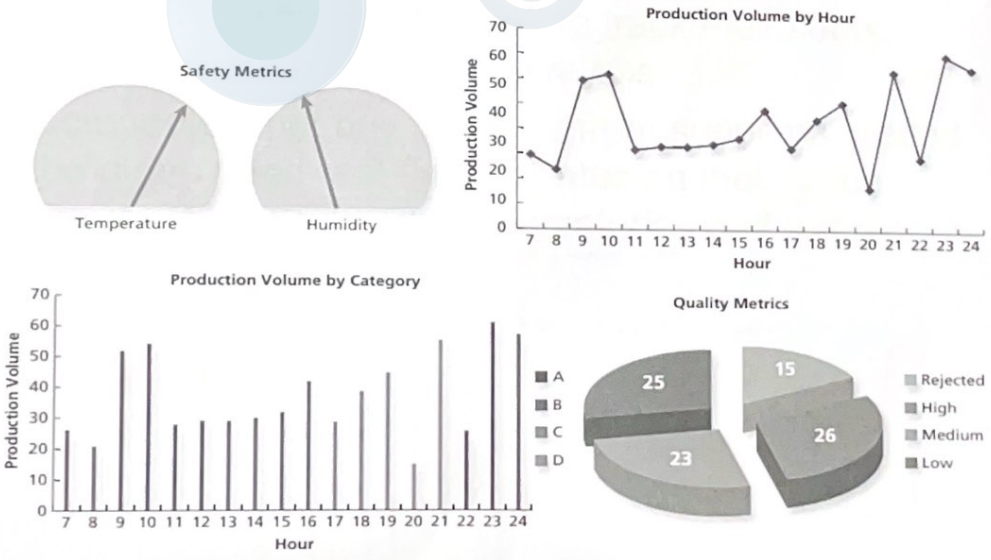
FIGURE 1-1
The major roles of information systems in organizations.

Managing Operations

- Operations Management: involves the design, operation, and improvement of the systems and processes the organization uses to deliver its goods and services.
- Information systems :-
  - Are crucial for tracking employee payroll, taxes, benefits ..
  - Accounting information systems are essential to track accounts receivable, to process transactions, to procure goods and services, and to pay the suppliers.
  - Back-office Information Systems keep all details about the company and operations.
  - Commercial information systems software packages: SAP, Oracle, NetSuite, or QuickBooks.

Industry Specific Operations

FIGURE 1-2
Manufacturing information system displaying production volumes and other metrics.



Industry Specific Operations … Cont'd

- Colleges and universities need systems to manage student academic records, class scheduling, faculty assignments, and student financial aid.

MyCollege MyTools MyClasses MyProfile

Update contact info
View schedules
Submit request
View requirements
Register for courses

Course	Days	Time	Location
Bus 111	MW	14:00–15:00	Macintyre
Bus 111	MW	15:00–16:00	Doyle
Bus 112	T-TH	9:00–10:45	Student Services
Bus 112	-	-	Online
Bus 112	M	9:00–11:45	Garcia
Bus 113	W	1:00–2:45	Doyle

FIGURE 1-3
Student information system with online services for students and faculty.

مثلاً نظام التسجيل يساعد الطلاب بعمليات التسجيل

Industry Specific Operations … Cont'd

- Transportation companies rely on information systems equipped with GPS to track their fleets, optimize routes, and conserve gas.
- Companies that buy products from suppliers around the globe need real-time updates on their global supply chains to manage inventories and reduce costs

might be used to manage inventories too.

End of 1st lecture.
16/10/23

Lec 2 18/10/23

Supporting Customer Interactions

أحد أنواع الـ IS

- Customer Relationship Management (CRM) systems, (discussed in Chapter 5), build and maintain relationships and support all the processes that underlie them.
- Identifying each product in the shopper's basket, tallies the total, feeds the data to the inventory system.
- Strategies to prevent theft.
- Web-based shopping and self service:
  - less phone calls
  - Web application helps understanding the motives and desires of each person (suggestions, special discounts, wish list …)

IS خاص ببناء جميع العلاقات مع الـ Supplier أو الـ Customer لإنها عملية صعبة ومعقدة

زيادة المبيعات أو تقليلها أو زيادة التسويق تبعها أو عمل تنزيلات على بضائع معينة بأوقات معينة

ممكن زيادة النزعة الشرائية تبع الـ Customer

IS وظيفة مهمة لأي

Making Decisions

* كل Level من هاي الـ Levels في إله IS خاص فيه يقدم معلومات تستخدم للإداريين كخلفيات لـ Knowledge يتم إستخدامها لإتخاذ القرارات

FIGURE 1-4
How do managers answer questions like these?

Making Decisions … Cont'd

- Managers make decisions every day, and many rely mainly on their own judgment.
  - A survey showed that 40% of major corporate decisions were based on instincts (intuition) → مش مجرد صدفة مبني على خبرة متراكمة
- Good decisions those which are based on data (data-driven decision making)
  - Information systems provides this information.
  - Large number of pieces of data to reveal important trends and patterns.
  - Example: the sales system will show how much the restaurant makes in the last hour of business → manager makes a good decision about closing early.

Making Decisions … Cont'd

أحصل معلومات خارج إطار الـIS إلي عندي

- Business intelligence refers to all the information managers use to make decisions
  - This information can come from many sources beyond the organization's own information systems.
  - The restaurant manager, for example, might combine customer records with publicly available information about income levels by area code to help make a smart decision about where to open another branch.
- Decision support systems and business intelligence, blends rapid analysis of information sources with artificial intelligence and human knowledge.

ممكن يكون في معلومات ولكن أحياناً من الصعب أتحقق من مصدرها مش زي الـIS

ممكن تيجي بطرق التجسس

من الـData Patterns بدي أطلع Trends تساعدني يكون عندي نظرة مستقبلية Predictable شي تساعدني أخذ قرار بالظروف الحالية أو المستقبلية

Collaborating on Teams

فتح مجال واسع العمل
أو الدراسة - أون لاين

- Collaboration and teamwork → Collaborating / team works تعزيز
  - Innovative information systems that allow people to work together at any time and from any place.
  - Participants can hold online meetings, share documents and applications, and interact using microphones, video cameras, and whiteboards.
  - Social networking sites support online communities: Facebook, Twitter …
  - Services that target business users, such as Microsoft's SharePoint, offer additional useful services such as shared calendars and group document editing.

اجتماع الإداريين ممكن من خلال تيمز أو زوم

customer relationship management (CRM) system
An information system used to build customer relationships, enhance loyalty, and manage interactions with customers.

data-driven decision making
Decision making that draws on the billions of pieces of data that can be aggregated to reveal important trends and patterns.

business intelligence External Sources
The information managers use to make decisions, drawn from the company's own information systems or external sources.

social networking sites
Online communities of people who create profiles for themselves, form ties with others with whom they share interests, and make new connections based on those ties.

Improving Individual Productivity

دائماً الـ IS ل يدعم قدرات العمال إلي عندك

- To improve productivity at work, people can choose from a bewildering variety of computer software and electronic devices, but more is not necessarily better.
  - You should select carefully, with an eye to the functions you need most, ease of use, and short learning curves.

* إختيار البرامج إلي هتوظف إلي عندي ممكن إتطور قدرات الموظف إلي عندي

PRODUCTIVITY TIP

Time management experts advise that you process your email inbox to zero, flagging important messages, moving others to appropriate categories, and rerouting some using automated filtering tools. Your email system can do quite a bit of work for you if you take time to configure it.

غالباً الشركات بتطور الـ applications الخاصة فيها

To improve Productivity عشان Variaty عنا of softwares

COMPETITIVE ADVANTAGE

هون بتحدث عن شيء واحد شركة بتنتج سلع ل تكون بـ Quality أفضل وسعر أقل من الباقي وبالتالي إلها ميزة تنافسية

- **Competitive advantage** refers to factors that allow a company to produce goods or services **better** or **more cheaply** than its rivals.
  - Cheaper product = less money going out, more margin.
  - Or cheaper product = more price competitive than rivals, more sales, more money going in, more margin.
  - A better product = more sales, more money going in, more margin.

COMPETITIVE ADVANTAGE

» Consumers are accustomed to yearly advances in
  - devices (smaller, more powerful)
  - services (faster, more reliable)
  - costs that are either lower or services greater for same cost

ال cost إما إتقل للـ services more زي ما هي أو تكون أرخص

Free, Perfect, and Now

أقدم خدمة ببلاش

- Free or delivered at no cost (Twitter, Instagram, Facebook, Google)
- Contain no errors or mistakes, competitive with alternatives

  مافيها أي أخطاء وتقدر تنافس أي Alternative.
- Delivered almost immediately, usable and available 24/7, no wait or downtime

  واصل حالاً والخدمة available دائمة

6 Major Roles of Info sys هيك مرينا على ال

Data

- It is all about data

  Digital data → بتتخزن → in digital devices.
  - Formats of data: numbers, letters, …. or audio, or video signals.
  - Regardless of the initial form, data is converted into digital format.
  - https://www.youtube.com/watch?v=c36M6oJS8sc (what is MIS?)
  - https://www.youtube.com/watch?v=X3paOmcrTjQ (Data Science in 5 mins | Data Science for Beginners | What is Data Science.)

  ال archives وال microfilm → ثورة في علم التخزين — Macro film Info sys

  جميع الجهود إلي بتعتمد على ال AI قائمة على ال Data
- IoT — Internet of things. ← شبكة ال Devices — كيف هاي الأجهزة أو ال Data تتشبك مع العالم
  - It is becoming the main source for data; as billions of devices are connected.
  - https://www.youtube.com/watch?v=WCfwEYaPuDQ

    Internet of Things (IOT) and it's Applications in Manf.

Devices Connected (IoT)

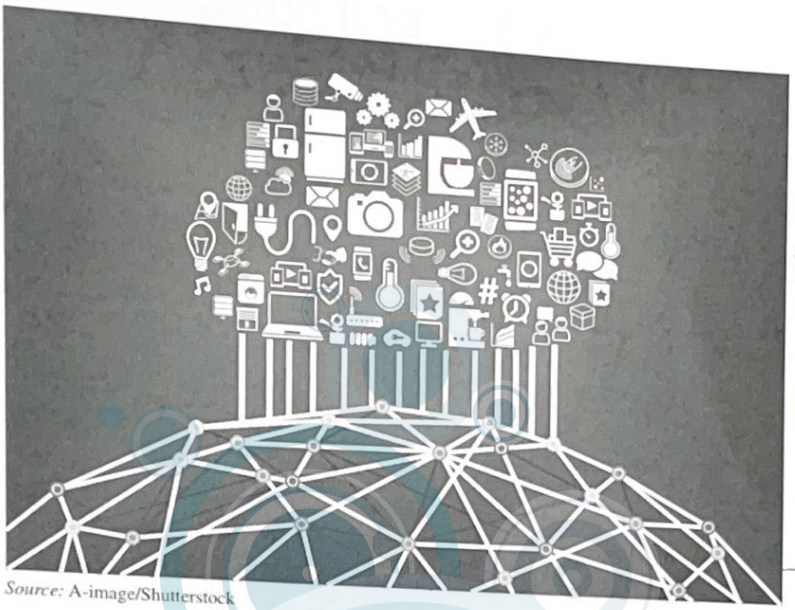


FIGURE 1-13
The Internet of Things.

Source: A-image/Shutterstock

جميع الـ Smart Networks إلي عنا بتعتمد بالدرجة الأولى على الـ Data

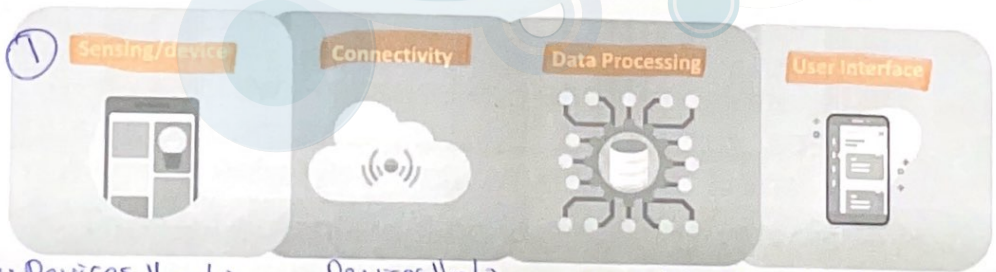
Sharing of Data عملية بتتم من خلال Highly Interconnected Networks مع أجهزة الـ Computer إلي منتشرة حول العالم.

= IOT

جمع الـ Digital Data Stored → تخزين وتأمين

Devices Connected (IoT) طريقة جمع الـ Data

Layers of IOT



هاي الـ Devices ح تجمع لي الـ Data

هاي الـ Devices بتكون Connected مع بعض عن طريق Cloud or Regular network.

بعدين ح يصير عندي Processing لهاي الـ Data من خلال الـ Processors على الأجهزة تبع الـ Computer بتقنيات عالية جداً

المعلومات كلها ح تطلع عندي بالنهاية ح تكون Available for the user w/a user interface.

Information Systems, the Discipline

- The study of information systems: how *people*, *technology*, *processes*, and *data* work together—is a lively discipline involving university faculty, private-sector analysts, government researchers, and more.
- Management Information Systems (MIS): a type of information system that supports decision making at the managerial level

Why do Industrial Engineering learn this topic?

- The field draws researchers and practitioners from business, computer science, psychology, sociology, public administration, and many other fields
  - They all are interesting in creating systems to help organizations do more with less
  - Make companies more competitive, increase productivity.

Topic	Sample Research Questions
Internet of Things	What kinds of devices can be used to collect data? How should the data be used?
Big data and data analytics	How can organizations collect and analyze big data to achieve competitive advantage?
Development of information systems	What are the best ways to develop new software?
IT in organizations	How should end users be involved in the development process? How should managers introduce change when new systems are implemented? What kinds of IT policies about "acceptable use" work best in different organizations?
IT and individuals	How should IT develop systems for the disabled? What kinds of interfaces are easiest for people to use?
IT and collaboration in groups	Why do virtual teams succeed or fail? How can managers use social networking to promote innovation?
IT and markets	How does the Internet affect the real estate business? How should businesses promote online sales?

* جميع الـ Data إلي حوا أنا بجمعها

* ع نحاول نجاوبهم من خلال الـ Course

Why do Industrial Engineering learn this topic?

كونه عني Big Data أنا بحاجة الـ Analytical tools حتى تساعدني أحلل هاي المعلومات

- MIS is a young discipline, and researchers strive to keep up with the rapid changes and trends
  - IoT
    - Generating big data
    - Need analytical tools
  - e-Marketplaces:
    - Threatening traditional players
    - Airbnb (Baycott Israel).
      - booking rooms provided by individuals
      - Competitive
      - Own zero rooms
    - Uber …

Virtual Company.

Big data

Volume of data generated online per second:

- *Emails: 2,314,084 sent*
- *Tweets: 7,231 sent*
- *Instagram: 1,129 images uploaded*
- *Tumblr: 1,352 posts*
- *Skype: 1,473 calls*
- *Internet: 22,148 GB of traffic*
- *Google: 44,490 searches*
- *YouTube: 84,841 videos watched*
- *Facebook: 30,000 likes, 5 new profiles*

Source: How Business Works, 2015, p262-263

من خلال حجم المعلومات
المهول هاد كيف ممكن أوصل
بين ال Data إلي بتهمني؟
بدي محركات وبرامج
هائلة جداً وذكية للغاية

Information Systems throughout the Organization

- The "people" component of information systems is critical; Just making technology work is not enough to create a successful information system.

Most imp component of any org → skilled worker/s
((Skilled workers)) الفرق الأساسي بين IS و IT هو وجود

Information Systems throughout the Organization

- Why should you learn about information systems?
  - "My career is marketing, developing creative ad campaigns. Those IT folks speak their own language, and I speak mine."
  - "I'm in human resources—the only system we use is the one the company set up. It's really a disaster, too. We really need a way to train new people faster, before the ones who have all the knowledge here leave."
  - "We're a nonprofit volunteer organization. We can't spend money on expensive overhead like IT, so what's the point? We don't need anything fancy—just email and word processing."

Information Systems throughout the Organization

- These people don't realize the importance of inf. systems and the individuals who know about it, and how it can contribute to the organization's success

1

Systems, Roles, and Development Methodologies

Systems Analysis and Design, 8e
Kendall & Kendall
Global Edition

Start Oct, 23, 2023
& Rec Oct 30, 2023. until 16:25

53 Slides
52

Learning Objectives

- Recall the basic types of computer-based systems that a systems analyst needs to address.
- Understand how users working in context with new technologies change the dynamics of a system.
- Realize what the many roles of the systems analyst are.
- Comprehend the fundamentals of three development methodologies: SDLC, the agile approach, and object-oriented systems analysis and design .
- Understand what CASE tools are and how they help a systems analyst.

How to Develop an IS From scratch? ← هاد الـ book بركزعلى

Information—A Key Resource

- Fuels business and can be the critical factor in determining the success or failure of a business
  - Needs to be managed correctly
  - Managing computer-generated information differs from handling manually produced data

من مزايا الـ MIS sys ↓ Are ruled & ~~managed~~ by skilled workers, who are Processing the data to produce Knowledge

لا شك إنه هاي الـ info بحاجة لإدارة Management

★ لما نحكي عن MIS sys منحكي عن Info stored بالـ computer technology أحدث

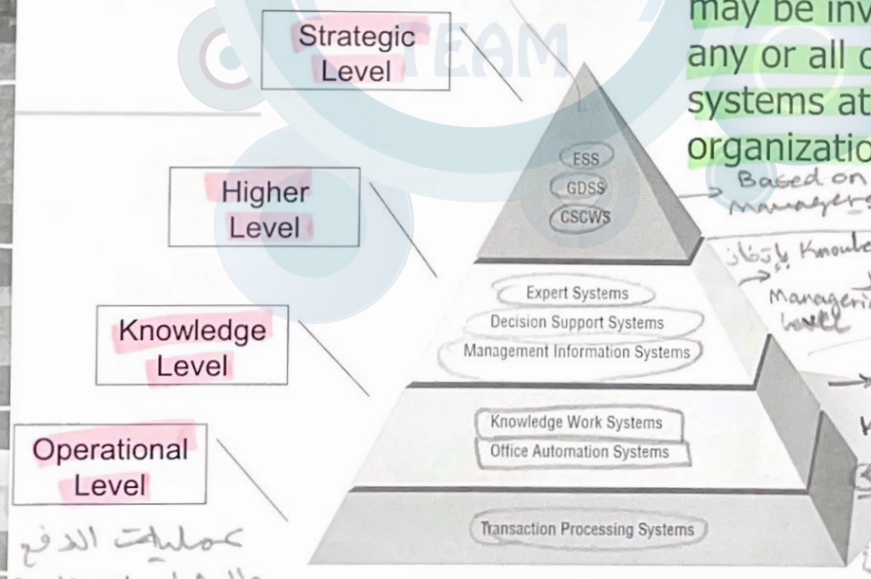
Major Topics

- Fundamentals of different kinds of information systems → تختلف حسب إختلاف الـ level إي بتعامل معه بالشركة Enterprise أو الـ
- Roles of systems analysts
- Phases in the systems development life cycle as they relate to Human-Computer Interaction (HCI) factors
- Computer-Aided Software Engineering (CASE) tools

Systems Analysts Recommend, Design, and Maintain Many Types of Systems for Users

- Transaction Processing Systems (TPS)
- Office Automation Systems (OAS)
- Knowledge Work Systems (KWS)
- Management Information Systems (MIS)
- Decision Support Systems (DSS)
- Expert Systems (ES)
- Executive Support Systems (ESS)
- Group Decision Support Systems (GDSS)
- Computer-Supported Collaborative Work Systems (CSCWS)

A systems analyst may be involved with any or all of these systems at each organization level.



Operational Level

أعمال روتينية عادية

- Transaction Processing System (TPS)
  - Process large amounts of data for routine business transactions
  - Boundary-spanning
  - Support the day-to-day operations of the company
  - Examples: Payroll Processing, Inventory Management

Knowledge Level

يعمل نوع من Office Management
بس من مطلوب عنه ينتج Knowledge.

- Office Automation System (OAS)
  - Supports data workers who share information, but do not usually create new knowledge
  - Examples: word processing, spreadsheets, desktop publishing, electronic scheduling, communication through voice mail, email, teleconferencing

خاص بالإدارة المكتبية
في عمل السكرتارية

share info don't create new.

- Knowledge Work System (KWS)

مختلف عن OAS في same level بس

→ Knowledge ينتج أخطر

  - Supports professional workers such as scientists, engineers, and doctors
  - Examples: computer-aided design systems, virtual reality systems, investment workstations

Higher Level

- Management Information System (MIS)
  - Supports a broad spectrum of organizational tasks including decision analysis and decision making
  - Examples: profit margin by sales region, expenses vs. budgets
- Decision Support System (DSS)
  - Aids decision makers in the making of decisions
  - Examples: financial planning with what-if analysis, budgeting with modeling
- Expert System (ES) and Artificial Intelligence
  - Captures and uses the knowledge of an expert for solving a particular problem which leads to a conclusion or recommendation
  - Researching understanding natural language and the ability to reason through a problem to its logical conclusion

Strategic Level

- Executive Support System (ESS)
  - Helps executives to make unstructured strategic decisions in an informed way
  - Examples: drill-down analysis, status access
- Group Decision Support System (GDSS)
  - Permit group members to interact with electronic support.
  - Examples: email, Lotus Notes
- Computer-Supported Collaborative Work System (CSCWS)
  - CSCWS is a more general term of GDSS.
  - May include software support called *groupware* for team collaboration via network computers
  - Example: video conferencing, Web survey system

كيف ممكن تتم عملية تطوير الـ IS؟

Integrating New Technologies into Traditional Systems

* How to develop IS ?
* كيف ممكن أطور وحتى ممكن أغيره using new technology ؟

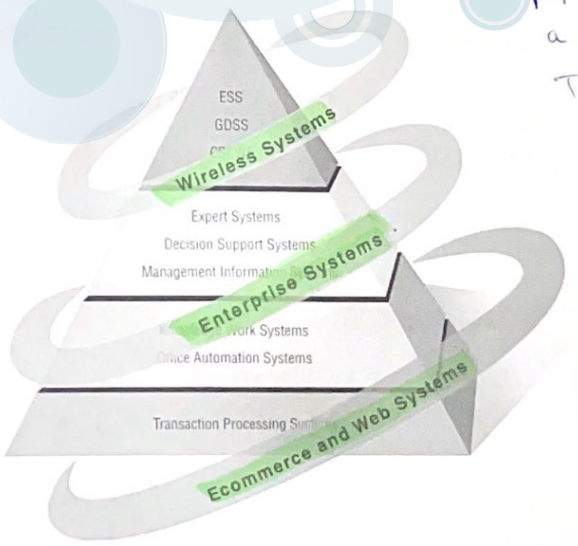
الي هي جزء من Software Engineering

- Ecommerce and Web Systems
- Enterprise Resource Planning Systems ERP
- Wireless and Mobile Systems
- Open Source Software
- Need for Systems Analysis and Design

* التكنولوجيا الحديثة أثرت على كل القطاعات الفنية والتعليمية etc.,

Systems Analysts Need to Be Aware that Integrating Technologies Affects all Types of Systems (Figure 1.2)

* Any IS has to have a major ميزة To adapt قدرته w/ new technologies



الـ IS مكلفة جداً
* هل لازم شغلها يبرر النفقات تبعتها ولا لا؟ المردود تبعها!

Ecommerce and Web Systems

- Benefits
  - Increasing user awareness of the availability of a service, product, industry, person, or group
  - The possibility of 24-hour access for users
  - Improving the usefulness and usability of interface design
  - Creating a system that can extend globally rather than remain local, thus reaching people in remote locations without worry of the time zone in which they are located

Enterprise Resource Planning Systems (ERP)

- Performs integration of many information systems existing on different management levels and within different functions
- Example: SAP, Oracle

Wireless and Mobile Systems

- A system analyst may be asked to design standard or wireless and mobile communication networks that integrate voice, video, and email into organizational intranets or industry extranets.
- A system analyst may also be asked to develop intelligent agents.
- Example: iPhone, iPod, BlackBerry
- Wireless communication is referred to as m-commerce (mobile commerce).

m - Commerce.

Open Source Software

- An alternative of traditional software development where proprietary code is hidden from the users → open source software is NOT
- Open source software is free to distribute, share, and modify.
- Characterized as a philosophy rather than simply the process of creating new software
- Example: Linux Operating System, Apache Web Server, Mozilla Firefox Web Browser

Like GPT's ↓ Revolutionary Development.

معاولة Network من خلال عملاء صلاحيات للـ User بيلاش Marketing

* The heart of the MIS is the Data !
Skilled Worker ذو وظيفة أهم

Need for Systems Analysis and Design

- Installing a system without proper planning leads to great user dissatisfaction and frequently causes the system to fall into disuse.
- Lends (help) structure to the analysis and design of information systems
- A series of processes systematically undertaken to improve a business through the use of computerized information systems

why? how?

Roles of the Systems Analyst

- The analyst must be able to work with people of all descriptions and be experienced in working with computers.
- Three primary roles:
  - Consultant
  - Supporting expert
  - Agent of change

* دائماً عندة رغبة في التغيير نحو الأحسن أو في الـ optimization

Qualities of the Systems Analyst

وظيفته التعامل مع مختلف المشاكل بالشركة!

- Problem solver
- Communicator
- Strong personal and professional ethics
- Self-disciplined and self-motivated

- What is the Methadology that the Sys Analyst will work w/?

Systems Development Life Cycle (SDLC)

أول ما نتعلمها لتطوير Methodology Softwares ال engineering.

- The systems development life cycle is a phased approach to solving business problems.
  ★ different phases & each phase has diff activities.
- Developed through the use of a specific cycle of analyst and user activities
- Each phase has unique user activities.

Systems Development Life Cycle (SDLC)

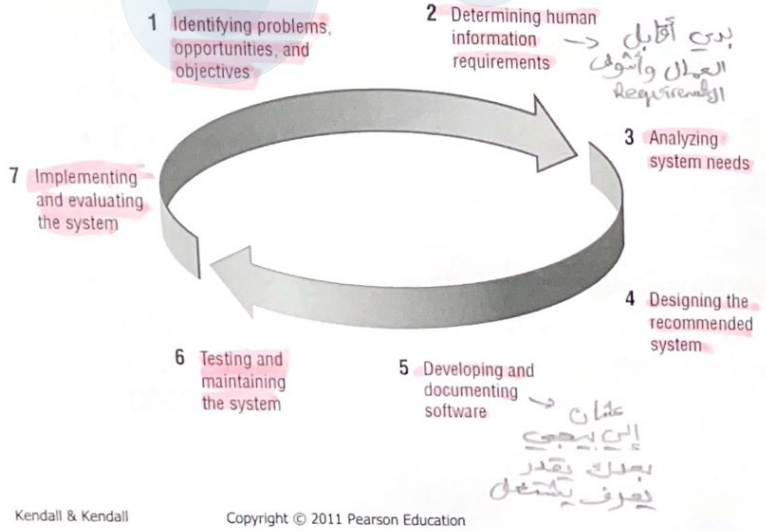
https://www.youtube.com/watch?v=Fi3_BjVzpqk 5:32.

↳ Intro to Software Development lifeCycle | ~~what is~~
what is Software Development | Simplilearn.

* Planning
2 Requirement Analysis
3 Designing.
4 Implementation
5 Testing
6 Deployment

The Seven Phases of the Systems Development Life Cycle (Figure 1.3)

(HCI)
Human Computer Interaction



Incorporating Human-Computer Interaction (HCI) Considerations

- The demand for analysts who are capable of incorporating HCI into the systems development process keeps increasing, as companies begin to realize that the quality of systems and the quality of work life can be improved by taking a human-centered approach at the outset of a project.

will be utilized by skilled workers.

Identifying Problems, Opportunities, and Objectives

- Activity:
  - Interviewing user management
  - Summarizing the knowledge obtained
  - Estimating the scope of the project
  - Documenting the results
- Output:
  - Feasibility report containing problem definition and objective summaries from which management can make a decision on whether to proceed with the proposed project

بيي أحدد الـ Scope ← اللي تبع الـ Proj

تعريف المشكلة والهدف اللي ممكن أحل فيه حل المشكلة

أحسم بي هو الـ Problem Definition

Determining Human Information Requirements

- Activity:
  - Interviewing
  - Sampling and investing hard data
  - Questionnaires
  - Observe the decision maker's behavior and environment.
  - Prototyping
  - Learn the who, what, where, when, how, and why of the current system.
- Output:
  - The analyst understands how users accomplish their work when interacting with a computer; and begin to know how to make the new system more useful and usable. The analyst should also know the business functions and have complete information on the people, goals, data, and procedure involved.

optimize حل ممكن أعمل لعملي الـ Software ؟

Analyzing System Needs

★ هون لازم أفهم الـ System Needs شو إحتياجاته وشو يعمل؟

- Activity:
  - Create data flow, activity, or sequence diagrams.
  - Complete the data dictionary.
  - Analyze the structured decisions made.
  - Prepare and present the system proposal.
- Output:
  - Recommendation on what, if anything, should be done

Designing the Recommended System

بعد الـ Designing ← Needs

- **Activity:**
  - Design procedures for data entry.
  - Design the human-computer interface. → الطريقة كيف الشخص يتعامل مع or GUI Graphical User Interface.
  - Design system controls.
  - Design database and/or files.
  - Design backup procedures.
- **Output**
  - Model of the actual system → Model أولي للدور صورة أولية لا تتغير تتعدل

Developing and Documenting Software

→ Not an option.

use it in Grad Proj.

* كودي بطور Procedures Documentation لازم يكون منظم جيد

- **Activity:**
  - System analyst works with programmers to develop any original software.
  - Works with users to develop effective documentation.
  - Programmers design, code, and remove syntactical errors from computer programs.
  - Document software with help files, procedure manuals, and Web sites with Frequently Asked Questions.
- **Output:**
  - Computer programs
  - System documentation } أهم شغلتين

Testing and Maintaining the System

- Activity:
  - Test the information system.
  - System maintenance.
  - Maintenance documentation.
- Output:
  - Problems, if any
  - Updated programs
  - Documentation

Implementing and Evaluating the System

عملية متواصلة

- Activity:
  - Train users.
  - Analyst plans smooth conversion from old system to new system.
  - Review and evaluate system.
- Output:
  - Trained personnel
  - Installed system

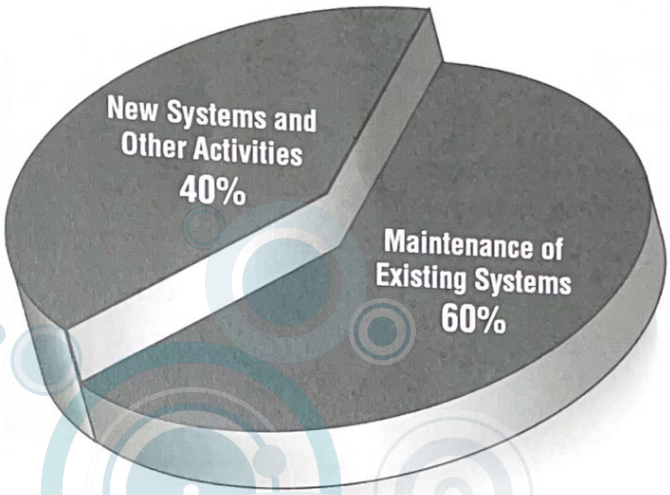
* عملية تغيير الـ Process بتم لما تكلفة الصيانة بتكون أكثر من إني أجيب واحد جديد

BottleNeck

أهم إني أدرب العمال على الاختلافات الأساسية بين القديم والجديد

Some Researchers Estimate that the Amount of Time Spent on Systems Maintenance May Be as Much as 60 Percent of the Total Time Spent on Systems Projects (Figure 1.4)

New 40%



Maintan Existing 60%

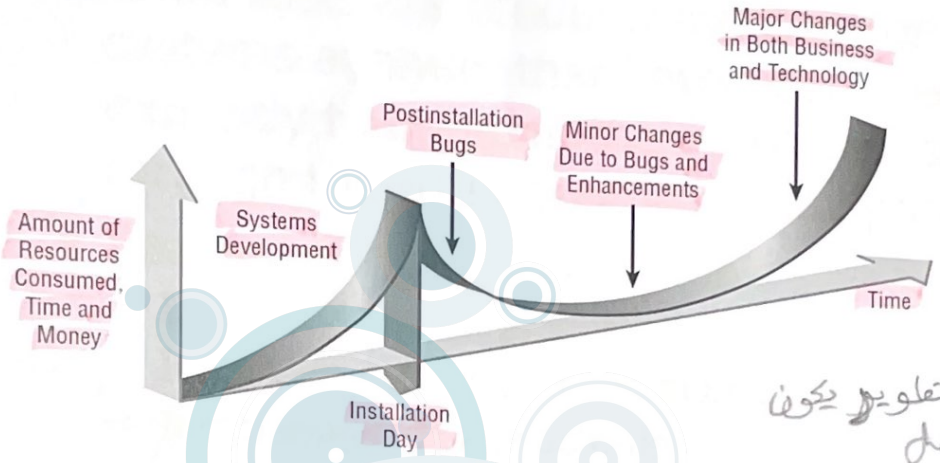
End of lec Oct, 23, 2023

Higher Tendancy to update the softwares, instead of just maintaining them.

The Impact of Maintenance

- Maintenance is performed for two reasons:
  - Removing software errors bugs.
  - Enhancing existing software تطوير
- Over time the cost of continued maintenance will be greater than that of creating an entirely new system. At that point it becomes more feasible to perform a new systems study.

Resource Consumption over the System Life (Figure 1.5)



يلزم التطوير يكون متواصل
متى بتوقف أعمال الصيانة ؟ لما التكلفة
New sys is less then maintenance.

Approaches to Structured Analysis and Design and to the Systems Development Life Cycle

- Traditional systems development life cycle
- CASE systems development life cycle
- Object-oriented systems analysis and design
- AGILE

Computer-Aided Software Engineering (CASE) tools

أي Tools بتساعدني بمجال الـ Computer Software Engineering ممكن أعتبرها CASE Tool

- CASE tools are productivity tools for systems analysts that have been created explicitly to improve their routine work through the use of automated support.
- Reasons for using CASE tools
  - Increasing analyst productivity
  - Improving analyst-user communication
  - Integrating life cycle activities

3I's

Case Tool Classifications

- Upper CASE tools perform analysis and design.
- Lower CASE tools generate programs from CASE design.

بتتعلق بالبرمجة أكثر

Upper CASE Tools

- Create and modify the system design.
- Help in modeling organizational requirements and defining system boundaries.

Lower CASE Tools

- Lower CASE tools generate computer source code from the CASE design.
- Source code is usually generated in several languages.
- Decreases maintenance time
- Generates error-free code

The Agile Approach

philosophy or mindset more then being a Methodology.

- Based on:
  - Values
  - Principles
  - Core practices

Agile Values

- Communication → مرات صعب تحصل عليه → ممكن بنوك معلومات سرية مش بالضرورة تطلع عليها
- Simplicity → صعب تقسم بعض الثقافة لأجزاء بسيطة معقدة
- Feedback → مرات صعب تحصل عليه بكل جزء
- Courage → من خلال الثقة بالنفس من خلال المشاريع → مش الكل بتحلى بالشجاعة وفى نسبة خطورة

4 Resources.

Four Agile Resources

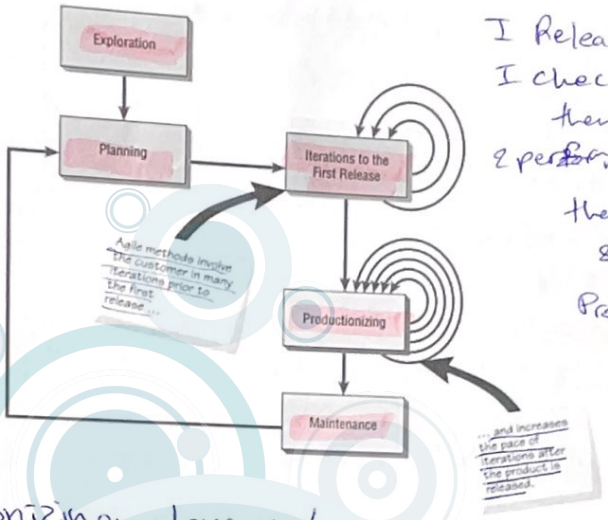
- Resources are adjusted to ensure successful project completion.
  - Time
  - Cost
  - Quality
  - Scope

5 stages.

Five Stages of Agile Development

- Exploration
- Planning
- Iterations to the first release
- Productionizing
- Maintenance

Agile Project Development Process (Figure 1.7)



I Release part of the sys
I check the mistakes
then I enhance them
& perform maintance
then the next part
& the next . . .
Production ... while I'm working on the sys.

Productionizing along w/ ...

more safe approach = SDLC.
sys development Life Cycle.

Agile must have experience
less time than SDLC.
communication simplicity feedback

The Agile Approach

https://www.youtube.com/watch?v=8eVXTyIZ1Hs

What is Agile Methodology?
Intro to Agile M in 6 minutes | Simplilearn.

Downtime: A specific timeframe allocated to deploy or changes for a software product in real time environ.
Most softwares used are developed using waterfall model.
like CISCO → Agile → SBP ← waterfall
Agile was introduced to overcome the downfalls or problems of the waterfall model.
↳ breaking the process into micro services or phases which is faster to execute.

Object-Oriented (O-O) Systems Analysis and Design

- Alternate approach to the structured approach of the SDLC that is intended to facilitate the development of systems that change rapidly in response to dynamic business environments
- Analysis is performed on a small part of the system followed by design and implementation.
- The cycle repeats with analysis, design, and implementation of the next part and this repeats until the project is complete.
- Examines the objects of a system

Object-Oriented (O-O) Systems Analysis and Design

https://www.youtube.com/watch?v=A38y7OO8OK4

object oriented Concepts 6:49

OOPS → refers to objects in programming rather than sequence of function.

Very Combine together Data & the functions/methods that operate on them in an obj so that no other part of the code can access this data.

Class: User defined blueprint or prototype from which objects are created. Represents the set of properties or methods that are common to all objects of one type. User defined data types.

faster to execute or apply changes on the go.

No need to worry about other or previous tasks while working on ~~one~~ particular phase avoiding product failure.

Agile based products dont require any time frame to deploy changes. unlike waterfall.

* waterfall sys same as SDLC

How are Agile based products developed?

Using Agile life cycle

1 developed working product is implemented in actual working envi for reviews from clients & stakeholders to check deliverabl

2. After client reviews the official prod is launched. in a real-time working environment.

Where agile methodology focuses on satisfying the consumer needs by ~~efficiently~~ effectively utilizing the resources and avoiding additional risks or deviations in the prod.

Ex: Providing trial beta version for user to experience the software. } helpful in refining & reviewing the prod.

Agile → flexibility & advantages to the sys. & efficiency.

↳ aims to meet consumers requirements to the MAX. & deploying changes in a rapidly developing environ.

إذا كان كل جزء لا يعتمد على
وإلى بعدي يكمن الـ SDLC

Example of OO Language

Unified Modeling Language (UML) Phases

Using features of OO
ممكن أقسم هاد الـ model لمجموعة داخلية Designs زي الـ objects وهاي الـ Designs ممكن فيها inherited features لـ Designs أصغر

- Define the use case model:
  - Use case diagram
  - Use case scenarios
- Create UML diagrams.
- Develop class diagrams.
- Draw statechart diagrams.
- Modify the UML diagrams.
- Develop and document the system.

ممكن أقسم الـ Proj لأجزاء inherited ولكن لا تعتمد على بعض

Choosing a Method

- Choose either:
  - SDLC
  - Agile
  - Object-oriented methodologies

itself has no space

then space will be made for it.

Define Class & what's included in it?

Syntax:

modifier class <classname>

{

Data Members;

Member Functions();

}

Example

public class Circle

{

float radius; } Data

String color;

Find Area();

Find Perimeter(); } Metho

Set color();

}

You create an object by specifying the class name.

Data

Class Variables

Instance Variables

State.

Functions

Class Methods

Instance Methods

Behavior

Objects interact w/ each other through methods sometimes called Message Passing.

---

4 Key concepts of OOP

1 Encapsulation 2 Abstraction

3 Inheritance 4 Polymorphism

1. Encapsulation: Binding/wrapping of code & Data together into a single unit is known as encapsulation.

Data in Class is hidden in encapsulation so also known as Data Hiding.

Access Restrictions by Access specifications → Public, Private, Protected

brings us to

2. Abstraction: is the property by which you hide the complexity of working inside an object & only the essential Details are exposed to the user.

the non essential units are displayed to the user.

We use Abstract class & abstraction to achieve abstraction.

3. Inheritance: Family tree, OO Languages allow new classes to be formed by inheriting features of a base class. 1. One obj aquires the properties & behaviors of a parent object. 2. Also provides code reusability. Ex; class = shape → circle, triangle, square.

4. Polymorphism: having many forms. Humans have diff blood groups → O, A, B, AB

Similarly in Java → Method over loading → multiple methods under same name

→ Method over riding → the derived class can use Base class method or have it's own method implementation, which will override the Base class function.

Simplifies the usage of object methods by external code & java takes care of calling the right method w/ the help of the signature & declaration on these entities.

When to Use SDLC ?

More safe
More documented
time frame زيد

- Systems have been developed and documented using SLDC.
- It is important to document each step.
- Upper level management feels more comfortable or safe using SDLC.
- There are adequate resources and time to complete the full SDLC.
- Communication of how new systems work is important.

When to Use Agile ?

- There is a project champion of agile methods in the organization.
- Applications need to be developed quickly in response to a dynamic environment.
- A rescue takes place (the system failed and there is no time to figure out what went wrong).
- The customer is satisfied with incremental improvements.
- Executives and analysts agree with the principles of agile methodologies.

When to Use Object-Oriented

- The problems modeled lend themselves to classes.
- An organization supports the UML learning.
- Systems can be added gradually, one subsystem at a time.
- Reuse of previously written software is a possibility.
- It is acceptable to tackle the difficult problems first.

ما ببدي من فراغ سواء بال Agile أو بال SDLC بعكس ال
يفضل إذا بدي أطور
toys from scratch
والي بيشتغلوا عليه
حد بخلي أستخدم
SDLC.
عندهم
الفرق
يشتغلوا
لساعات طويلة
بس ما عندهم
خبرة

Summary

- Information is a key resource.
- Systems analysts deal with many types of information systems.
- Integration of traditional systems with new technologies
- Roles and qualities of the systems analyst
- The systems development life cycle
- CASE tools
- Agile systems development
- Object-oriented systems development

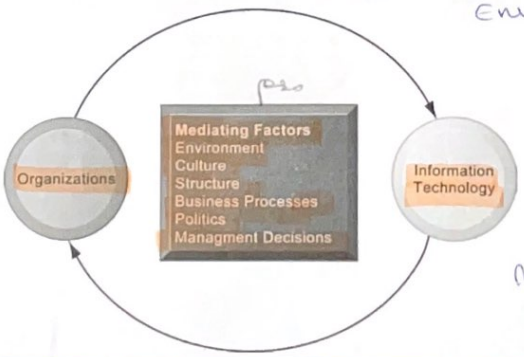
Information System Management (MIS)

Chapter Three:
Information Systems Organization and Strategy

Dr. Baha'eddin Alhaj Hasan
Department of Industrial Engineering

Information Systems and Organizations

- The interaction between information technology and organizations is complex and is influenced by many mediating factors.



The Two-Way Relationship between Organizations and Information Technology

What Is an Organization?

- **Technical definition**
  - Formal social structure that processes resource from environment to produce outputs
  - A formal legal entity with internal rules and procedures, as well as a social structure

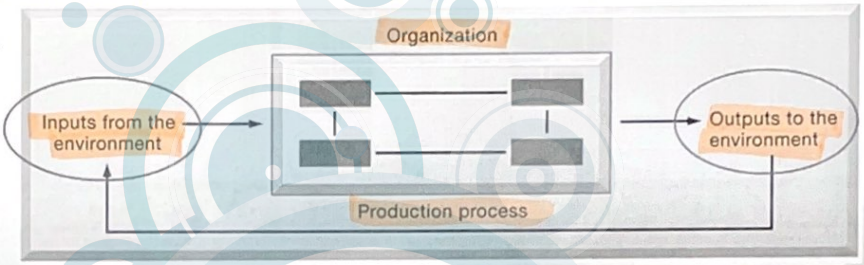


Figure 3.3 The Behavioral View of Organizations

Behavioral definition

A collection of rights, privileges, obligations, and responsibilities that is delicately balanced over a period of time through conflict and conflict resolution

Common Features of Organizations

- All organizations have some similar "structural" features:

should have internal rules & Procedures.

- ✓ Clear division of labour
- ✓ Hierarchy → بناء هرمي
- ✓ Explicit rules and procedures
- ✓ Impartial judgments → قانون عمل يتم تطبيقه بعدل → HR's.
- ✓ Technical qualifications for positions
- ✓ Maximum organizational efficiency → كم ممكن أحقق من هاي الـefficiency بالوضع الراهن

كم بتفت عدد الموظفين وكفاءتهم

Routines and Business Processes

Business firms/orgs → Business Process → Routines.

- Routines are patterns of individual behavior.
- Business processes are a collection of routines. → sub process. لعملية إعطاء القروض أو رفضها
- Business firms are a collection of business processes.
- Business processes enable organizations to cope with all recurring expected situations.

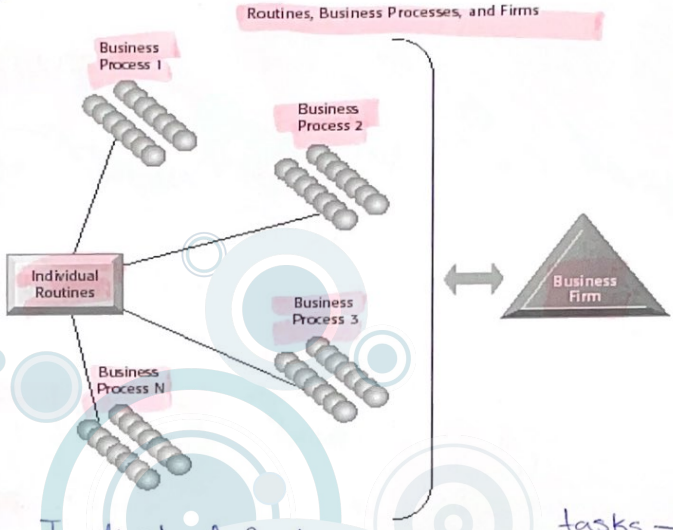
جزء من العمليات التي يتم إنجازها داخل أي org. → Can be sub Business Process or work behaviors or actions.

it's efficiency to cope w/ جميع التغيرات non-expected و expected

Routines, Business Processes, and Firms

في عملية التدريب للاكثر
في عملية التسجيل
Individual behavior

تغيرات بال



Individual Routines.
Social structure = humans.

tasks → actions.

Organizational Culture

what? How? where? For whom?

يعتمد بالدرجة الأولى على الـ Products

- What products the organization should produce
- How and where it should be produced
- For whom the products should be produced

كثير بحدد الـ culture إلي بدي ياها

for an org to be called an organization it has to have unique features & Aims, Goals & objectives

Unique Features of Organizations

- Structures ✓
- Goals ✓ & Aims & Objectives.
- Constituencies → قوانين وتشريعات — Privilages. أتعهد بواجباتي وحقوقي
- Leadership styles → نوع من القيادة إلى الجميع بنطاخ إلها غصباً أو رغبةً
- Tasks →
- Surrounding environments

Organizations and Environments

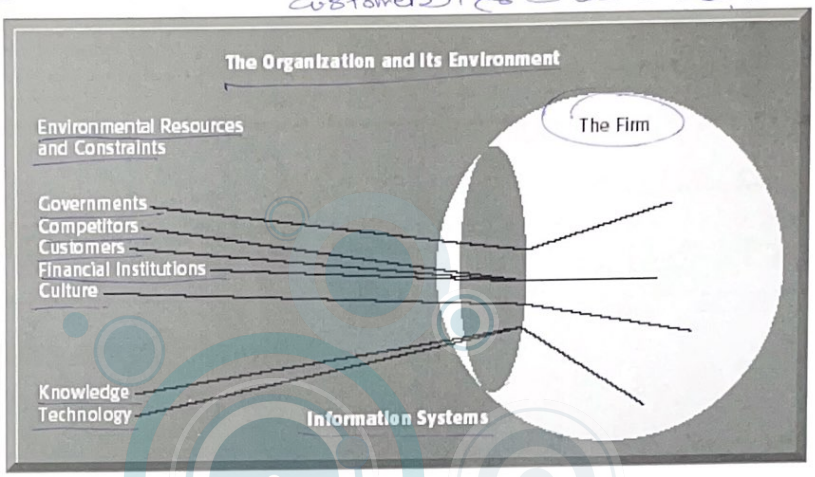
الـ org بتتأثر من Socially & Culturally الـ Physical enviroment اللي حوالين
Org → People Structure.

- Organizations and environments have a reciprocal relationship. ↓ org ↑ environ.
- Organizations are open to, and dependent on, the social and physical environment.
- Organizations can influence their environments.

* رعاية طبية ورياضة أطفال و Gym * بناء مناطق وبيوت للعمال

Organizations and Environments

filter أو lens أو Interface
customers



Knowledge adaptation.

Mac germany doesn't serve the same menu as Jo.
Like they serve pork we don't
You can't serve beef in India because they bow to the cow

Organizations and Environments

Mutual effects between environ & orgs.

- Environments shape what organizations can do, but organizations can influence their environments and decide to change environments altogether.
- Information technology plays a critical role in helping organizations perceive environmental change and in helping organizations act on their environment.

Other Differences Among Organizations

- Ultimate goals
- Different groups and constituencies
- Nature of leadership
- Tasks and technology

Organizing the IT Function

The information systems department is responsible for maintaining:

- Hardware
- Software
- Data storage
- Networks

Information Technology Services

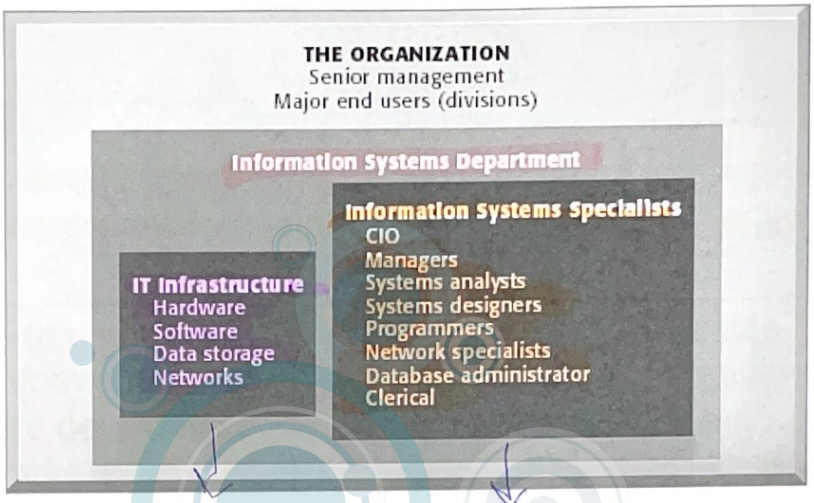


Figure 3-6

IS = Interaction between 2 structures

IT structure People structure → qualified human components = most imp components in the system.

Info Sys.

Information Technology Services

Includes Specialists:

- Programmers: Highly trained, writers of the software instructions for computers
- Systems analysts: Translate business problems into solutions, act as liaisons between the information systems department and rest of the organization
- Information system managers: Leaders of various specialists

Information Technology Services

Includes Specialists: (Continued)

- Chief Information Officer (CIO): Senior manager in charge of information systems function in the firm
- End users: Department representatives outside the information system department for whom applications are developed

مجرد عاملين → أي الموظفين بالجامعة ← بعرفوا يستخدموا الكمبيوتر لكن مش هيعرفوا طوروا

Economic Impacts

جزء أساسي من عملية الإنتاج

- IT changes both the relative costs of capital and the costs of information.
- Information systems technology is a factor of production, like capital and labor.

★★ essential factor of Production

★ عناصر ★

End of Rec
Oct 30, 2023

Economic Impacts

- **Transaction cost theory:** Firms seek to economize on the cost of participating in markets (transaction costs). → تكلفة التشغيل
- IT lowers market transaction costs for firm, making it worthwhile for firms to transact with other firms rather than grow the number of employees.

IT بطرح حلول ممكن يتم من خلالها تقليل أو المحافظة على transaction costs بسيطة عن طريق إستثمار بموظفين للعمل معها مثل كموظفين أساسيين عن طريق التعاون other firms. مع

BY THE NUMBERS

Transform How Data Drives Decisions

Dynamic Workplace Intelligence is designed to empower a businesses' digital transformation. Why is this critical for you and your customers?

87%

87% of companies believe that **digital transformation is a competitive opportunity.** *(CapGemini)*

85%

85% of enterprise decision makers feel they have **two years to make significant inroads on their digital transformation** before falling behind their competitors. *(LinkedIn)*

88%

88% of firms are using **third-party providers** for at least one component of their digital transformation. *(Accenture)*

$17.3B

Worldwide business workflow **automation and optimization market** is expected to grow to $17.3B by 2022 at 11.1% CAGR. *(Worldwide Business Workflow Automation and Optimization Forecast, 2018-2022)*

30%

The biggest **competitive advantage** for 30% of organizations will be the ability to creativity **exploit digital technologies.** *(Gartner MarketGuide for Managed Print Services in the Digital Marketplace)*

لما أشتغل عن بعد
هاي نوع من أنواع الـ automation

The Transaction Cost Theory of the Impact of Information Technology on the Organization

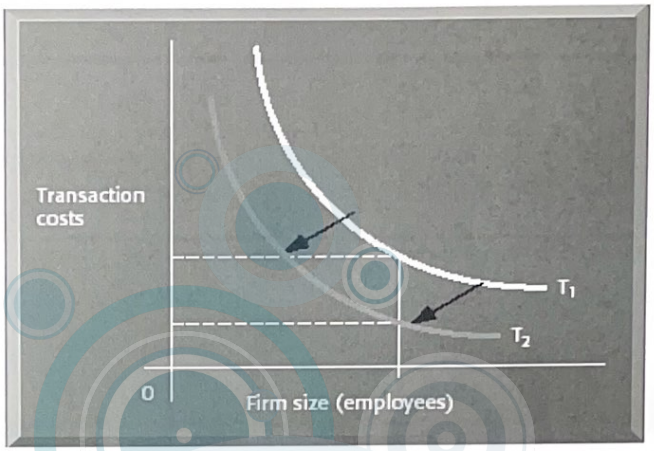


Figure 3-7

ITال عن طريق Transaction الـ cost ممكن تقليل
ممكن أختصر من الـ Firm size. وأقلل من عدد الموظفين
أزيد الكفاءة بدون عدد موظفين كبير!

Economic Impacts

- Agency theory: Firm is nexus of contracts among self-interested parties requiring supervision.
- Firms experience agency costs (the cost of managing and supervising).
- IT can reduce agency costs, making it possible for firms to grow without adding to the costs of supervising, and without adding employees.

The Agency Cost Theory of the Impact of Information Technology on the Organization

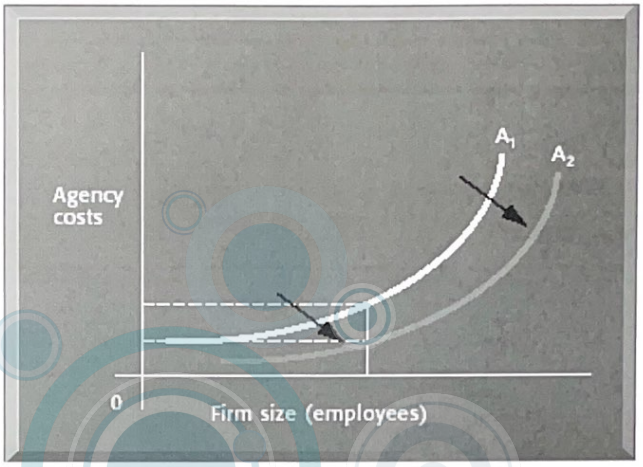


Figure 3-8

* كون قللت Agency cost وعدد الموظفين عن طريق الإستثمار بالـ IT

Organizational and Behavioral Impacts

IT Flattens Organizations:

وح أطول تقليل الـ Hierarchy وتوزيع أفضل للعمل

- Facilitates flattening of hierarchies
- Broadens the distribution of timely information
- Increases the speed of decision making

مواقفات سريعة من الموظف

- Empowers lower-level employees to make decisions without supervision and increase management efficiency
- Management span of control (the number of employees supervised by each manager) will also grow.

Flattening Organizations

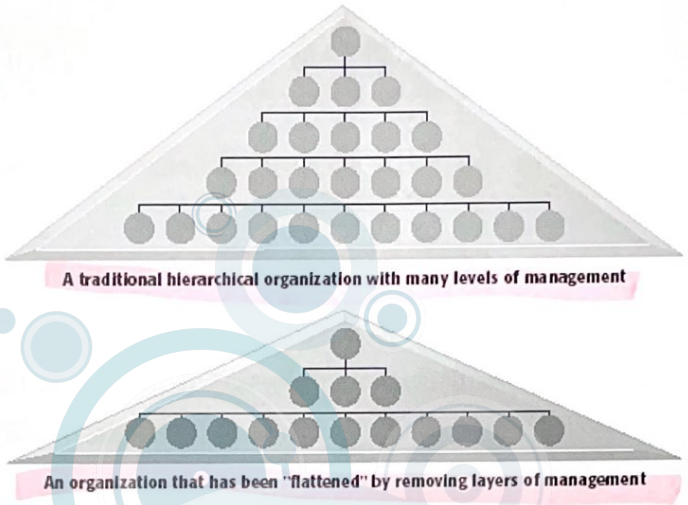


Figure 3-9

Postindustrial Organizations and Virtual Firms

Postindustrial Organizations:

- Authority increasingly relies on knowledge and competence.
- Information technology encourages task force-networked organizations.

Postindustrial Organizations and Virtual Firms

Virtual Firms: → شغلها بتم عبر الـInternet كلياً أو جزئياً

- Use networks to link people, assets, and ideas
- Can ally with suppliers, customers to create and distribute new products and services
- Not limited to traditional organizational boundaries or physical locations بتوصلني للعالمية

How Information Systems Impact Organizations and Business Firms

Increasing Flexibility of Organizations: قدرة الشركة على التكيف مع التغييرات

- Information systems give both large and small organizations additional flexibility to overcome the limitations posed by their size.
- Small organizations use information systems to acquire some of the muscle and reach of larger organizations.

الـ Virtual part تكلفته قليلة وممكن يضاعف من قدرة Firm الـ

How Information Systems Impact Organizations and Business Firms

① Increasing Flexibility of Organizations: (Continued)

رشاقة والقدرة على رد الفعل السريع

- Large organizations use information technology to achieve some of the agility and responsiveness of small organizations. تتغلب على البيروقراطية Beaurocracy

- Customization and personalization: IT makes it possible to tailor products and services to individuals.

عن طريق الـ Websites ممكن
To customize products depending on the orders.

How Information Systems Impact Organizations and Business Firms

② Understanding Organizational Resistance to Change:

ممكن يكون في مقاومة للتغيير

- Information systems become bound up in organizational politics because they influence access to a key resource.

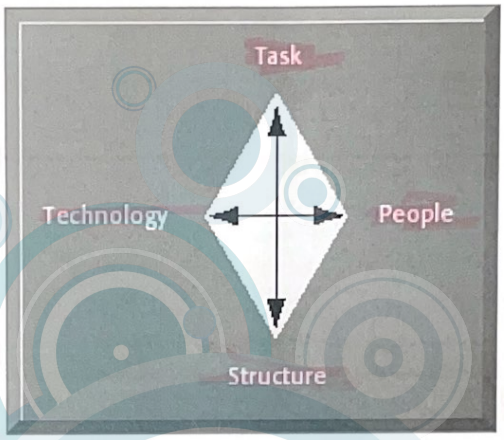
- Information systems potentially change an organization's structure, culture, politics, and work.

- Most common reason for failure of large projects is due to organizational and political resistance to change.

① ②

How Information Systems Impact Organizations and Business Firms

Organizational Resistance and the Mutually Adjusting Relationship between Technology and the Organization



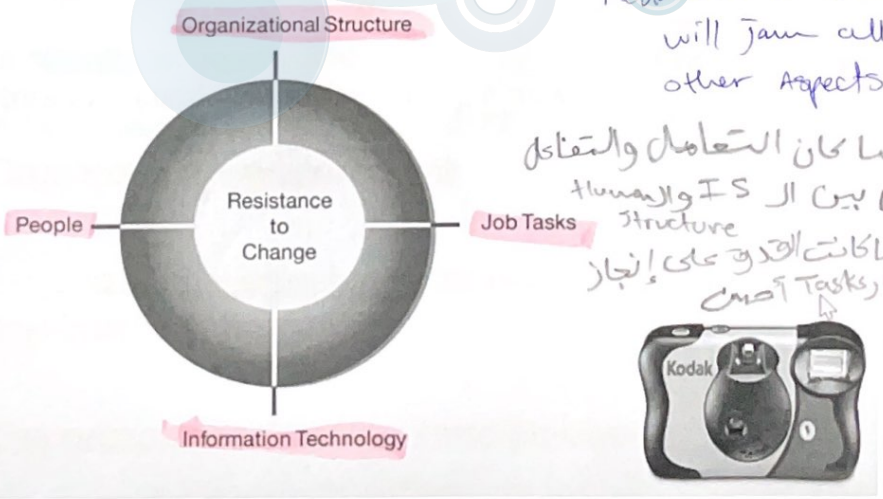
هل إدارة الشركة مع التغيير أو لا ؟
Kodak - ما واجهت التغييرات وخسرت عشان الإدارة ما تخسرت

Source: Reprinted by permission of James G. March.

Figure 3-10

How Information Systems Impact Organizations and Business Firms

تغيير الإدارة والقيادة



Resistance to changes will jam all the other Aspects.

كل ما كان التعامل والتفاعل سلس بين الـ IS والـ Structure كل ما كانت الأدوار على إنجاز الـ Tasks أحسن

How Information Systems Impact Organizations and Business Firms

The Internet and Organizations

- The Internet increases the accessibility, storage, distribution of information and knowledge for business firms.
- The Internet lowers the transaction and agency costs of firms.
- Businesses are rapidly rebuilding their key business processes based on Internet technology. Example: online order entry, customer service, and fulfillment of orders.

The Impact of IT on Management Decision Making

Implications for the Design and Understanding of Information Systems

Factors to consider while planning a new system:

- Organizational environment
- Organizational structure, hierarchy, specialization, routines, and business processes
- The organization's culture and politics

The Impact of IT on Management Decision Making

- The type of organization and its style of leadership
- Groups affected by the system and the attitudes of workers who will be using the system
- The kinds of tasks, decisions, and business processes that the information system is designed to assist

★ طبيعة تأثير الIT على management Decision making.

* MIS is an interface between business & IT

* كفاءة العنصر الإنساني بتحدد كفاءة الـ sys.

The Impact of IT on Management Decision Making

Characteristics to be kept in mind while Designing Systems:

★ أي sys بيعتمد على طبيعة الناس إلي رح تحلل المعلومات

- Flexibility and multiple options for handling data and evaluating information
- Capability to support a variety of management styles, skills, and knowledge
- Capability to keep track of many alternatives and consequences
- Sensitivity to the organization's bureaucratic and political requirements

★ على أي مستوى بدي أساعد في إتخاذ القرار؟

أي IS لازم يكون عبارة عن قرون باستشعار الـ org ← يطرح Alternatives ويعطي Consequences

End of Nov 1 Lec.

The Impact of IT on Management Decision Making

Business strategy decisions of the firms will determine the following:

- The products and services a firm produces
- The industries in which the firm competes
- Competitors, suppliers, and customers of the firm
- Long-term goals of the firm

Start Reclec
Nov 5/6, 2023

Information Systems and Business Strategy

Business-Level Strategy: The Value Chain Model

The most common generic business level strategies are:

أهداف الـ Business
1. أقل يكون سعري
2. أنوع البضائع غيري
3. القدرة والـ flexibility كي تغير المنافسة

أختص بنوع أو جزء إلي بعمله

- Become the low-cost producer
- Differentiate your product from competitors' products
- Change the scope of competition by enlarging the market or narrowing it to a specialized niche

enlarge or narrow your market or niche.

الهدف أقل تكاليف الإنتاج وزيادة الـ Profit margin

Information Systems and Business Strategy

Value Chain Model:

- Highlights the primary or support activities that add business value
- A good tool for understanding strategy at the business firm level

Primary Activities:

- Directly related to the production and distribution of a firm's products or services

Ex: Marketing & Sales

Information Systems and Business Strategy

Support Activities:

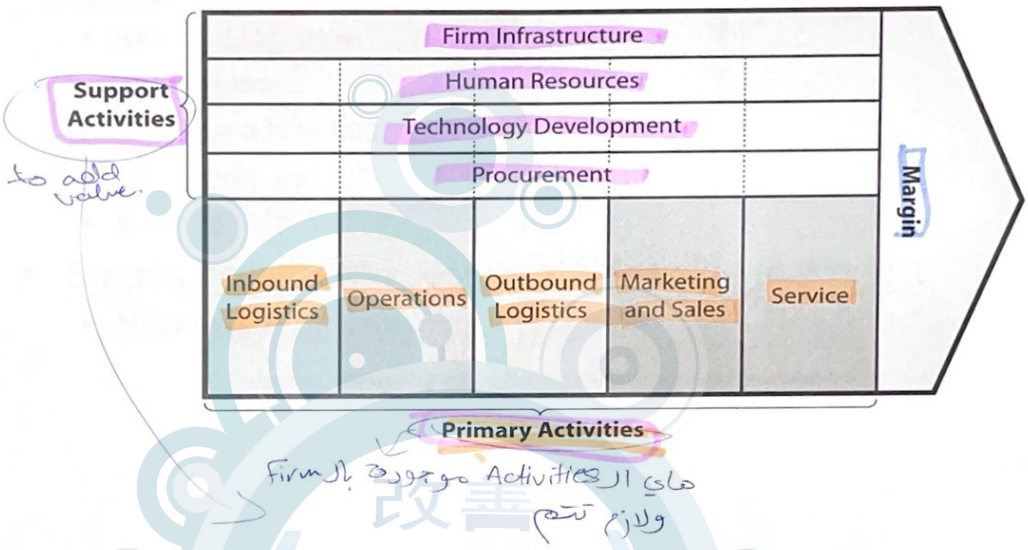
- Make the delivery of primary activities possible
- Consist of the organization's infrastructure, human resources, technology, and procurement

1 infrastructure
2 Human Resources
3. Technology
4. Procurement

HR dept

Value Chain

Activities لمساعد على إتمام ال
Profit وزيادة ال
Margin.



Firm موجودة بال Activities هاي ال
ولازم تتم

What Is a Value Chain?

- Network of value-creating activities
- Primary activities
- Support activities
- Linkages

Primary Activities

- Five activities
  - Inbound logistics
  - Operations
  - Outbound logistics
  - Marketing and sales
  - Service
- Stages accumulate costs and add value to product
  - Net result is total margin of chain

Support Activities

- Four activities
  - Firm infrastructure
  - Human resources
  - Technological development
  - Procurement
- Contribute indirectly to production, sale, and service
- Add value and costs
  - Produce margin that is difficult to calculate

Linkages →

العمليات
cross functional/
between different
activities
Primary or support.

* Linkages للتحسين وهو
Cross functional
Business Process يجمع الأنشطة

- Interactions across value activities
- Sources of efficiencies
- Readily supported by information systems
- Reduce inventory costs

the flow of ← يعزز
the value-added
products.

Benefits of value chains

- Support decisions for various business activities.
- Diagnose points of ineffectiveness for corrective action.
- Understand linkages and dependencies between different activities and areas in the business. For example, issues in human resources management and technology can permeate nearly all business activities.
- Optimize activities to maximize output and minimize organizational expenses.
- Potentially create a cost advantage over competitors.
- Understand core competencies and areas of improvement.

Information Systems and Business Strategy

The Firm Value Chain and the Industry Value Chain

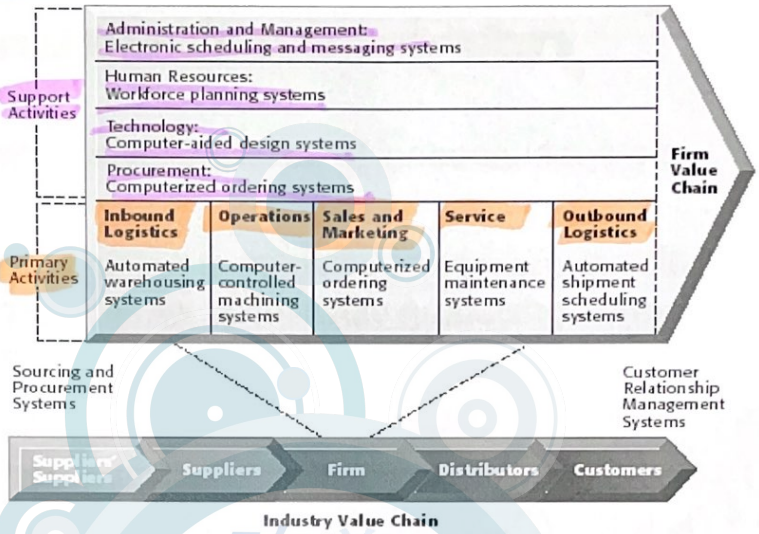


Figure 3-11

Information Systems and Business Strategy

Strategic question:

- How can IT be used at each point in the value chain to lower costs, differentiate products, and change the scope of competition?

إلى حد الأهداف الثلاثية
إلى تحدثنا عنها

Information Systems and Business Strategy

Value Web:

Internet-enabled Web of cooperating firms

- Customer-driven network of independent firms
- Uses information technology to coordinate value chains of separate firms for collectively producing a product or service

Information Systems and Business Strategy

The Value Web

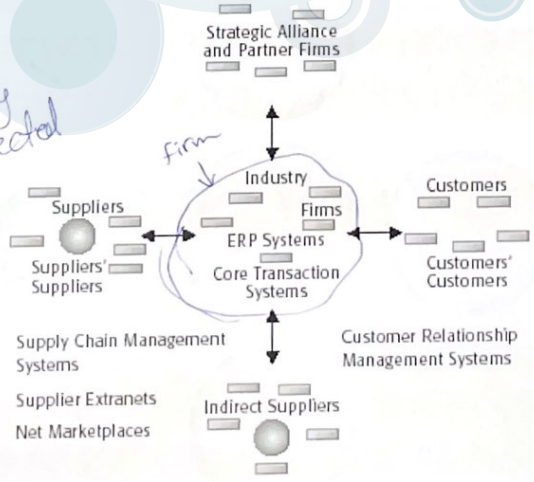


Figure 3-12

Information Systems and Business Strategy

Information Systems Products and Services

Systems that Create Product Differentiation:

* تفضيل أو ولاء أو حب الـcustomers الـProducts الي بعملها

- Firms can use IT to develop differentiated products.
- Create brand loyalty by developing new and unique products and services تنويع بالـProds و الـservices
- Product and services not easily duplicated by competitors

Examples: Dell, Orbitz

Information Systems and Business Strategy

Systems that Support Focused Differentiation:

How does IT & IS support Product differentiation?

- Uses intensive analysis of customer data to support new ways of contacting and serving the customer

Analysis عن طريق الـ of the Customer Data.

- Enables development of new market niches for specialized products or services
- A niche market is a segment of a larger market that can be defined by its own unique needs, preferences, or identity that makes it different from the market at large.

Information Systems and Business Strategy

Porter's Five Forces Model

In the larger environment, there are five main forces or threats:

- New market entrants
- Substitute products and services
- Suppliers
- Customers
- Other firms competing directly

Information Systems and Business Strategy

Porter's Competitive Forces Model

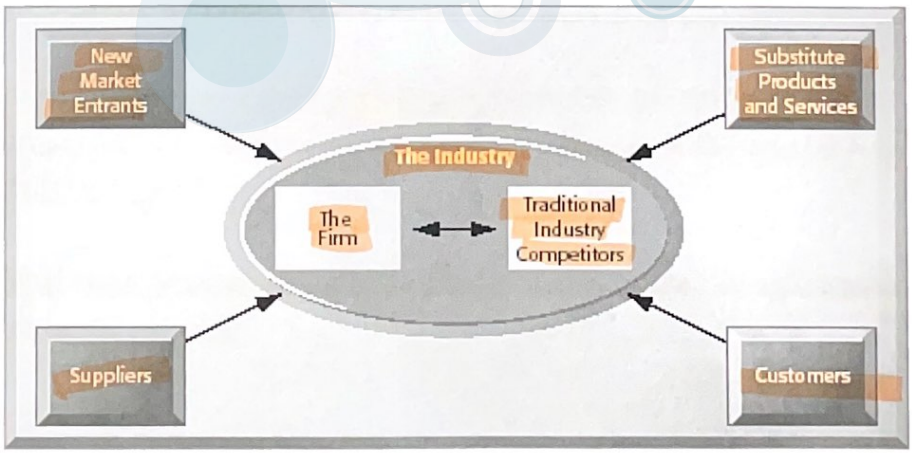


Figure 3-15

Information Systems and Business Strategy

IT and the Internet can greatly change the strength of these competitive forces:

- Encourage new entrants. Example: NetFlix (offers thousands of movies and TV shows for a flat monthly rate) vs. Blockbuster (a pay-per-view video-on-demand service (you rent or buy each title individually)
- Increase customer bargaining power. Example: Expedia.com (travelling agency) and others.

التكنولوجيا صبت في مصلحة الـ Customers
لكن قلت من الـ Supplier Power

Information Systems and Business Strategy

IT and the Internet can greatly change the strength of these competitive forces: (Continued)

- Decrease in supplier power. Example: eCampus.com increases the efficiency of used textbook market, reducing publisher profits

Textbooks ?
e-book's

- Substitute products. Example: online music lowers value of record stores

قدرة على التخزين
أعلى

How is Porter's Value Chain Used?

1. To Design a competitive Strategy
2. Identify areas to obtain competitive adv. over competitors for instance.
   - JIT inventory sys could give cost advantage (Inbound logistics).
   - Using Skilled Craftsmen could give quality adv. (Operations)
   - Outsourcing delivery could help give cost adv. (outbound logistics).
   - Centralised purchasing could give cost adv. (Infastructure).

2nd Video:-

Value chain is a set of activities that an org carries out to create Value for its customers.

Porter's Value Chain focuses on systems & how inputs are changed into the outputs purchased by consumers using primary & support activities.

Porter's value chain: strategic tool or model used for internal analysis of a firm
How are various activities performed by an organization? Add or don't add value?
The value chain model. → A model of value activities.
↓
Procure inputs
Process inputs
Add value to them
To generate outputs for customers
& the Relationship between those activities.

https://www.youtube.com/watch?v=fO4hzG4u3-Q
Porter's Value Chain. (5:49)

https://www.youtube.com/watch?v=QU3dRhXmC_8
Macdonald's value chain.

End of Nov
5/6, 2023
Rec Lec.
49:50.

Start Nov 8, 23
34:05

* الهدف الأساسي لأي IS في أي org يساعد بتحقيق أهداف الشركة إلى عنيق سواء على المدى القريب أو المدى البعيد

Organizational Strategy

& How the IS can affect the Org Strategy
→ يلعبون أهداف الشركة على المدى المتوسط والبعيد

- Determines organization's goal and objectives
- Developed from organizational structure
- Creates the value chain for organization
- Establishes the structure, features, and functions of information systems

زي الـ IS بساهم في تحقيق أهداف الشركة
هو فعليًا بساهم في عملية إعادة صياغة جميع الـ Business Process إلي بتعملها الشركة لتحقيق الأهداف تبعها

زي ما بساهم بتشكيل الـ IS ↓ مع أهم مصادر المعلومات

الهدف الأساسي لأي org is to add competative strategy.

What Is Competitive Strategy?

- Organization's response to structure of its industry structure:
- The structure of the industry refers to the nature of barriers to entry and competitive dynamics in the industry.
- Four characteristics of industry structure are particularly important to the performance of new firms in the industry:
  - ✓ Capital intensity
  - ✓ Advertising intensity,
  - ✓ Concentration,
  - ✓ Average firm size.

هاي الـ Industrial structure ممكن يكون مقياس لـ Performance firm أي

ترتيز رأس المال

Organizational Strategy

الهدف تبع يكون عشي

- Porter identified four competitive strategies:
  - Cost leadership across industry
  - Cost leadership focused on particular industry segment
  - Differentiation across industry
  - Differentiation focused on particular industry segment
- Porter says goals, objectives, culture, and activities must be consistent with strategy

→ to add competitive advantage.

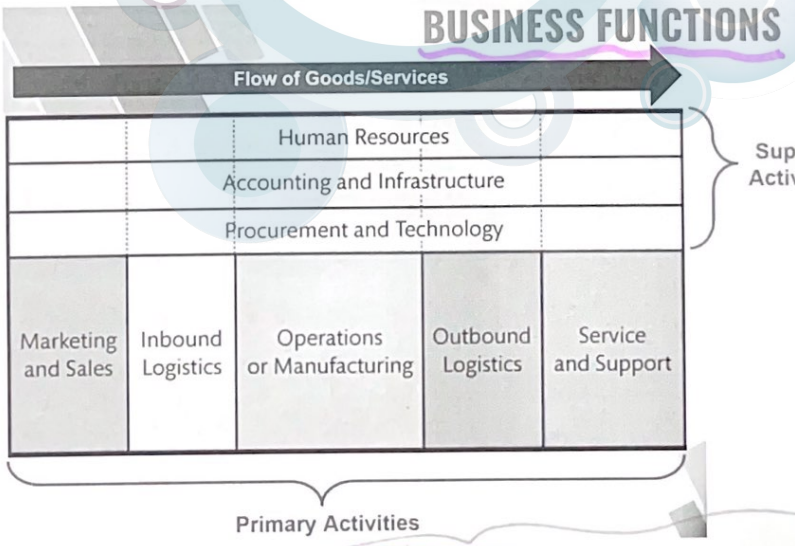
Competitive adv/strategy: → لهم الـ Strategy بشغلين أكون متخصص بـ Segment معينة بالـ Industry بطريقة تخليني أطلع منتج بالـ Quality عالية جدا وبسعر تحدد التنافسية.

	Cost	Differentiation
Industry-wide	Lowest cost across the industry	Better product/service across the industry
Focus	Lowest cost within an industry segment	Better product/service within an industry segment

Achieving Competitive Advantage

- Businesses determine competitive strategies
- Create processes to achieve strategies
- Information systems developed to support business processes
- Help organizations achieve competitive advantage
- Need to avoid creating systems that are unrelated to organization's strategy

Business Functions



Business Functions: the activities carried out by an enterprise; the combination of all primary and support activities.

Fundamental Types of Information Systems within Organizations

I have Info sys for specific depts & IS for cross departmental IS.

- Calculation systems
- Functional systems
- Cross-functional systems

مصممة بالدرجة الأولى لخدمة Business functions all over the enterprise.

Calculation Systems

في نظام دفع الرواتب

الموظف استلم ولا حسبت الراتب

- Antiquates system
- Relieved workers of repetitive calculations
- Labor-saving devices
- Produced little information
- Examples: systems that computed payroll and wrote paychecks; inventory tracking

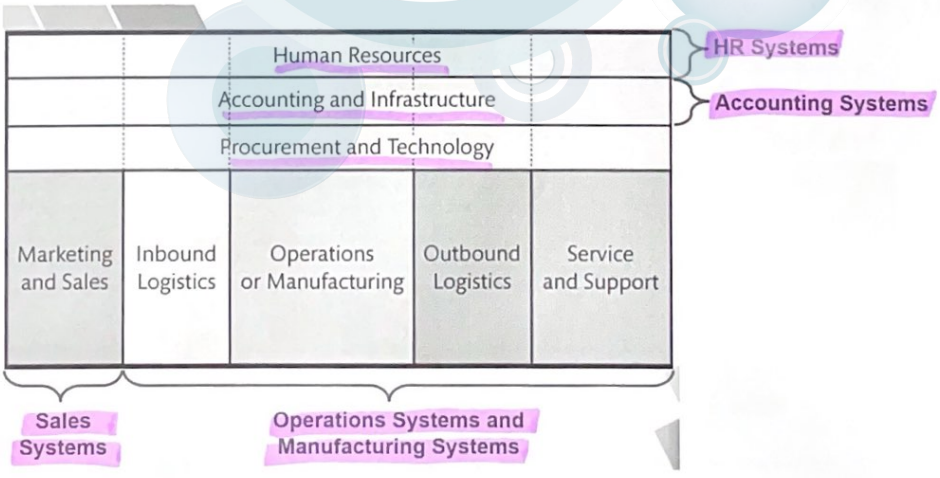
Temporally Data

Functional Systems

in Single Dept.

- Facilitates work of single department or function
- Functions added to calculation system programs to provide more value
- Islands of automation
  - Work independently from each other
  - Effective as independent functions
  - Inefficient working in cooperation with other processes across entire business
- Examples: human resources; financial reporting

Functional Systems



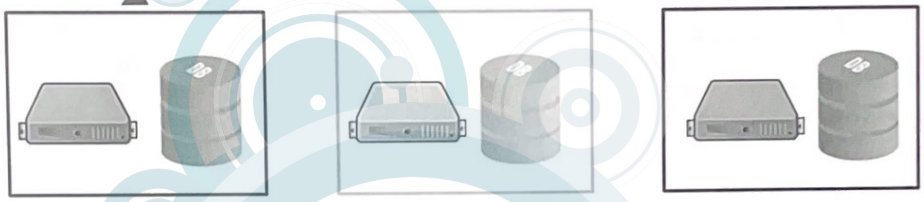
Functional System: information systems which facilitate the work of a single department or function.

Functional Silos

دي بالعكس ←

FUNCTIONAL SILOS

Functional Silos: Isolated systems designed to work independently of one another.



Sales and Marketing | Operations and Manufacturing | Accounting

* ح يكون عندي مجموعة IS لكل Dept ح تدعم الـ Business Process لكل Dept بس !!
مش ح تعرف تدعم الـ Business Processes الـ Cross-functional departments

Functional Systems

↓ هون كل Functional Info Sys ح يستخدم A certain format of the Data. ←
مرات الـ software اللي بستخدمه بـ Dept معينة صعب أستخدمه بغيرها

- Data Integrity Issues:

صعب أنوصل Integration Software مع Dept ثانية

Order Data

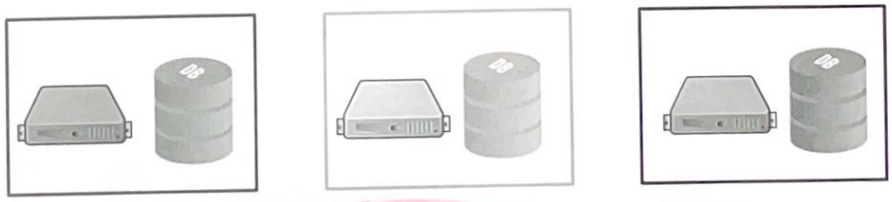
Product	Price
LXZ-0324	$135.56
LTK-0203	$38.99

Inventory Data

Product	Price
LXZ324	$135
LTK203	$38

Accounting Data

Product	Price
00324-LXZ	$130.25
00203-ATK	$39.00



Lose of integrity or Hetroginity Between softwares

Every software uses a certain format.

Sales and Marketing ↔ Operations and Manufacturing ↔ Accounting

طريقة كتابة السعر مختلفة

حتى الـ Product name مختلف

Functional Systems

لما أبني Info sys لكل Dept لحالها الموضوع حيكون مكلف جدا $$$

- Costly Functional Systems

Functional sys = Based on departments (departmental based)
Cross-functional sys = Based on Process.

Integrated, Cross-Functional Systems

- very helpful
- more efficient
- Higher Integrity between depts
- Supports the strategy of the Firm

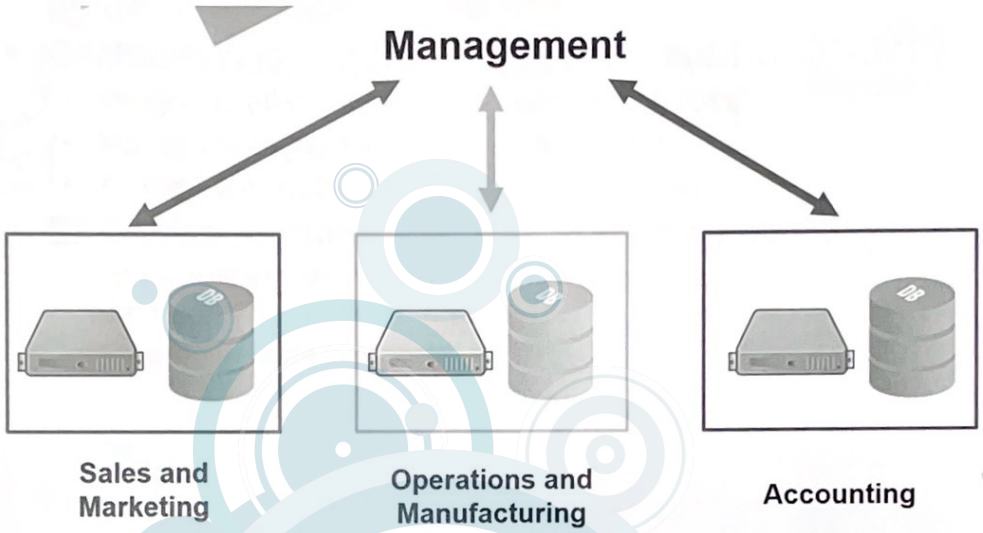
للتغلب على الـ Functional Silos.

- Cross-department systems operate across departmental boundaries
  - Increased functionality
- Process-based systems support complete business processes
  - Integrated processing systems are more efficient
  - Needs clear line of authority

↓ Most Imp to have a clear line of authority

Integrated, Cross-Functional Systems

Cross-functional SYS ح يصير في نوع من الـ management بحملي باه



Functional Systems Problems

- Systems provide tremendous benefits, but are limited because they operate in isolation
  - Data duplication results from each application having own database
  - Potential lack of data integrity
  - Business processes disjointed across functions
  - Produces lack of integrated enterprise information
  - Limited information available at any one source
  - Inefficient decisions based on limited knowledge
  - Increased costs to organization

لما أبني أكثر من IS وأواجه كل IS فاهمين بكل dept وأواجه كل المشاكل اللي عندي
أكيد ح يكون Not efficient & Costly

Cross-Functional Systems and the Value Chain

- Cross-functional systems designed to overcome problems in functional systems
- Customer relationship management systems (CRM)
  - Integrates all of the primary business activities
  - Makes the organization customer-centric
  - All customer data stored in single database
- Enterprise resource management systems (ERP)
  - Integrates primary value chain activities with human resources and accounting
  - Enterprise-wide systems

Business Process Design

- Porter's idea
  - Create integrated, cross-departmental business systems
  - Do not automate or improve existing systems
  - Instead, create new processes:
    - Integrate activities of all departments
    - Across entire value chain

New process = New Info Sys.

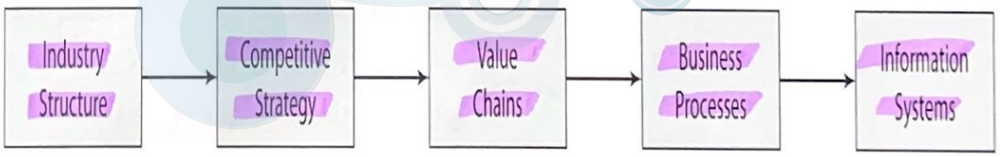
Business Processes

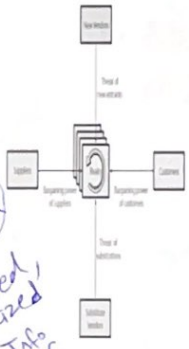
عبارة عن شبكة من النشاطات والموارد والـ facilities والمعلومات

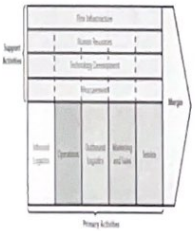
- Network of activities, resources, facilities, and information
- Accomplish a business function
- Implement value chains or portions of value chains

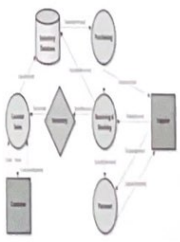
الـ Business Process المفروض تبرر التكلفة تبعها
إما عن طريق تعطيني خدمة متميزة أو
تعطيني بضاعة متميزة

Organizational Strategy Determines Information Systems









Competitive Advantage via Products

- Organizations gain a competitive advantage by:
  1. Creating new products or services
  2. Enhancing existing products or services
  3. Differentiating their products or services

Competitive Advantage via Business Processes

- Organizations can gain a competitive advantage by implementing business systems
  - Locking in customers
    - High switching costs
  - Locking in suppliers
    - Making it easy to connect to and work with organization

Competitive Advantage via Business Processes, continued

- Create entry barriers
  - Making it expensive for new competition to enter market
- Establish alliances
  - Establish standards
  - Promote product awareness
- Reducing costs
  - Increased profitability

كونه ال Competitive adv. سعري بده يكون Lowest price ← إشي طبيعي

Barriers ← يخلق w/ competitors.

← عقد تحالفات عن طريق تبني Standards معينة و أفضل عملية وفي بال Product إلي بنتجه

Information System Management (MIS)

Chapter Four Business Processes and Information Systems

Dr. Baha'eddin Alhaj Hasan
Department of Industrial Engineering

IS الهدف الأساسي لأي
is to optimize the business process.
to achieve some business function.

WHAT IS A BUSINESS PROCESS?

or business system.

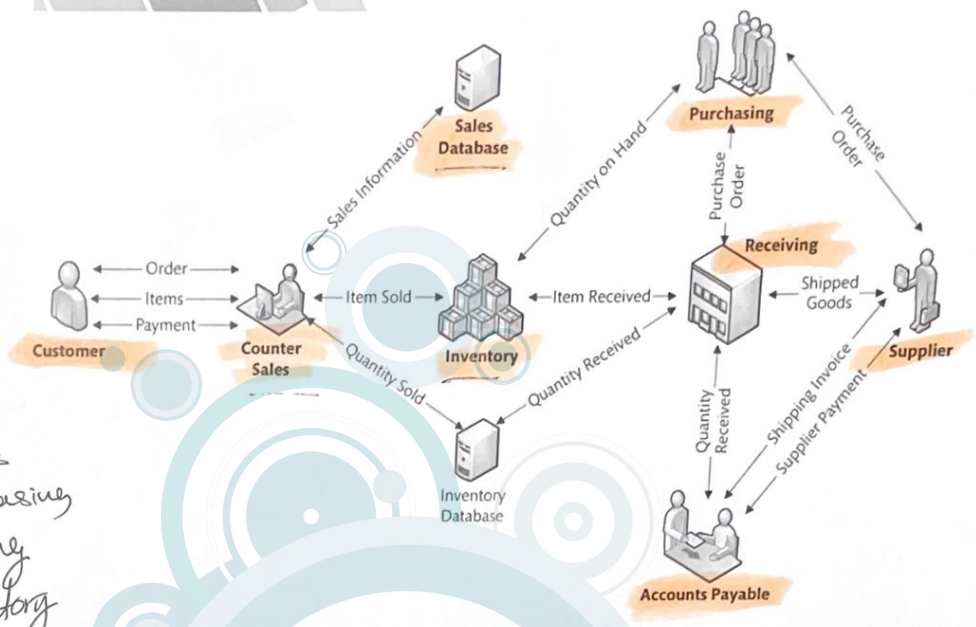
- A **business process** is a series of activities, tasks or steps designed to produce a product or service.
- Sometimes referred to as a **business system.**

Business Process هي عبارة عن Tasks أو actions

steps can be modified to become single actions.

Business Function. وأحيانا يمكن تسميتها

EXAMPLE BUSINESS PROCESS

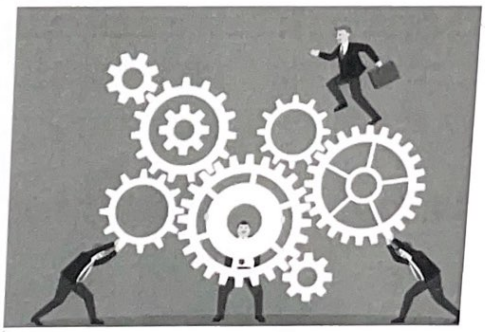


Ex.
Sales
Purchasing
Suppling
Inventory
etc.

How Did This Stuff Get Here?

نوع طبيعي
Business الـ Processes
Sync: يكونوا w/ each other

- Business processes must work together
- Each business must
  - Obtain payment
  - Cover costs
  - Make profit



أي Business Process in generally Should at least (Cover Costs) Basic costs.

أحياناً الـ Profit تسعى هي الخدمة إلى بأديها

Business Processes

A more in depth definitions.

- Network of:
  - Activities
  - Resources
  - Facilities
  - Information
- Interact to achieve business function

Business Processes, continued

Syncronized processes like manuf.

- Business systems
- Examples:
  - Inventory management processes
  - Manufacturing processes
  - Sales and support processes

Business System

- Activities
- Facility
- Information
- Resource

كيف ممكن أخزنه كمثال

Inventory Management Business System

- Purchasing(activity) queries Inventory Database(facility) obtains QuantityOnHand(information)
- If reorder needed, Purchasing generates Order(information) to Supplier(resource)
- Order Placement(activity) sends copy to Receiving(activity)
- Receiving puts goods into Inventory(facility)
- Record sent to Inventory Database and Payment(activity)

Inventory Management Business System, continued

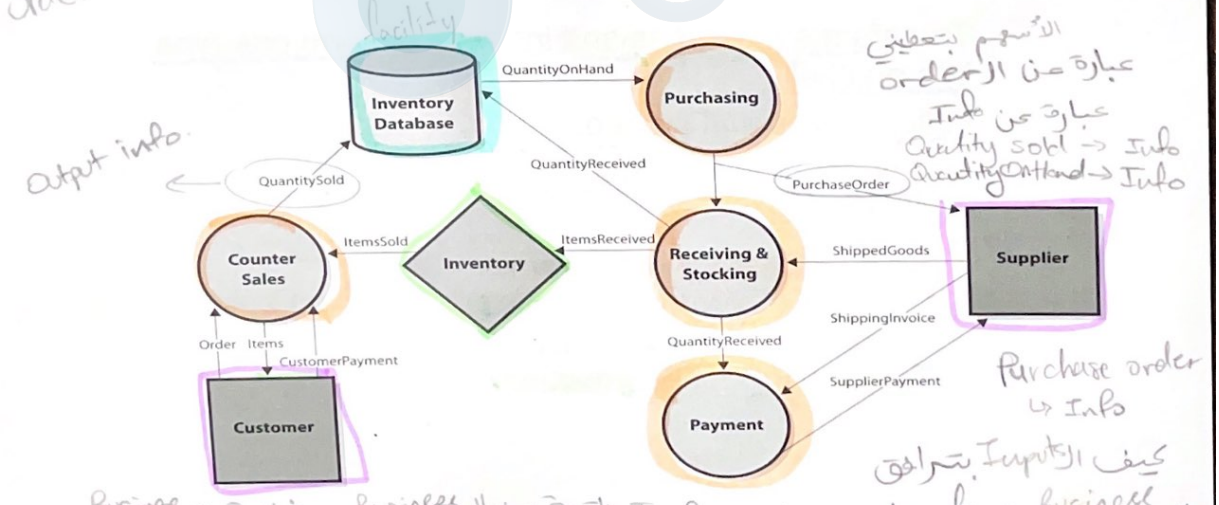
- Supplier sends Shipping Invoice(information) to Payment
- Shipping Invoice compared to Order, generates Check(information and resource)
- Counter Sales(activity) interacts with Customer(resource), Inventory(resource), and Inventory Database

Facility?

هذا الكلام بختصر الـ Examples إلي عندي

Info sys : is the core of any business Process!!

Portion of Inventory Management Business System



Order → input info

output info

Facility

الأسهم بتعطيني عبارة عن الـ order

Info عبارة عن Quality sold → Info QuantityOnHand → Info

Purchase order ↳ Info

كيف الـ Inputs بتراقق الـ output بـ Business Process

Info ناتجة عن الـ Business Process وبغذية الـ Business بنفس الوقت

What Are the Components of a Business Process?

- Activities → Transforms Resources into info & into info
- Resources (customer, customer payment)
- Facilities
- Information

Activities

- Transforms resources and information form one type into another
- Follows rules and procedures
- Can be manual, automated, or combination
- Example:
  - Payment(activity) transforms QuantityReceived(information) and ShippingInvoice(information) into PaymentToSupplier(resource)

Resources

- Items of value
- External to organization
- Examples:
  - Customers
  - Suppliers

حتى يكون عندي Resources → لازم يكون External to the organization.

أبرز الأمثلة

Facilities

can be hardware or software

- Structures used within business process
- Examples:
  - Inventories
  - Databases → IT sys
  - Factories
  - Equipment → Machines

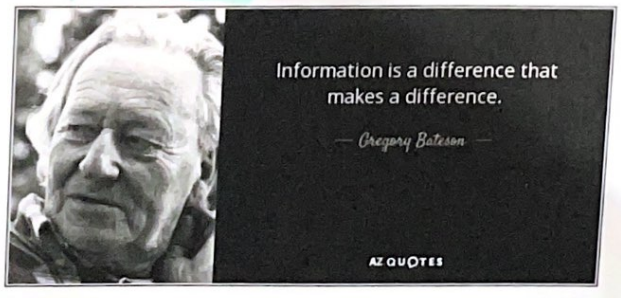
facilities

Information

- Used by activities
- Determine how to transform inputs into outputs
- Difficult to define

What is Information?

- Knowledge derived from data
- Data presented in meaningful context
- Processed data
- Data processed by summing, ordering, averaging, grouping, comparing
- A difference that makes a difference



What is Information?

- **Data:** Recorded facts or figures.
- **Information:** Data presented in a **meaningful** context or processed to provide a **meaningful** context.
  - **Processed data**
    - Processed by summing, ordering, averaging, grouping, comparing, or other similar operations (that is, we *do* something to data to produce information)
  - **A difference that makes a difference**
    - If you get new information and it does not make a difference to your decision, is what you received really information?

Data

- Recorded facts or figures
- Not meaningful on its own

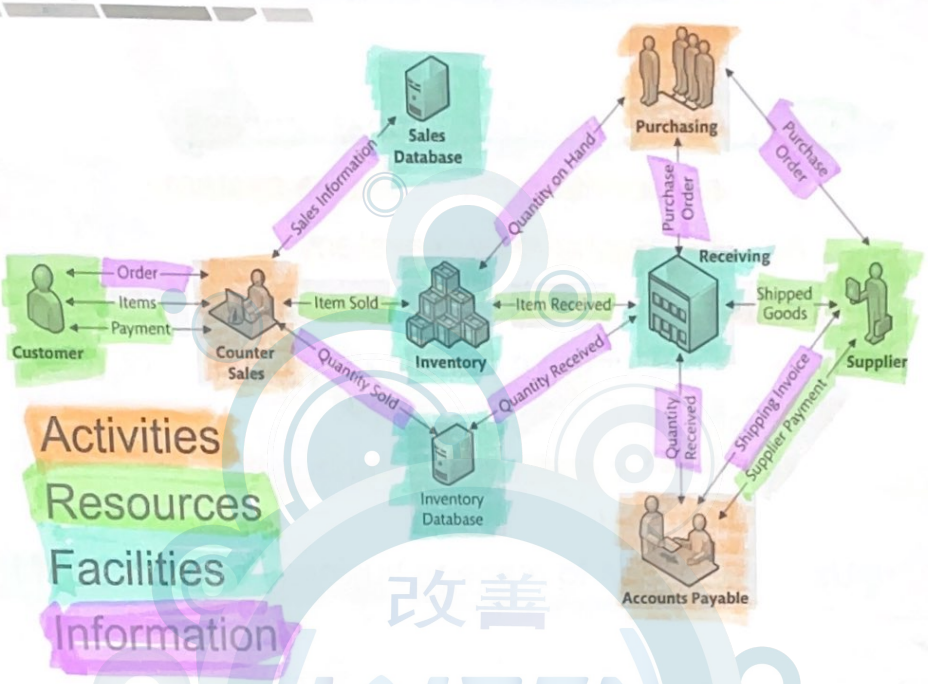
Good Information

- Accurate
  - Correct and complete
  - Crucial for management
  - Cross-check information to ensure accuracy
- Timely
  - Produced in time for intended use
- Relevant
  - Context
  - Subject

Good Information, continued

- Just Barely Sufficient
  - Sufficient for purpose for which generated
  - Do not need additional, extraneous information
- Worth Its Cost
  - Relationship between cost and value
  - Information systems cost money to develop, maintain, and use
  - Must be worth the cost

Business Process Components



What Is the Role of Information in Business Processes?

- Business processes generate information:
  - Brings together items of data in a context
  - An opportunity to produce good information.
  - May be higher level
    - Useful for management and strategy decisions

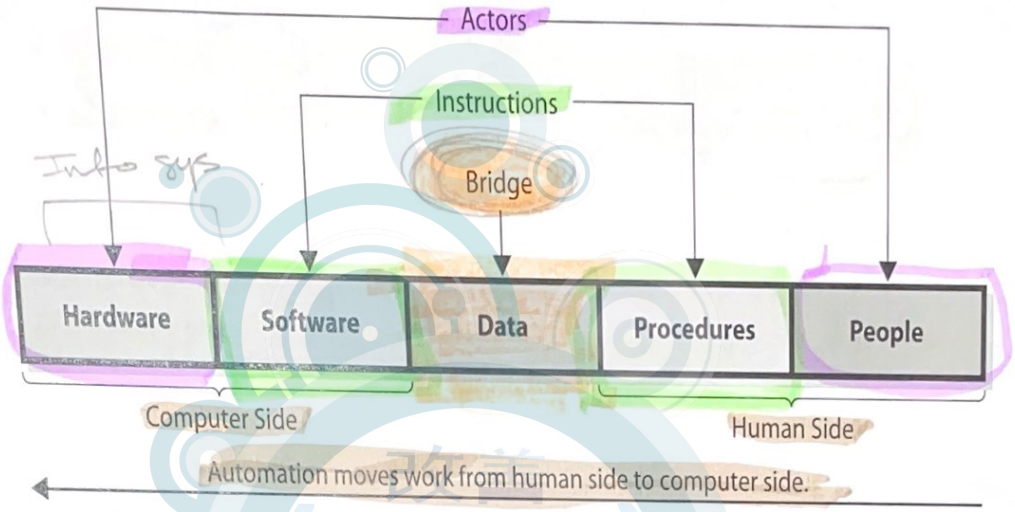
How Do Information Systems Support Business Processes?

- Used by activities in a business process
  - Several activities may use one system
  - Activity may have own system
  - Activity may use several systems
- Systems designers determine relationship of activities to information systems
  - Relationship determined during systems development
- Use information to manage business process itself !

Business Process Manegement (BPM)

» A field of management that promotes the development of **effective** and **efficient** processes through **continuous improvement** and **innovation**.

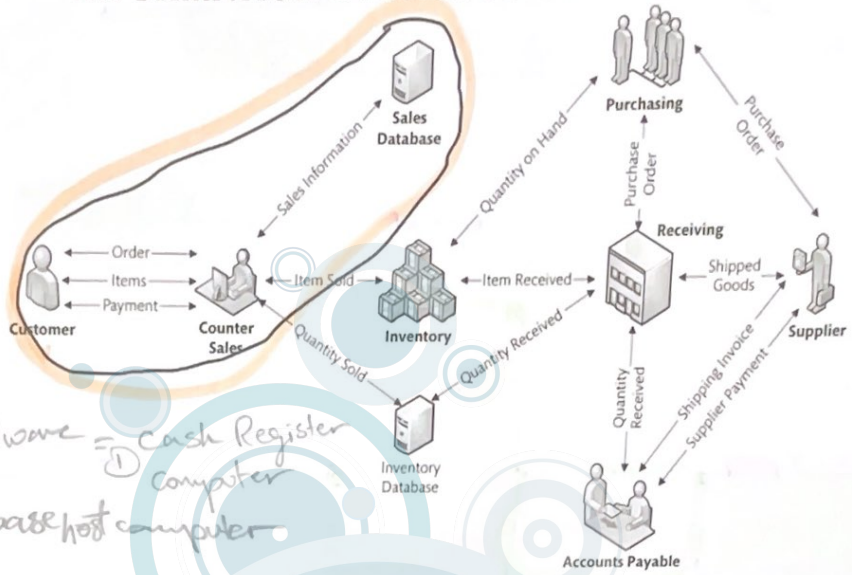
What Does It Mean to Automate a Process Activity?



Automation of Process Activity

- Automation of processes
  - Transfer work done by people to computers
  - People follow procedures
  - Computers follow software instructions

INFORMATION SYSTEM TO SUPPORT COUNTER SALES



1-Hardware = ① Cash Register Computer
② database host computer

Mostly automated

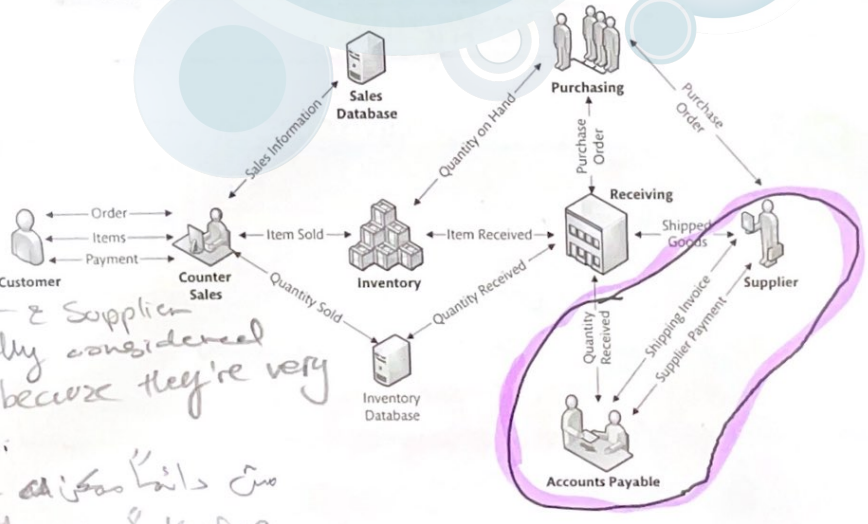
Information System Supporting Counter Sales

Hardware	Software	Data	Procedures	People
– Cash register computer – Database host computer	– Sales-recording program on cash register	– Sales data – Inventory database	– Operate cash register	– Cashier

Mostly an automated system.
Almost all work is done by computers and software.

Information System Supporting Counter Sales, continued

- Fully automated
  - Cashiers do not require extensive training
  - Cashiers do not work directly with programs on computer
- Computer in cash register communicates with computer that hosts Inventory Database
- Programs record sales and makes changes



Information System to Support Payment

Hardware	Software	Data	Procedures	People
– Personal computer	– Adobe Acrobat Reader – Email	– *QuantityReceived* – *ShippingInvoice*	– Reconcile receipt document with invoice. – Issue payment authorization, if appropriate. – Process exceptions.	– Accounts payable

Mostly a manual system.
Little work is done by computers and software.
Most work is done by Accounts Payable clerk.

Procedures التوقيع وهيك صعب جداً تكون automated → supplyment لا يفضل تكون د Fully automated.
العنصر البشري بارز جداً فيها

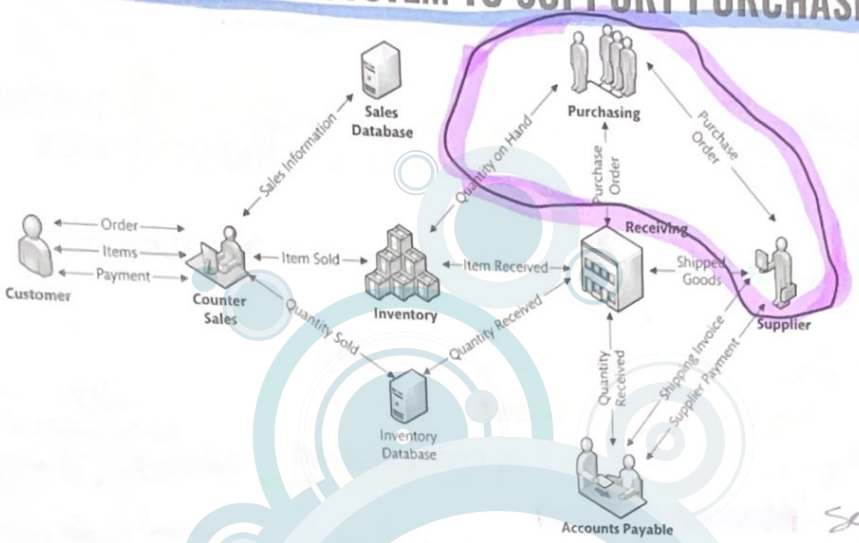
* Authorization payment must be done manually *

Information System to Support Payment, continued

- Payment receives QuantityReceived and ShippingInvoice and produces SupplierPayment
- Mostly manual
  - Accounts Payable Clerk reads documents and issues payment or investigates discrepancies
  - Processing exceptions complicated
    - Programming expensive
    - Probably not effective

very expensive
not effective

INFORMATION SYSTEM TO SUPPORT PURCHASING



semiautomated

I have to issue a Purchase order According to the Inventory management Practices & guidelines.

لكن بالمقابل كونه عندي guidelines لازم تكون واضحة تماماً

Balanced Business Tools

Information System to Support Purchasing

Hardware	Software	Data	Procedures	People
– Personal computer – Database host computer	– Inventory application program – Purchasing program	– Inventory database	– Issue *PurchaseOrder* according to inventory management practices and guidelines.	– Purchasing clerk

Balance between computer and human work.

Information System to Support Purchasing, continued

- Purchasing clerk computer runs program that queries database and identifies stock levels and generates PurchaseOrder
- Designers balanced work between automation and manual activity
  - Searching database is repetitive
    - Automated process
  - Selecting suppliers is complicated
    - Manual process

جانب يكون automated وبتعلق بال Database
وجانب يكون manual
والي بتعلق بال supplier
عملية متوازنة

Your Role in Information System

- You are part of system (people)
- Most important component
  - Must be able to use system
  - Quality of thinking

Skilled worker is the MOST IMP Part in any info sys.

The most imp valuable part in any info sys is the (Skilled worker)

or Human structure

Data

IT structure I here

he or she are more imp bcuz they'll transform the data into valuable info

DECISIONS BY LEVEL & STRUCTURE

By Level:

- Operational Decisions
- Managerial Decisions
- Strategic Decisions

Supported by transaction processing systems (TPS)

TPS

DECISIONS BY LEVEL & STRUCTURE

By Level:

- Operational Decisions
- Managerial Decisions
- Strategic Decisions

Supported by management information systems (MIS)

MIS

DECISIONS BY LEVEL & STRUCTURE

- **By Level:**
  - Operational Decisions
  - Managerial Decisions
  - Strategic Decisions

Supported by Enterprise Information Systems (EIS)

EIS

DECISIONS BY LEVEL & STRUCTURE

- **By Level:**
  - Operational Decisions
  - Managerial Decisions
  - Strategic Decisions

Time Frame Increases

DECISIONS BY LEVEL & STRUCTURE

- **By Level:**
  - Operational Decisions
  - Managerial Decisions
  - Strategic Decisions
- **By Structure:**
  - Structured Decision
  - Unstructured Decision

Decisions By Structure

- Differentiation decisions according to the structure of decision - making process not the structure of problem or subject.

لما أقسم القرارات بناءً على الـ Structured
يعني طريقة الإتخاذ القرار نفسه
هل هي مبنية بشكل منظم أو
ألية معينة
Predefined Process?

مش بناءً
على تنظيم
الـ Process نفسه؟

Decisions By Structure

- Structured Decision:
- Have an understood and accepted method to making them.
- decision is made based on a pre-defined preocess or formula.
- Decision is made by simplly plugging some data from your business .
- Example: a set of calculations to determine how many bowls to order based on past sales.

Decisions By Structure

- Unstructured Decision:
- Do not have an agreed- upon decison –making method or formula to follow.
- Examples: predicting the stock market or evaluating the quality of supplier's goods while you are choosing a supplier for your business.
- More subjective depends on maneger rather than a decision –making process.

DECISIONS BY STRUCTURE

Deciding where to open a new restaurant (Unstructured)

هل عندي معادلة ممكن تحدد لي عدد الساعات؟

Predicting the weather {Structured}

Determining how many employees we need to work on Friday {Structure}

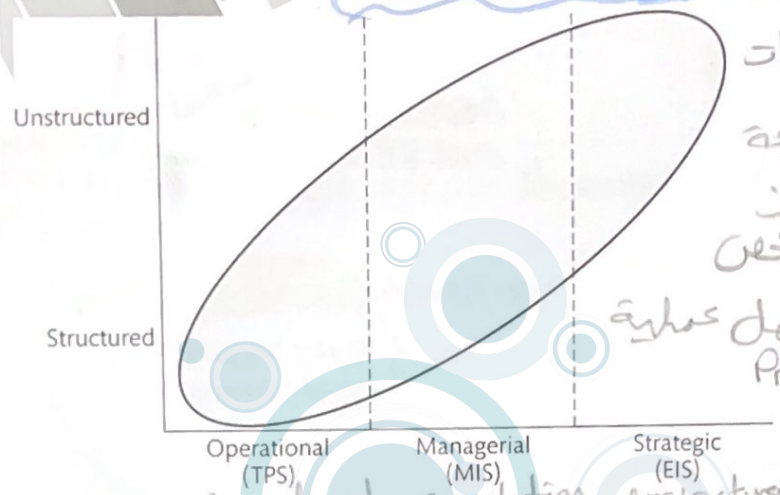
Choosing a new product line to create (Unstructured)

when is my rush hour?

DECISIONS BY STRUCTURE

Structured Decision	Unstructured Decision
Determining how many employees we need to work on Friday	Deciding where to open a new restaurant
Predicting the weather	Choosing a new product line to create

DECISIONS BY LEVEL & STRUCTURE



STEPS TO MAKE A DECISION

Decision Step	Description	Examples of Possible Information Systems
Intelligence gathering	• What is to be decided? • What are the decision criteria? • Obtain relevant data.	• Communications applications (email, video-conferencing, word processing, presentation) • Query and reporting systems • Data analysis applications
Alternatives formulation	• What are the choices?	• Communications applications
Choice	• Analyze choices against criteria using data. • Select alternative.	• Spreadsheets • Financial modelling • Other modelling
Implementation	• Make it so!	• Communications applications
Review	• Evaluate results of decision; if necessary, repeat process to correct and adapt.	• Communications applications • Query and reporting Systems • Spreadsheets and other analysis

Figure 2-10 Decision Making Steps

Information System Management (MIS)

Chapter Five: Part 1 - Database Concepts

Dr. Baha'eddin Alhaj Hasan
Department of Industrial Engineering

Why DATABASE

- https://www.youtube.com/watch?v=j09EQ-xlh88

Evolution of database
Flat File Database
↓
Hierarchical Database
↓
Network Database

2020
Relational Database
Non-Relational Database
Combination of both is used!

SQL → structured Query language.

Relational database: Data is stored in tables
SQL.

NonRelational database
Key value, wide column
Document, Search engine
Graph, Time Series

قواعد البيانات

Database: is the heart of any Info sys!

every data stored will be assigned to a key!

شو العلاقة بين ال Database وال Info sys؟

البداية الأساسية لأي Info sys هو ال Database نفسه

حكينا بأي Info sys العنصر الأساسي هو ال skilled worker بعدين ال info Base بتيجي of the data collected.

وبالتالي ← The collected data بتجي كداعدة بيانات معينة هي ال Database

Info: processed data

عشان تصير عنا لازم يكون كل شي مرتب بقاعدة بيانات

12:00 mins.

Learn what is Database | Types of Database | DBMS

أقرب ترجمة لكلمة Data → بيانات

Success of a Company comes from how well do they access their data?

You need a database to store data.

What is Data? Can be anything & everything.
Any info or fact can be considered as data!

A video audio or a text can be considered as data. data can be in any form.

What is database?
Can be considered as a container filled w/ data or info, which is electronically stored in a system.

Purpose of storing data in the database so it can be easily accessed, modified, protected & Analyzed.

DBMS ≠ Database?
Software to manage your database.

بالكورس ح نركز على الـ Relational Database

WHY DATABASES?

أنت كل يوم بتسوي عملية access لـ Database خلال الـ internet والبرامج والـ mobile apps ما بتستخدموها

Databases are everywhere!

- Databases are accessed every time you go to an Internet site, buy something online, use a search engine, send messages/emails online, play online games, and much much more!
- Discord, Google, Facebook, Amazon, Twitter, OWL, Student Center, all use databases!

E-learning, ... etc

تعتمد على الذكاء الإصطناعي

WHY DATABASES?

أي Business حالياً لازم يعتمد على Database عشان يقدر يتعامل مع حجم الـ Data الهائل

باختصار Overview كيف الـ Data بتترتب

بشوف الـ Concept الأساسي تبعها

لما نتدرس على مستوى الـ Database ح نفهم أكثر عن الـ Data

أهمية الـ Data

But why do I need to know about them?

- Need to understand the technology your business is using to make correct decisions.
- **Business use databases to:**
  - Organize and keep track of things
  - Automate data tracking and retrieval — باستخدام برامج الـ SQL
  - Allow multiple users to access data concurrently.
  - Keep track of multiple themes

MULTIPLE THEMES

General rule:

- **Single theme:** can store data in a spreadsheet
- **Multiple themes:** require a database
- What's a theme?
  - Ex: student grades, student emails, student office visits.

ممكن أربط كل هاي الـ Themes المختلفة
من خلال Database

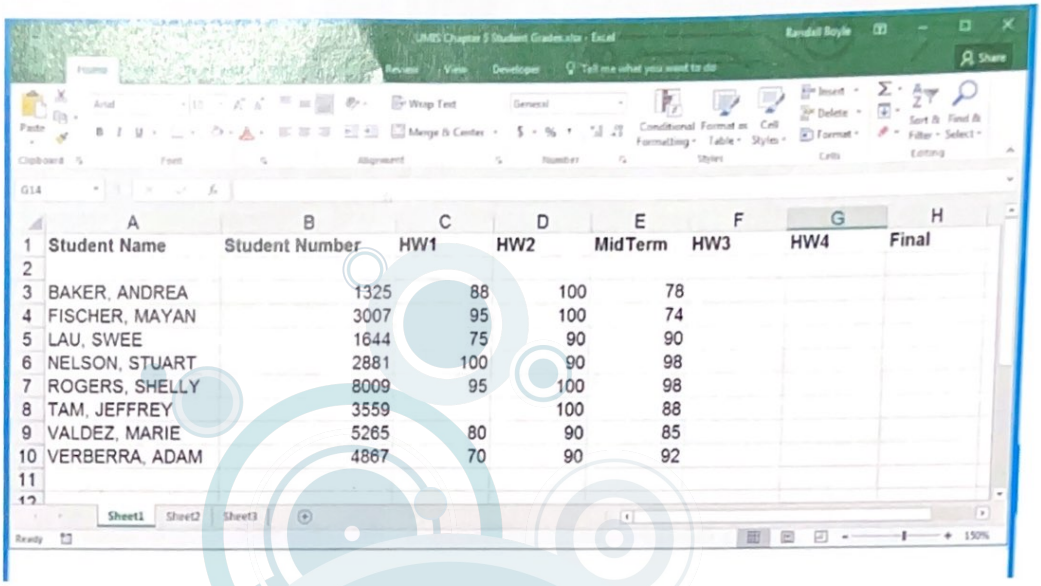
Theme هي
ممكن أخزنها
Simple excel بـ
Spreadsheet

L6

	A	B	C	D	E	F
1	Customer Contact Log					
2						
3	**Contact Date**	**Contact Time**	**Customer**	**Purpose**	**Contact Method**	**Notes**
4	2023-12-04	10:30:00 PM	Brown, Emmett	Product Support	Phone	Had an issue with his flux capacitor, fixed by turning it on and off again.
5	2025-11-22	1:34:00 AM	Brown, Emmett	Sales	Live Chat	Wanted to buy a delorean.
6	2024-01-26	6:23:00 PM	Smith, John	Product Support	Email	Police box had a broken chameleon circuit, customer did not want to fix.
7	2029-05-17	11:42:00 AM	Brown, Emmett	Follow Up	Phone	Follow up sales call about delorean.
8	2025-09-16	4:52:00 PM	Okabe, Rintaro	Product Support	Phone	Crazy ramblings about some kind of gate. Prank call?
9	2020-05-24	7:21:00 AM	Smith, John	Follow Up	Email	Follow up customer service call. Customer's screw driver was out of batteries.

Contact Log | Orders

Ready Accessibility: Good to go

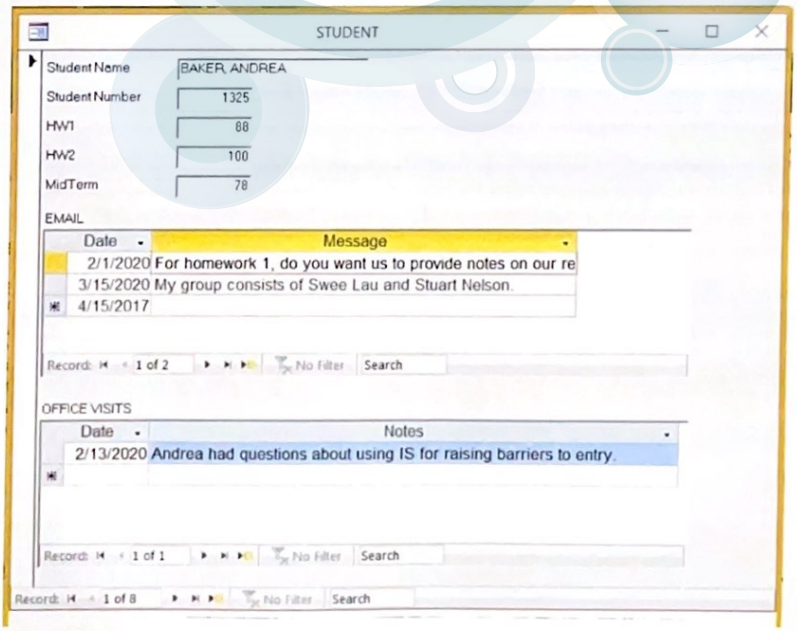


	A	B	C	D	E	F	G	H
1	Student Name	Student Number	HW1	HW2	MidTerm	HW3	HW4	Final
2								
3	BAKER, ANDREA	1325	88	100	78			
4	FISCHER, MAYAN	3007	95	100	74			
5	LAU, SWEE	1644	75	90	90			
6	NELSON, STUART	2881	100	90	98			
7	ROGERS, SHELLY	8009	95	100	98			
8	TAM, JEFFREY	3559		100	88			
9	VALDEZ, MARIE	5265	80	90	85			
10	VERBERRA, ADAM	4867	70	90	92			
11								
12								

Sheet1 Sheet2 Sheet3

Can be updated at the same time.

MULTIPLE THEMES



MULTIPLE THEMES

https://www.youtube.com/watch?v=x4Xt0M1mHbc

WHAT IS CONTENT?

Content: Something of value, which can be considered an asset

- Can be stored as data, documents, spreadsheets, presentations, websites, text from blogs, Twitter, or discussion boards, graphics, video files and video logs, audio files, etc.

HOW CAN CONTENT BE ORGANIZED?

Management of content

- Indexing, cataloguing, processing, storing bytes

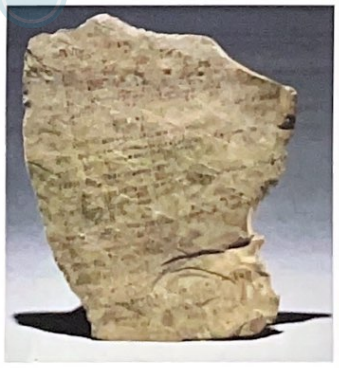
Presentation of content

- Distributing to the right person, right format
- Usually handled by content management system (CMS)

WORDPRESS

CMS: Information systems whose primary purpose is to provide an easy way to manage and present information, for example a popular blog post content Manegement system is wordpress. Wordpress makes it easy for blog authors to creat edit format and disply content without having any understanding of HTML (Hypertext Markup Language) or the database that being used under the hood.

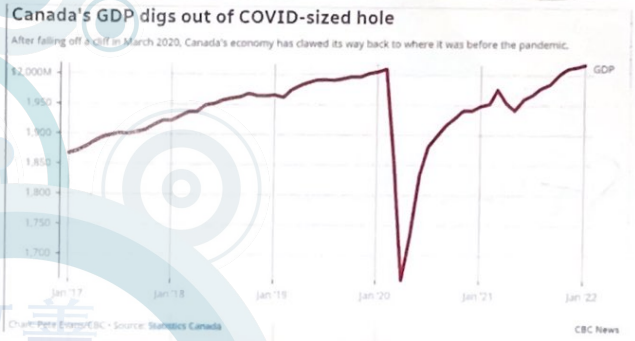
HOW CAN CONTENT BE ORGANIZED?



Data stored in the past in filing cabinets. Card catalogs and ledger books More in past data was saved on rocks.

Prices	Chained (2012) dollars																
Seasonal adjustment	Seasonally adjusted at annual rates																
Geography	Canada (map)																
Estimates	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021
	Dollars																
Final consumption expenditure	1,589,953	1,602,008	1,612,596	1,620,793	1,623,998	1,630,417	1,634,348	1,640,360	1,652,127	1,623,818	1,441,854	1,592,983	1,604,927	1,619,101	1,615,021	1,668,656	1,674,543
Household final consumption expenditure	1,151,676	1,159,463	1,165,460	1,172,344	1,172,238	1,177,374	1,180,001	1,184,106	1,192,898	1,166,164	1,003,922	1,132,979	1,136,311	1,141,610	1,138,821	1,192,886	1,195,840
Goods	518,528	523,136	525,335	528,569	527,820	529,172	531,092	530,511	531,041	515,597	475,615	553,877	554,940	557,697	543,946	556,117	555,178
Durable goods	154,525	156,302	157,398	157,174	157,504	157,369	157,629	156,507	156,411	140,181	121,670	166,351	166,041	165,482	160,385	156,825	157,180
Semi-durable goods	85,195	86,200	86,243	87,162	87,112	87,624	88,663	88,329	88,231	80,577	68,950	90,394	87,763	89,395	86,736	99,638	99,011
Non-durable goods	278,854	280,686	281,736	284,283	283,261	284,246	284,901	285,754	286,466	294,577	284,583	296,744	300,608	302,377	296,369	300,247	299,528
Services	633,260	636,482	640,262	643,918	644,533	648,274	649,015	653,590	661,694	650,243	529,885	581,928	584,176	586,739	597,225	638,819	642,672
Non-profit institutions serving households' final consumption expenditure	20,996	20,224	20,668	20,548	20,844	21,100	21,356	21,668	21,860	22,348	18,360	20,448	21,320	20,544	20,640	21,056	21,516
General government final	408,714	412,730	416,819	418,296	421,250	422,292	423,336	424,927	427,729	425,432	407,626	429,072	436,527	445,828	444,456	444,530	446,939

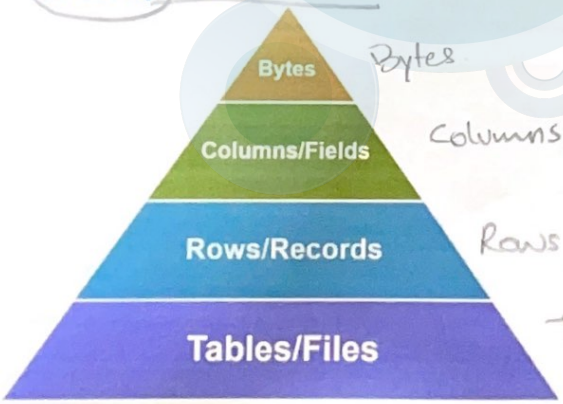
Good information has to be presented in good way so it will be useful!



2020

WHAT DOES A DATABASE CONTAIN?

- **Database:** a self-describing collection of integrated records
- **Hierarchy** of data elements:



Integrity

Bytes

very good! efficient

Columns/Fields

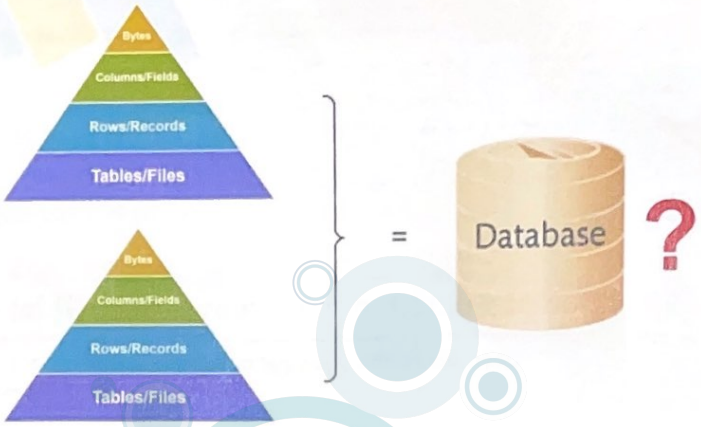
I can update

Rows/Records

Tables/Files

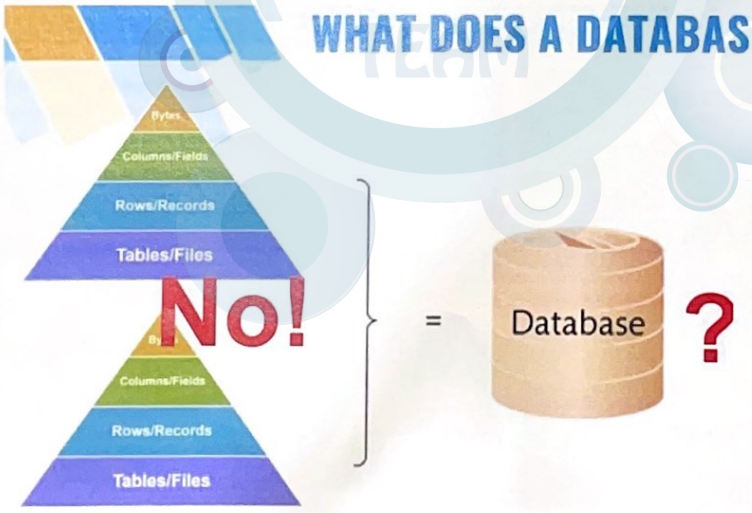
First Name	Last Name	Address	Phone #	Age	Sex	Email
Daniel	Servos	123 Fake St.	555-555-5555	37	Male	dservos5@uwo.ca
Jane	Doe	42 Long Rd.	555-123-4567	56	Female	jdoe@uwo.ca
Joe	Bloggs	135 Short St.	555-765-4321	14	Male	jbloggs@uwo.ca

WHAT DOES A DATABASE CONTAIN?



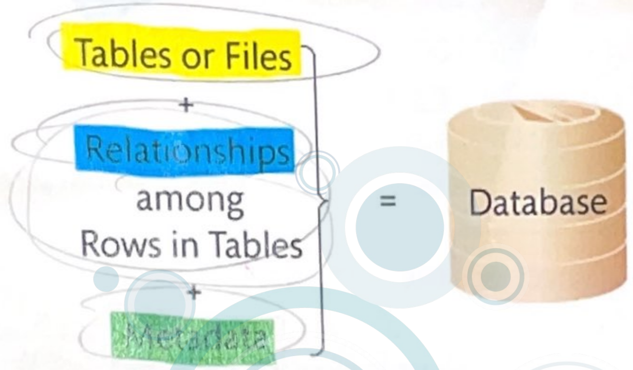
؟Tables مجموعة Database هل بس بتضم

WHAT DOES A DATABASE CONTAIN?



أكيد لا

WHAT DOES A DATABASE CONTAIN?



Here we're talking about Relational Databases

الـ Database بتضم أكثر من هيكل

* All tables have a Primary key.

RELATIONSHIPS

Email Table

Date	Message	Student Number
2/1/2007	For homework 1, do you want us to provide notes on our references?	1325
3/15/2007	My group consists of Swee Lau and Stuart Nelson.	1325
3/15/2007	Could you please assign me to a group?	1644

Student Table

Student Number	Student Name	HW1	HW2	MidTerm
1325	BAKER, ANDREA	88	100	78
1644	LAU, SWEE	75	90	90
2881	NELSON, STUART	100	90	98
3007	FISCHER, MAYAN	95	100	74
3559	TAM, JEFFREY		100	88
4867	VERBERRA, ADAM	70	90	92
5265	VALDEZ, MARIE	80	90	85
8009	ROGERS, SHELLY	95	100	98

Office_Visit Table

Date	Notes	Student Number
2/13/2007	Andrea had questions about using IS for raising barriers to entry.	1325
2/17/2007	Jeffrey is considering an IS major. Wanted to talk about career opportunities.	3559
2/17/2007	Will miss class Friday due to job conflict.	4867

Primary key: عبارة عن Identifier بجمع جميع المعلومات اللي عندك مع بعض حتى لو ظاهريًا مهمة مش Related ببعض

Primary Keys:
- Column(s) (Fields) that **uniquely** identify a **row** (Records) in a table.
- All tables have a **primary key**.

Q1: What Is the Purpose of a Database?

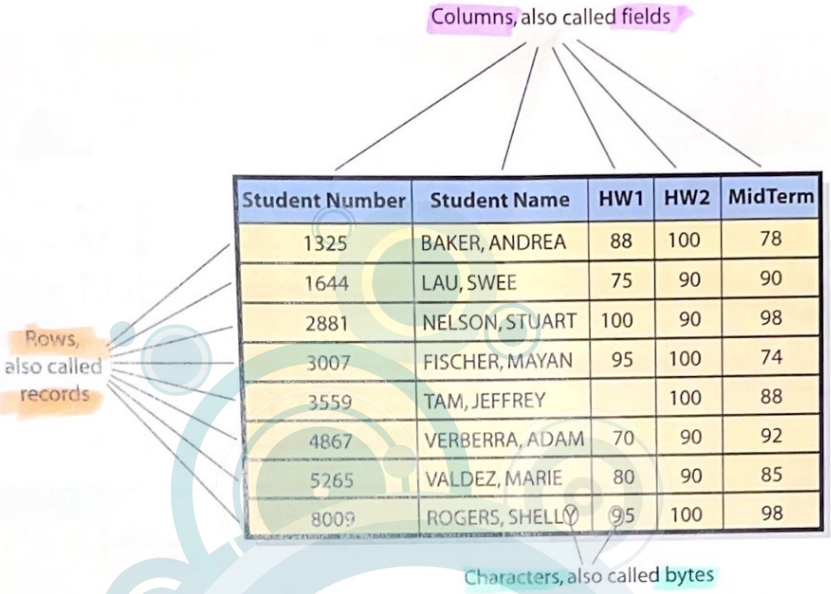
- Purpose: To organize and keep track of things
- Spreadsheets do that too
  - Keeping lists of only a single theme per worksheet
    - Example: Student test scores in a course
  - Linking and managing multiple worksheets is a real pain
- Databases
  - Keep lists that involve multiple themes
  - Examples: Student grades, grades for all courses in a department, courses offered in all departments, faculty records, and so on

Based on Rows not cells

Q2: What Does a Database Contain?

- A self-describing collection of integrated records
- Hierarchy of data elements
  - Bytes/data are grouped into columns/fields
  - Columns grouped into rows/records
  - Rows are grouped into tables/files
- Collection of tables plus relationships among rows
  - Also includes "metadata"
    - **Describes the structure of the database and its data**
- A database is a structured collection of records stored in a computer system so that a computer program or person using a query language can consult it to answer queries.

Student Table
(a.k.a., File)



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4867	VERBERRA, ADAM	70	90	92
5265	VALDEZ, MARIE	80	90	85
8009	ROGERS, SHELLY	95	100	98

Relationships Among Records

- Database have multiple tables (one for each theme)
- Values in one table may relate to rows/records in other tables
- Keys
  - A column(s) that identify unique row in table
  - Each table has a key
- Foreign keys
  - Are keys of a different table than the one in which they reside
- Relational databases
  - Databases use tables, keys, and foreign keys to create relationships

Example of Relationships Among Three Tables

Email Table

EmailNum	Date	Message	Student Number
1	2/1/2004	For homework 1, do you want us to provide notes on our references?	1325
2	3/15/2004	My group consists of Swee Lau and Stuart Nelson.	1325
3	3/15/2004	Could you please assign me to a group?	1644

Student Table

Student Number	Student Name	HW1	HW2	MidTerm
1325	BAKER, ANDREA	88	100	78
1644	[illegible]	75	90	90
2451	[illegible] TUART	100	90	98
3007	[illegible] AYAN	95	100	74
3559	[illegible]	[illegible]	100	88
[illegible]	[illegible]	70	90	92
5265	[illegible]	85	90	85
8009	[illegible]	95	100	98

كل طالب له Unique Student Number وهذا جداً يكون فيه Duplicate.

Office_Visit Table

VisitID	Date	Notes	Student Number
2	2/15/2004	Andrea had questions about [illegible] for entry.	1325
3	2/17/2004	Jeff [illegible] wanted to talk about career opportunities.	3559
4	2/17/2004	Will [illegible] day due to [illegible] coming.	4867

Example of Relationships Among Three Tables

- These lines are not stored in the database, they are just for illustrative purposes.
- Databases define these relationships through primary and forigen key fields and the values they contain in records.

Metadata

- Database is self-describing
  - Contains descriptions of its data
- Metadata
  - Data that describe data
  - Makes databases more useful
  - Makes databases easier to use
- Describes data by:
  - Data type – text, number, date, etc.
  - Field name
  - Field properties

data is self describing

Student #
↳ metadata
لأنه يفسر معلومات ثانية

Access Metadata Report

C:\Users\oys\Courses\CIS300\data sets\Exercise 2 Skills.accdb — Wednesday, September 30, 2009
Table: Annual Sales — Page: 1

Properties

DateCreated:	12/10/2006 11:00:18 PM	DefaultView:	2
GUID:	{guid {1C07FCAB-2C95-4AF0-B2F1-9D1CB3B6778A}}	LastUpdated:	12/13/2006 12:06:14 AM
NameMap:	Long binary data	OrderByOn:	False
Orientation:	Left-to-Right	RecordCount:	44
Updatable:	True		

Columns

Name	Type	Size
Last Name	Text	20

AllowZeroLength:	True
AppendOnly:	False
Attributes:	Variable Length
CollatingOrder:	General
ColumnHidden:	False
ColumnOrder:	Default
ColumnWidth:	Default
DataUpdatable:	False
DisplayControl:	Text Box
GUID:	{guid {6BDC3986-D79B-4384-A970-F6C20A520D4C}}
IMEMode:	0
IMESentenceMode:	3
OrdinalPosition:	0
Required:	False
SourceField:	Last Name
SourceTable:	Annual Sales
UnicodeCompression:	True

First Name	Text	20

AllowZeroLength:	True
AppendOnly:	False
Attributes:	Variable Length
CollatingOrder:	General
ColumnHidden:	False
ColumnOrder:	Default
ColumnWidth:	Default
DataUpdatable:	False
DisplayControl:	Text Box
GUID:	{guid {19A288AD-5358-4E10-BDE4-7FE86DB7A75B}}
IMEMode:	0

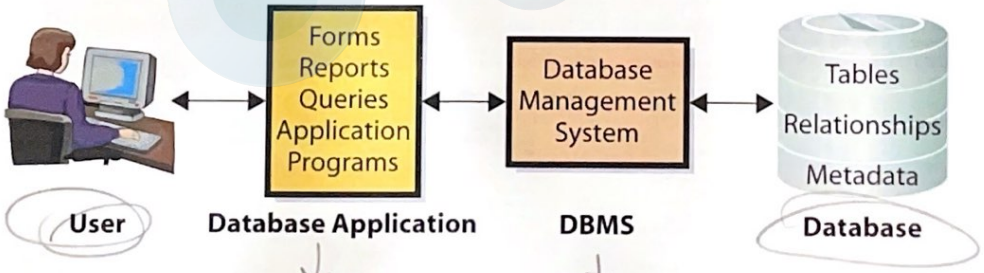
Metadata report

Q3: What Is a DBMS and What Does It Do?

- Database management system (DBMS)
  - Program that creates, processes, and administers databases
  - Usually licensed from vendors
  - Examples: Microsoft Access, Oracle, MySQL, DB2

- DBMS and database are two different things
  - Database is a structured collection of records or data stored in a computer system so a computer program or person using a query language can consult it to answer queries.
  - Database management system (DBMS) is a computer program used to manage and query a database

Components of a Database Application System



أي برنامج بتدخل عليها

Interface Between users & Database

Database Management Systems

- DBMS is used to create tables, relationships in databases

- Applications use a DBMS to read, insert, modify, and delete data
  - Structured Query Language (SQL)
    - International standard language for querying databases
    - Allows users to interactively interrogate the database, analyze its data and update it according to the users privileges on data
    - Also controls the security of the database

interrogate
يخاطب أو يستجوب
Database او يكتب

Creating the Database and Its Structure

EMAIL : Table

	Field Name	Data Type	Description
🔑	EmailNum	AutoNumber	Primary key -- values provided by Access
	Date	Date/Time	Date the message is recorded into the database
	Message	Memo	Text of the email
	Student Number	Number	Foreign key to row in the Student Table
▶	Response?	Yes/No	True / false value to indicate if prof has responded

Field Properties

General | Lookup

Format	Yes/No
Caption	
Default Value	False
Validation Rule	
Validation Text	
Required	Yes
Indexed	No

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

Processing the Database

- DBMS perform four basic operations
  1. Read data
  2. Insert data
  3. Modify data
  4. Delete data

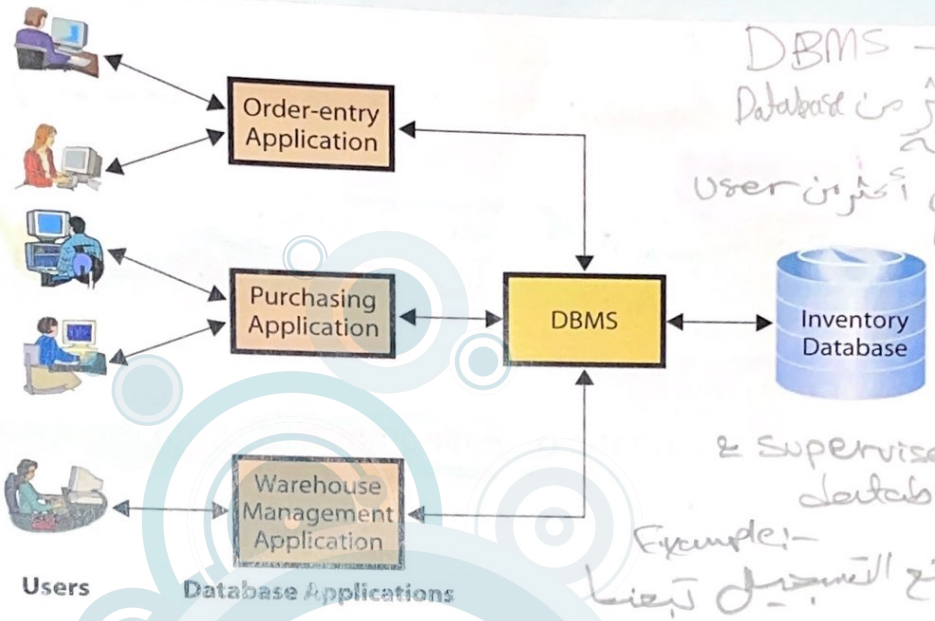
- Structured Query Language (Example)

```
INSERT INTO Student
([Student Number], [Student Name], HW1, HW2, MidTerm)
VALUES
(1000, 'Franklin, Benjamin', 95, 95, 100)
```

Administering the Database

- DBMS security features are used to set up user accounts, passwords, permissions, processing limits
  - Permissions – data access rights for specific users or groups of users
- Database backup and replication, adding structures, removing unneeded data

Use of Multiple Database Applications



DBMS → يمكن Database يتحكم بأكثر من مختلفة User ويمكن أكثر من يستخدم At the same time.

& supervises the database.

Example:- موقع التسجيل بجامعة

Q4: What Is a Database Application?

- Database application is the software we create that actually utilizes our database.
- Collection of forms, reports, queries, and application programs that process a database
- Databases can have multiple applications
- Applications can have multiple users

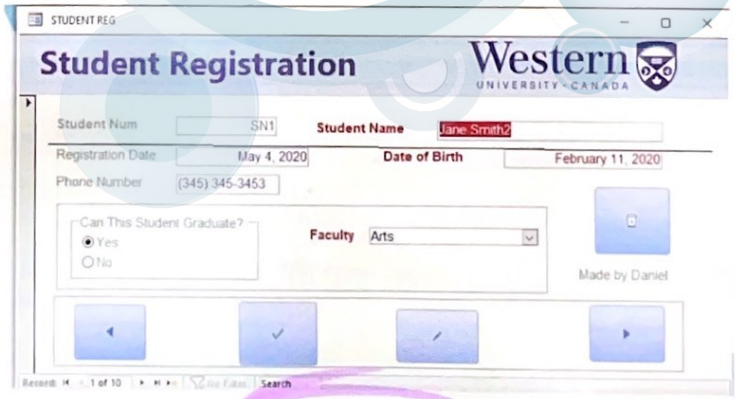
Forms, Reports, and Queries

- Forms
  - Used to read, insert, modify, and delete data
- Reports
  - Show data in structured context
  - May compute values such as Totals, within a report
- Queries
  - Are a means of getting answers from database data

بتورجيني ← Data ال ← أي حاجة

Specific questions or specific data.

Forms, Reports, and Queries



Form

Forms, Reports, and Queries

Doctor's Patients

Daniel's Patient Report

Doctor:				
Last Name	First Name	Phone Number	Address	Account Balance
Davis	Dave	4165557777	54 Blarney Rd., London, ON	$5.00
Doe	Jack	5195550000	99 Fake St., London, ON	$35.00
			Doctor Total:	$40.00

Doctor:				
Last Name	First Name	Phone Number	Address	Account Balance
Jones	Alice	5195552323	876 Richmond St, London, ON	$0.00
Jones	Bob	1235558321	444 Limberlost St, London, ON	$600.00
			Doctor Total:	$600.00

Doctor:				
Last Name	First Name	Phone Number	Address	Account Balance
Bloggs	Joe	1235550011	123 fake St., London, ON	$0.00
Doe	Jane	4165558473	1151 Richmond St, London, ON	$1,000.00
			Doctor Total:	$1,000.00

Doctor:				
Last Name	First Name	Phone Number	Address	Account Balance
O'Brian	Patty	5195552583	36 Blarney Rd., London, ON	$20.00
			Doctor Total:	$20.00

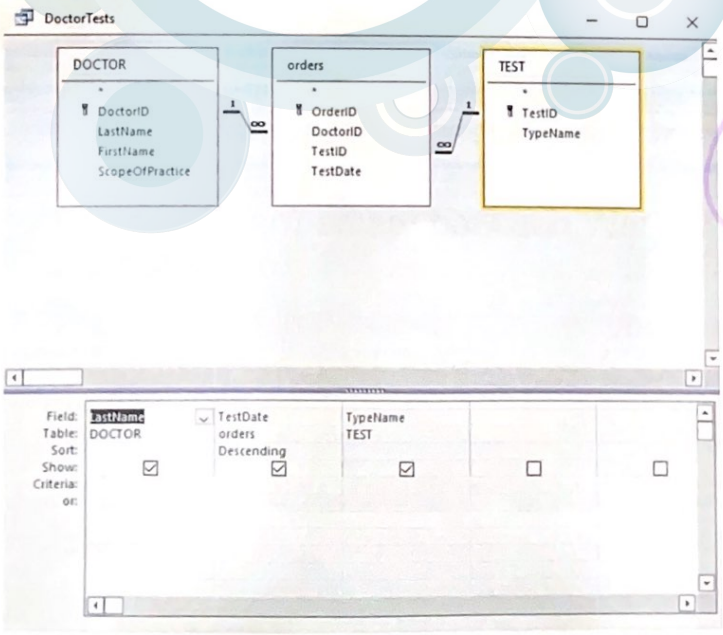
Total: $1,660.00

May 27, 2022

Page 1 of 1

Report 报表

Forms, Reports, and Queries



Query in Access DBMS

Forms, Reports, and Queries

DoctorTests

```
SELECT DOCTOR.LastName, orders.TestDate, TEST.TypeName
FROM TEST INNER JOIN (DOCTOR INNER JOIN orders ON DOCTOR.DoctorID = orders.DoctorID) ON TEST.TestID = orders.TestID
ORDER BY orders.TestDate DESC;
```

Query
on a specific question
لما أطلب معلومات معينة
First name
Last name

Forms, Reports, and Queries

DoctorTests

LastName	TestDate	TypeName
Bloggs	2020-05-13	MRI
Smith	2020-05-12	CAT Scan
Bloggs	2020-05-05	CAT Scan

Record: 14 4 of 4 Search

Database Application Programs

- Forms, reports, and queries work for standard functions
- Application programs provide more robust information
  - Process logic specific to business need
  - Enables database processing over Internet
    - Serves as intermediary between Web server and database
    - Responds to events
    - Reads, inserts, modifies, deletes data

Database Applications ← جهاز بال

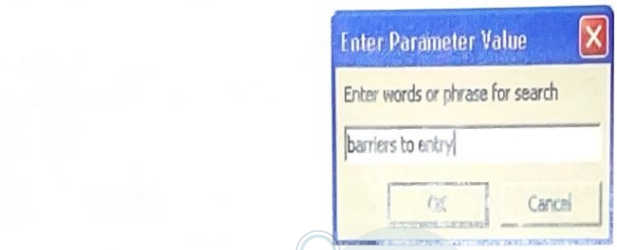
لكن طبعاً جهزها يتم التحكم فيها من خلال الـ servers اللي بتضم الـ Database Management Systems.

Database Application Programs

- Application programs
  - Process logic specific to a business need
  - May enable database processing over Internet to:
    - Serve as intermediary between Web server and database
    - Respond to events,
    - Asks DBMS to read, insert, modify, delete data

Repeated.

Example of a Query

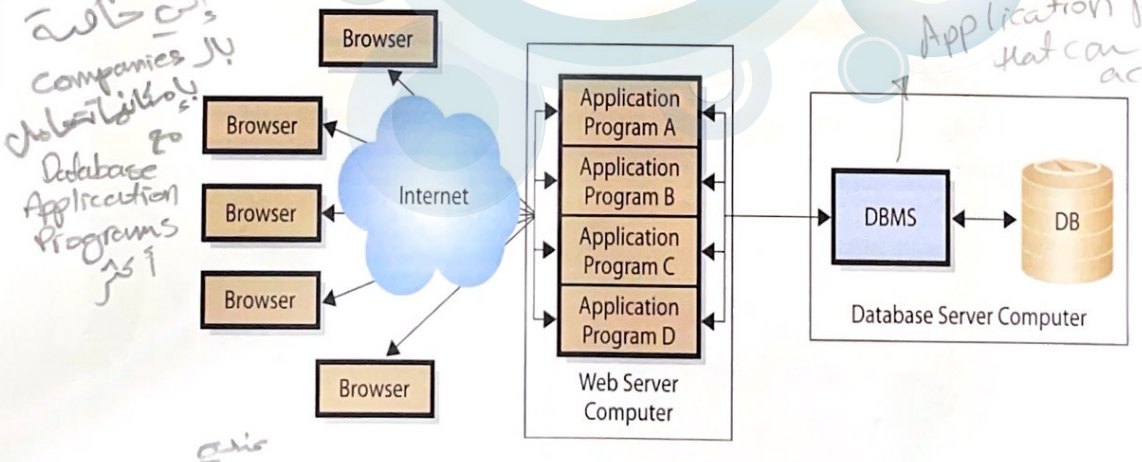


a. Form used to enter phrase for search

b. Results of query operation

* لما بدي أطلب معلومات معينة

Four Application Programs on a Web Server Computer



* Browsers

Multiuser Processing Considerations

- Lost-update problem
  - Occurs when an update made by one transaction is lost due to an update made by another transaction.

1. Process A reads a customer a record from a file containing account information, including customer's account balance and phone number.
2. Process B now reads same record from same file, now B has its own copy.
3. Process A changes account balance in its copy of customer record and writes record back to the file.
4. Process B—which still has the original value off account balance in its copy of the customer record—updates customer's phone number and writes customer record back to the file.
5. Process B has now written the old account balance value to the file, causing the changes made by process A to be written over or lost.

Multiuser Processing Considerations (cont'd)

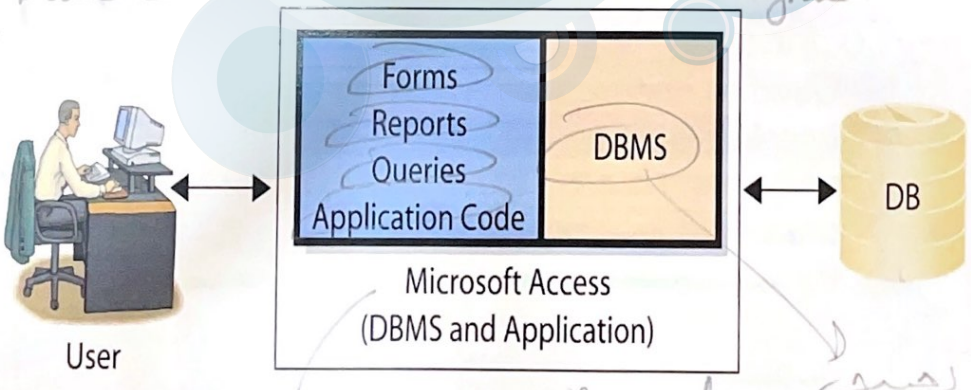
- Preventing Lost Update problems using:
- Locking
  - Used to ensure that a transaction does not interfere with any other transaction. Locking prevents the problem of lost update, uncommitted data, and inconsistent data.
  - By preventing another user or process to open a record that is currenty being used by another user or process.

Q5: What Is the Difference Between an Enterprise DBMS and a Personal DBMS?

- **Enterprise DBMS**
  - Processes large organizational and workgroup databases
  - Supports many users (thousands plus)
  - Examples: DB2, SQL Server, Oracle, DB2

- **Personal DBMS**
  - Designed for smaller, simpler database applications
  - Supports fewer than 100 users (mostly 1-10 users)
  - Examples: Access, dBase, FoxPro, Paradox, R-Base

Personal Database System



Information System Management

Chapter Five – Part 2:
Database Design

is the ♥ heart of any IS

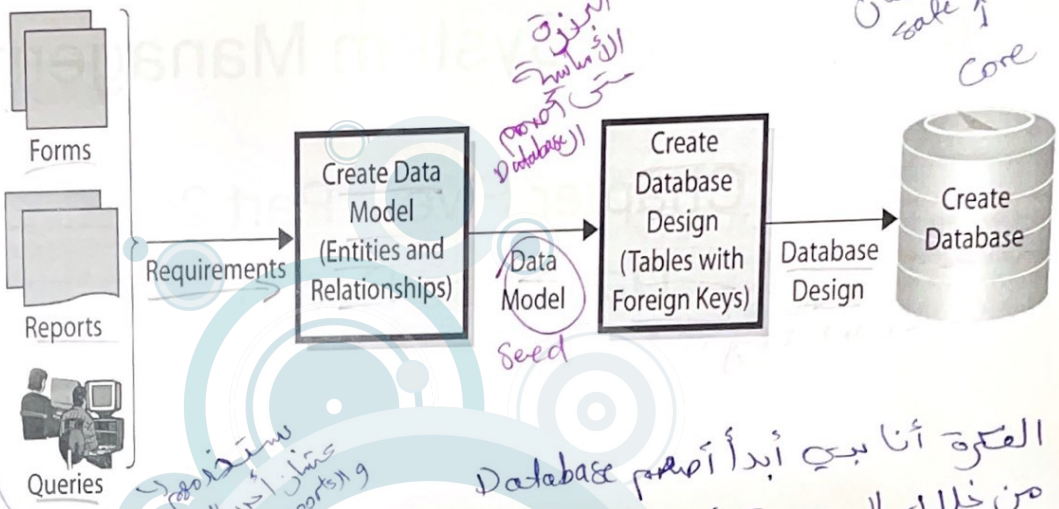
Dr. Baha'eddin Alhaj Hasan
Department of Industrial Engineering

Database Application Systems

الي الـ end user بتعامل معها وعن طريق الـ Database Management System ممكن تعمل Access لـ Database الي كنتوي

- Database application consists of:
  - Forms
  - Reports
  - Queries
  - Application programs

How Are Systems Developed?



Database Application System Development Process

- Developers interview users
- Develop requirements for new system
  - Analyze existing reports, forms, and user activities
- Requirements summarized in data model
  - Logical representation of structure of data
  - Contains description of data and relationships
- Users validate and approve model
- Design implemented in a database
  - Database filled with user data

بعد ما أعبي الـ Data إلي عندي
عملية الـ Database بتكون عملية
متواصلة وبتكون Dynamic

Database

of banks, liberaries, etc.

- Must include all data necessary for users to perform jobs
- Contains only that amount of data, and no more
- Developers rely on users to:
  - Tell them what to include
  - Check data model
  - Verify correctness and completeness

Database Design

- Process of converting data model
  - Transforms entities into tables
  - Expresses relationships
    - Defines foreign keys → WE will learn what are foreign keys
  - Shows data constraints → How do I ~~decide~~ put the constraints I should always have data constraints. apply

الأشياء المفروض إنها تكون موجودة والأشياء الـ optional رح نحدد طبيعة الـ Relationship
والـ entities رح نحولها لـ Tables

THE PROBLEM

How can we describe the structure of this database to others?

Email Table

EmailNum	Date	Message	Student Number
1	2/1/2007	For homework 1, do you want us to provide notes on our references?	1325
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4	2/17/2007	Will miss class Friday due to job conflict.	4867

لوبي أبدأ أصمم Tables من خلال شكل الDatabase إلي هندي رح يكون شكلها كالتالي ←

صعب بدأ نشرح Structure Tables من خلال Database أي Database بتضم عدد لا يمكن حصره من الTables فصعب جداً تعمل عليه model . أنا بحاجة لشيء مريح بصرياً يختصر كل الData حاي ويحدد طبيعة الData إلي حتكون موجودة

يحدد ↓

1. Nature of the data
2. Types of data
3. Constraints of the data.
4. Relations

THE PROBLEM

The metadata!

How can we describe the structure of this database to others?

Email Table

EmailNum	Date	Message	Student Number
1	2/1/2007	For homework 1, do you want us to provide notes on our references?	1325
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Student Table

Student Number	Student Name	HW1	HW2	MidTerm
1325	BAKER, ANDREA	88	100	78
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2881	NELSON, STUART	100	90	98
3007	FISCHER, MAYAN	95	100	74
3559	TAM, JEFFREY		100	88
4867	VERBERRA, ADAM	70	90	92
5265	VALDEZ, MARIE	80	90	85
8009	ROGERS, SHELLY	95	100	98

Office Visit Table

VisitID	Date	Notes	Student Number
2	2/13/2007	Andrea had questions about using IS for raising barriers to entry.	1325
3	2/17/2007	Jeffrey is considering an IS major. Wanted to talk about career opportunities.	3559
4	2/17/2007	Will miss class Friday due to job conflict.	4867

Structure ⇒ Metadata.

المعلومات إلي بتشرح لحاي الData

زي الheaders of the tables عبارة عن Metadata.

THE PROBLEM

Using Text?

هل ممكن نستخدم ال Text to describe or model the database?

هل ممكن أشرحها بالطريقة هاي مثلاً

EMAIL (<u>EmailNum</u>, Date, Message, *Student Number*)

STUDENT (<u>Student Number</u>, Student Name, HW1, HW2, MidTerm)

OFFICE_VISIT (<u>VisitID</u>, Date, Notes, *Student Number*)

Has limitations:

- Lacks relationships.
- Lacks properties of attributes.
- Hard to visualize.

Limitations

Using texts. lacks visualization
ERD will perform visualization

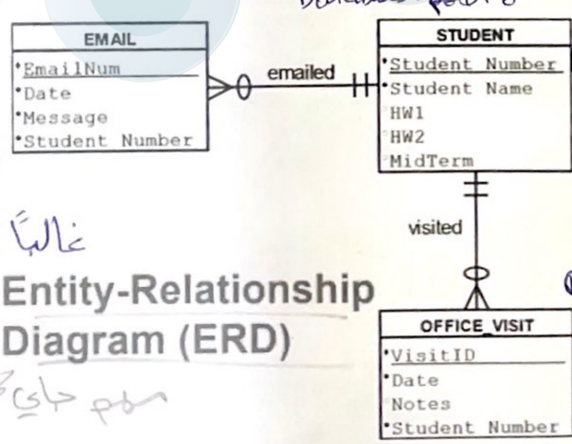
ERD -> more than one type -> رح يعمل عملية visualization وبالتالي رح يكون شكل ال model

رح يشرح لي ال Entities إلي مطلوبة مني
رح أحدد من خلال ال constraints إلي بتعتمد Data types

رح أحدد visual representation لل Database وال Relations إلي عندي
وكمان رح يعطيني ال meta data إلي عندي إلي رح نحولها ال headers student office visit بال Tables لأسماء ال Database

THE PROBLEM

Using a Diagram?



في أكثر من Version لل ERD إلي رح نستخدمه هون هي إلي خاصة بطريقة التمثيل إله عنا ياها لل Relations

طريقة التمثيل أو ال Diagram أحياناً تسمى برجل البطة أو الشوكة

غالباً منستخدم ال

Entity-Relationship Diagram (ERD)

مهم جاي كثير على الفاينل

E-R DIAGRAM (ERD)

Flow Chart
illustrates database's → Data model.

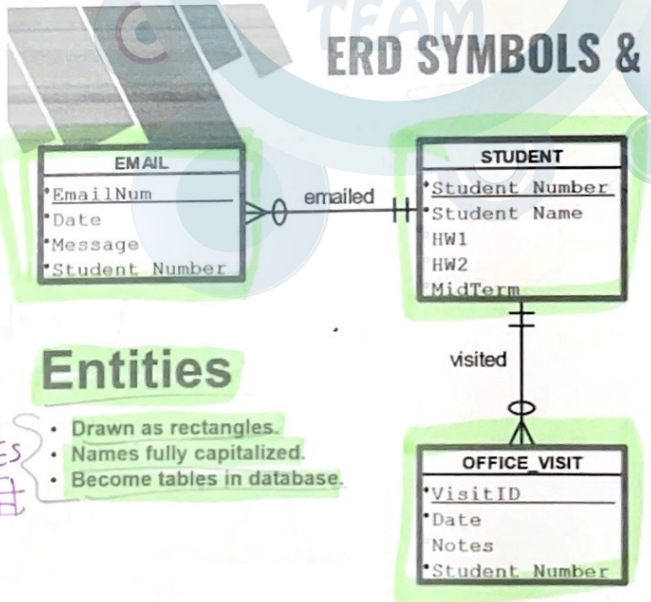
What is an E-R Diagram (ERD)?

↳ shows:-
how entities are related to eachother & what attributes they contain!

- Type of flowchart that illustrates a database's **data model**.
- Shows how **entities** are ***related*** to each other and the **attributes** they contain.
- Used in database design as an **initial step** to represent the database in a system independent way.

↳ Structure of data = entities + metadata

ERD SYMBOLS & NOTATIONS



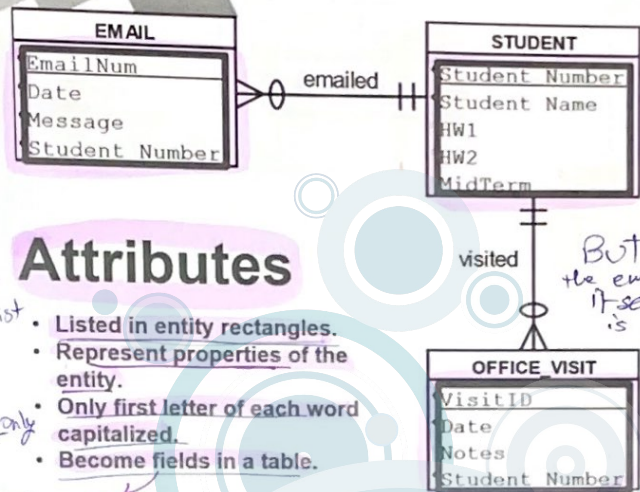
مثلاً بال Email
الـ entities لـ تتحول
عبارة عن (EMAIL) header الـ metadata

Entities

NAMES

- Drawn as rectangles.
- Names fully capitalized.
- Become tables in database.

ERD SYMBOLS & NOTATIONS



Attributes ← الأسماء أو الرموز
~~or constraints~~
يعني مواصفات
entities ال Properties of entities.
Student Number
Student Email.
But the email itself is → ال Email نفسه بعتبره Metadata.

Attributes

~~OR Constraints~~ List

- Listed in entity rectangles.
- Represent properties of the entity.
- Only first letter of each word capitalized.
- Become fields in a table.

First letter only

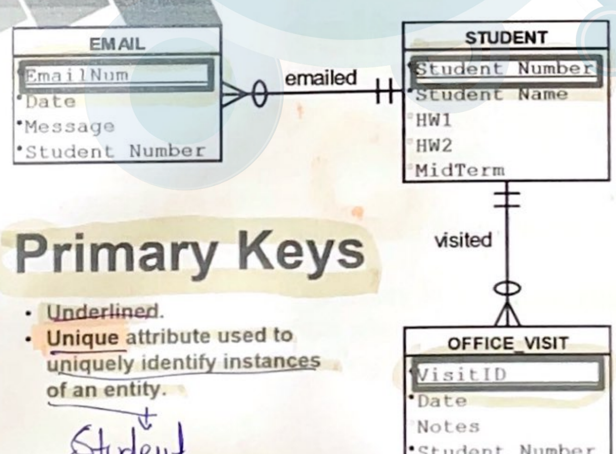
fields or columns.

أول حرف بكل Attribute → capitalized

المواصفات إلي عندي داخل ال Datastructure.

entities ال Attributes بتضم مواصفات ال entity إلي هي أسم ال EMAIL بتضم ال Metadata نفسه الي هو إلي عندي

ERD SYMBOLS & NOTATIONS



Primary Keys إلي تحتها خط Student Number

المعرف الأساسي إلي عندي

Primary Keys

تحتهم خط

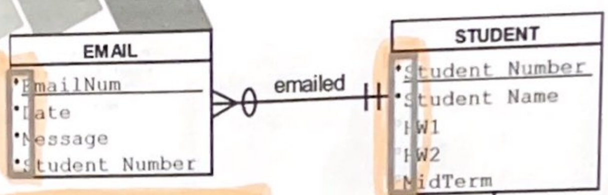
- Underlined.
- Unique attribute used to uniquely identify instances of an entity.

Student entity هو ال لما أدخل عليه Student Num. بصير Instances.

Instance حالة موجود بس قابل انه يتغير

في حالة ال STUDENT entity المعرف الأساسي هو ال Student Number.

ERD SYMBOLS & NOTATIONS



Must be put

Attribute Properties

- Denoted with different bullet shapes.
- Defines if an attribute is a primary key, unique, required (not nullifiable), or not required (nullifiable).

filled => Required
يعني ياه
زي Student Name.
لابد يكون عندي

أما Notes
مش بالضرورة
تكون موجودة

✓ filled dark circles/Bullets (Required).
✓ Empty white Bullets => (Not Required).

ERD SYMBOLS & NOTATIONS

Attribute Properties

Primary Key Attribute
Also denotes a primary key.

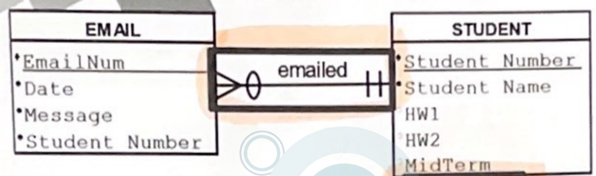
Nullifiable Attribute
An instances of an entity may have no value for this attribute (e.g. students are **NOT** required to have a date of birth).

ممكن أستغني
عن هاي المعلومة

Required Attribute
Each instances of an entity must have a value of this attribute (e.g. all students must have a name).

Databases are more than Records

ERD SYMBOLS & NOTATIONS



In Relationships

Names are always Lowercase.

Lines connecting entities.

Crow's foot ← رجل البطة

Relationships

- Represented by lines connecting entities.
- Relationship names are always all lowercase.
- Crow's foot notation used to denote cardinality and participation.

ERD here is crow's foot ERD.

CARDINALITY

↳ # of instances of entities involved in the Relationship.

» Indicates the **number** of instances of the entities that are involved in the relationship.

NOTE: **Not** the total number of instances in the entity.

This regards how many instances in one Entity are *related* to how many instances in the other Entity in the relationship

الهدف إني أعرف هل هي one to one. يعني كل Instance في هاي ال entity داخلة في ال Relation مع Instance وحدة مع هاي ال entity ولا one to many؟ يعني كل instance من هون داخل مع many instances مع هاي ال entity

or Many to Many

many من هون و many من هون

هاد هدف ال Cardinality

CARDINALITY

Email Table

EmailNum	Date	Message	Student Number
1	2/1/2007	For homework 1, do you want us to provide notes on our references?	1325
2	3/15/2007	My group consists of Swee Lau and Stuart Nelson.	1325
3	3/15/2007	Could you please assign me to a group?	1644

1:N

Student Table

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4867	VERBERRA, ADAM	70	90	92
5265	VALDEZ, MARIE	80	90	85
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1:N

Office_Visit Table

VisitID	Date	Notes	Student Number
2	2/13/2007	Andrea had questions about using IS for raising barriers to entry.	1325
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Student Number مرتبط بـ Student Name واحد

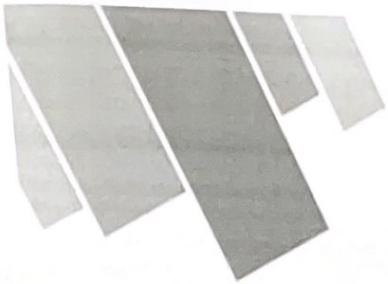
كل طالب ممكن يبعت أكثر من Email.

One to Many.

CARDINALITY

- 1:1 relationships
  - Single entity instance to single entity instance
- 1:N (N:1) relationships
  - One to many
  - Single entity instance to many entity instances
- N:M relationships
  - Many to many
  - Many entity instances to many entity instances

لو في أكثر من شغلة معينة إلى في الطبيعة بتعمل



PARTICIPATION

(a.k.a. Modality -or- Multiplicity)

» The participation of an entity in a relationship indicates whether all or only some of the instances of the entity are involved in the relationship

Participation of entity in Relationship.

يحدد عدد المشتركين بالعلاقة نفسها

عدد على الأكثر أو الأقل

PARTICIPATION

(a.k.a. Modality -or- Multiplicity)

2 types of participation

» "Mandatory" participation:
  - All of the instances are involved in the relationship

» "Optional" participation:
  - If NOT all of the instances are involved in the relationship

In Other Words: every time an instance is added to an entity, ***must*** an associated instance be added to the related entity ?

PARTICIPATION

All emails must have a student (Mandatory)

Email Table

EmailNum	Date	Message	Student Number
1	2/1/2007	For homework 1, do you want us to provide notes on our references?	1325
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3	3/15/2007	Could you please assign me to a group?	1644

All e-mails must have a student (mandatory).

Student Table

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Not all students will have sent an e-mail (optional).

ممكن طول الفصل ماتبعت ولا إيميل

بكل Student كل لازم يكون في إيميل

Office_Visit Table

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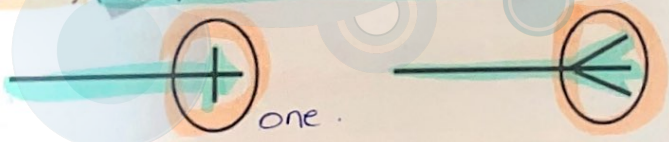
CROW'S FOOT NOTATION

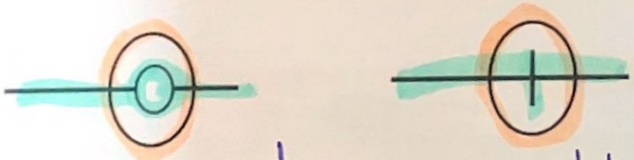
Cardinality (Multiplicity - [one] -or- [many]):



one.

many crow's foot

Participation Level ([optional] -or- [mandatory]):



optional

Mandatory.

CROW'S FOOT NOTATION

Cardinality
vs
Participation.

One and ONLY One

(Only One Instance BUT Mandatory)

Zero or One

(Only One Instance BUT Optional)

ممكن 1 وممكن 0

على الأكثر عنصر واحد

One or Many

(One or More Instance BUT Mandatory)

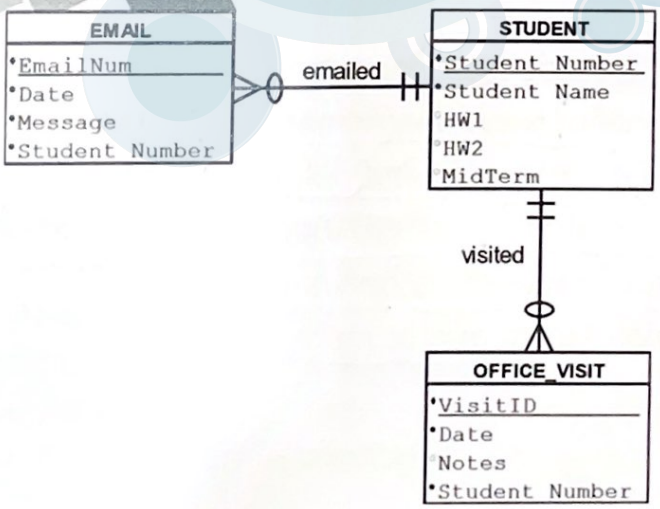
Zero or Many

(One or More Instance BUT Optional)

ممكن zero وممكن many.

على الأقل عنصر واحد

CROW'S FOOT NOTATION



Normalization

- Process
  - Converts table into two or more tables
  - Changes from poorly structured to well-structured
- Data integrity problems
  - Different names for the same entity
  - Produces incorrect and inconsistent information
  - Resolve by eliminating duplicated data
- Normalized tables
  - Eliminate data duplication
  - Slower to process
  - Every table has single topic

Relational Database Design

- Designer creates table for every entity
- Entity identifier becomes primary key of table
- Attributes of entity become columns
- Tables normalized to single theme
- Represent relationships between tables
- Add foreign key to one or more tables

What Is the Users' Role?

users' رح نبدأ بال → users interview
users judgement

- Final judges as to what data should be contained
- Determine how records are related to each other
- Need to review data model
- Must insure that model reflects an accurate view of business

interview in the first
& Review in the last.

Review مع الusers نفسهم بس أخلص الDatabase عشان أشوف
هل الmodel إلي عندي Reflects, Represents إلي عندي ولا لأ

Who Will Volunteer?

Obj, of this Ch. Database using Microsoft Access.

- Consultant creates data model
  - Based on interviews with users
- Data model reviewed and approved
- Database tables constructed
  - Primary and foreign keys selected → عشان نعمل الRelationship between the tables.
    - Based on interviews
- Microsoft Access database created
  - Relationships indicated
  - Forms and reports constructed

كل هاد بدي أبنيه من خلال Programme خاص

نوع من أنواع Personal database Management systems.

DESIGNING AN E-R MODEL/DIAGRAM

The 7 Steps

Step 1: Collect & review ALL the data.

Step 2: Identity **entities** & **attributes** draw them on your ER diagram

Step 3: Identify the **key attribute(s)** and underline them on your diagram

Step 4: Decide on the **relationships** and draw lines between the entities, including any **attributes** of the relationships.

Step 5: Decide on the **cardinality** of each relationship and add it to the diagram

Step 6: Decide on the **participation** of each entity in each relationship and *add* if required.

Step 7: Add the **foreign keys** of each relationship for each entity pairs and *add* relationship attributes if present.

EXAMPLE SCENARIO

The Doctor's Office

Requirements/Use Cases

1. Nurses **work for** the Doctor in the office.
2. Each Nurse **works for** (assigned to) a **single** Doctor.
3. Every Doctor has **one or more** Nurses **working for** (assigned) them.
4. Each Nurse has a **first name**, **last name** and a unique **Nurse's ID**.
5. Each Doctor has a **first name**, **last name** and a unique **Doctor's ID**.
6. Only a Doctor can **order** a type of **Test**, but not all Doctors order **Tests**.
7. Each type of Test has a unique **Test ID number** and the **name of Test**.
8. If known, keep track of the **hours per week** worked by the Nurse.
9. We need to keep track of the **date** that any Test order was placed.

STEP 1 & 2

Step 1: Collect & review ALL the data.

Step 2: Identity entities & attributes draw them on your ER diagram

يعني أحدد الـ entities اللي عندي

1. **Nurses** work for the **Doctor** in the office.
2. Each **Nurse** works for (assigned to) a single **Doctor**.
6. Only a **Doctor** can order a type of **Test**, but not all **Doctors** order **Tests**.

STEP 1 & 2

Step 1: Collect & review ALL the data.

Step 2: Identity **entities** & **attributes** draw them on your ER diagram

NURSE	DOCTOR	TEST
nurse ID	doctor ID	test ID
lastName	lastName	type
firstName	firstName	

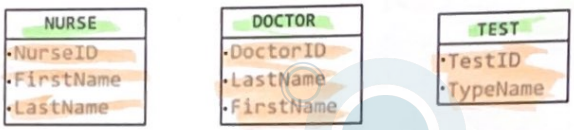
Attributes لتحديد بياناته.

4. Each **Nurse** has a first name, last name and a unique Nurse's ID.
5. Each **Doctor** has a first name, last name and a unique Doctor's ID.
7. Each type of **Test** has a unique Test ID number and the name of Test.

STEP 1 & 2

Step 1: Collect & review ALL the data.

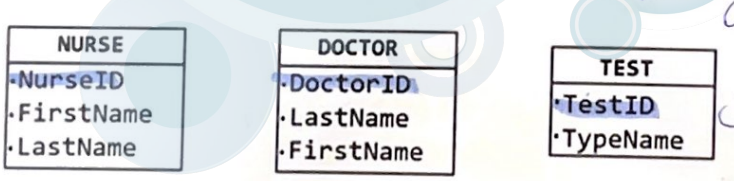
Step 2: Identity entities & attributes draw them on your ER diagram



STEP 3

Step 3: Identify the **key attribute(s)** and underline them on your diagram

Key attributes ح أحدد أو Primary Keys



يكون required

ح ياخذوا الشكل الماعين

diamond.

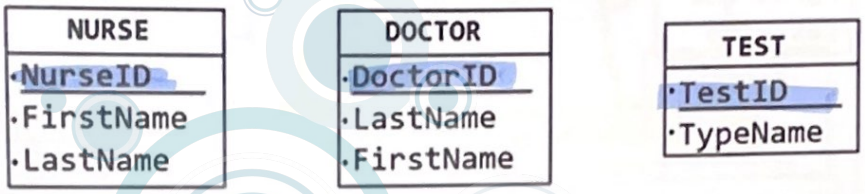
4. Each Nurse has a first name, last name and a unique Nurse's ID.

5. Each Doctor has a first name, last name and a unique Doctor's ID.

7. Each type of Test has a unique Test ID number and the name of Test.

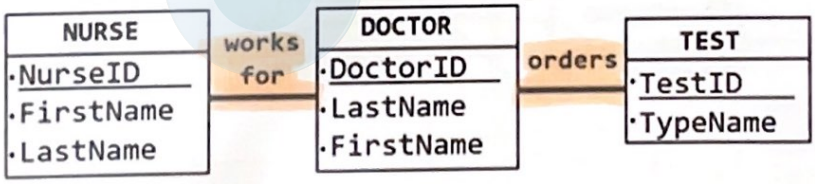
STEP 3

Step 3: Identify the **key attribute(s)** and underline them on your diagram



STEP 4

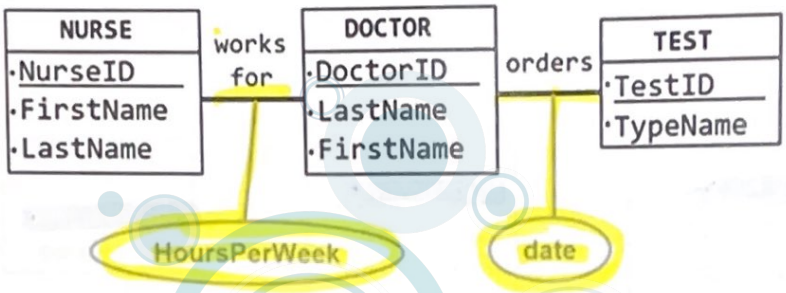
Step 4: Decide on the **relationships** and draw lines between the entities, including any attributes of the relationships.



1. **Nurses** work for the **Doctor** in the office.
6. Only a **Doctor** can order a type of **Test**, but not all **Doctors** order **Tests**.

STEP 4

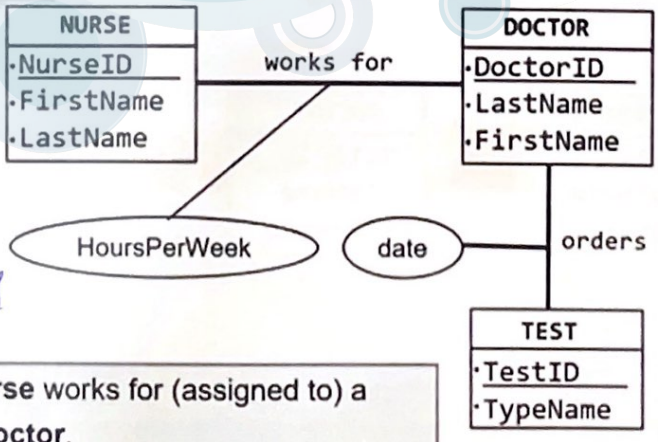
Step 4: Decide on the **relationships** and draw lines between the entities, including any attributes of the relationships.



8. If known, keep track of the hours per week worked by the **Nurse**.
9. We need to keep track of the date that any **Test order** was placed.

STEP 5

Step 5: Decide on the cardinality of each relationship and add it to the diagram.



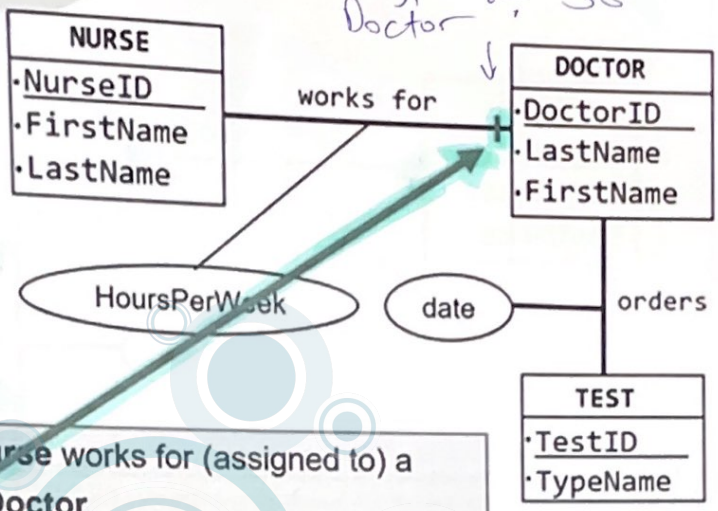
so cardinality = 1

2. Each **Nurse** works for (assigned to) a single **Doctor**.
3. Every **Doctor** has one or more **Nurses** working for (assigned) them.

1 +.

تبعت cardinality الـ Nurse

الـ Doctor

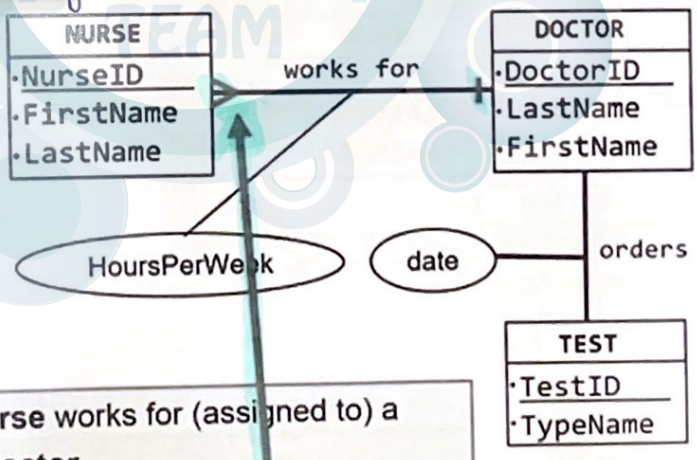


2. Each **Nurse** works for (assigned to) a **single Doctor**.
3. Every **Doctor** has one or more **Nurses** working for (assigned) them.

*

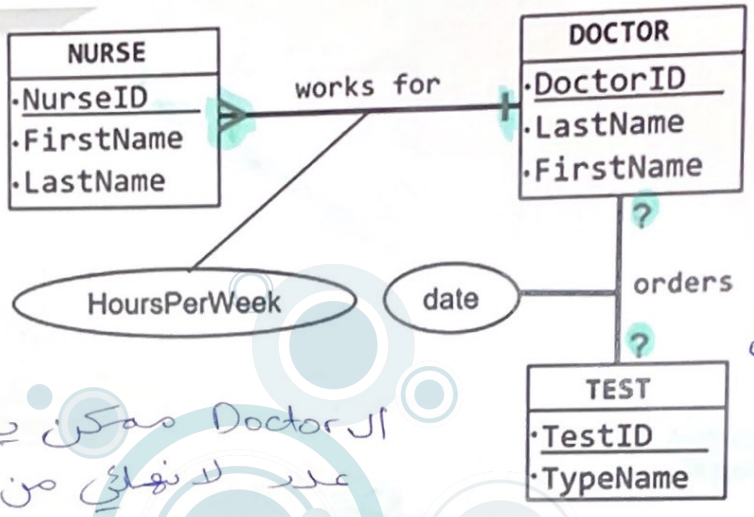
بس
The cardinality of the entity would be on the opposite side of it Not it's own adjacent side.

الـ Nurse عكس الـ cardinality الـ Doctor على الـ edge.



2. Each **Nurse** works for (assigned to) a **single Doctor**.
3. Every **Doctor** has one or **more Nurses** working for (assigned) them.

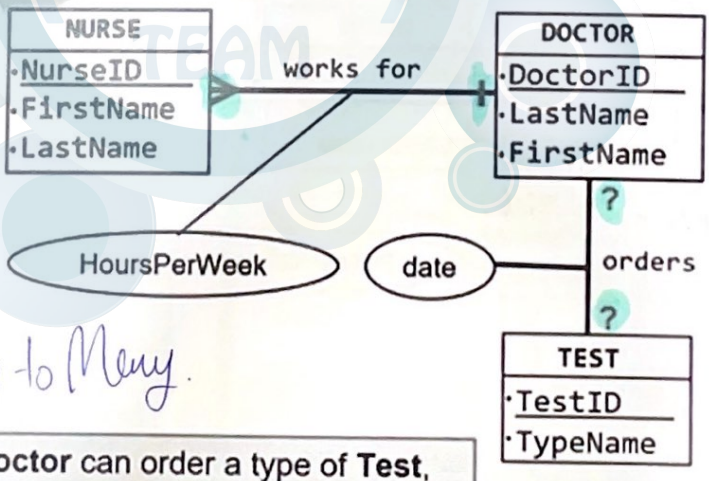
الـ cardinality دي One to Many.



هنا الـ Cardinality بين الـ Doctor والـ Test

الـ Doctor ممكن يطلب عدد لا نهائي من الـ Tests

وكمان نفس الـ Test ممكن يتطلب من أكثر من Doctor.

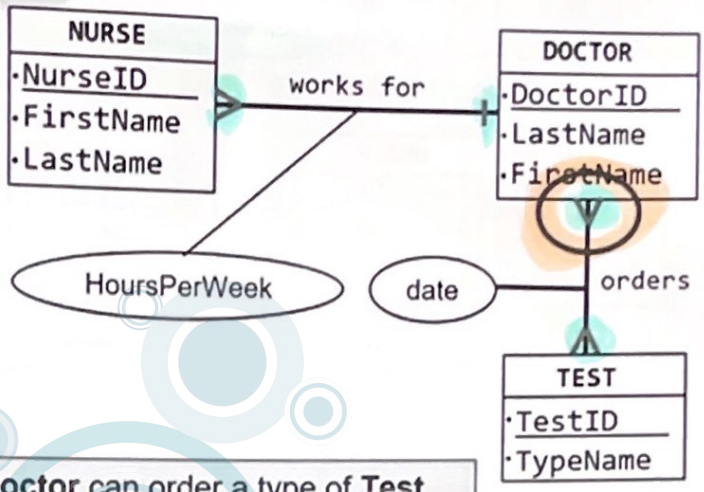


So,

Cardinality is Many-to-Many.

6. Only a **Doctor** can order a type of **Test**, but not all Doctors order **Tests**.

(notice the ambiguity – now common sense comes in to play ...)

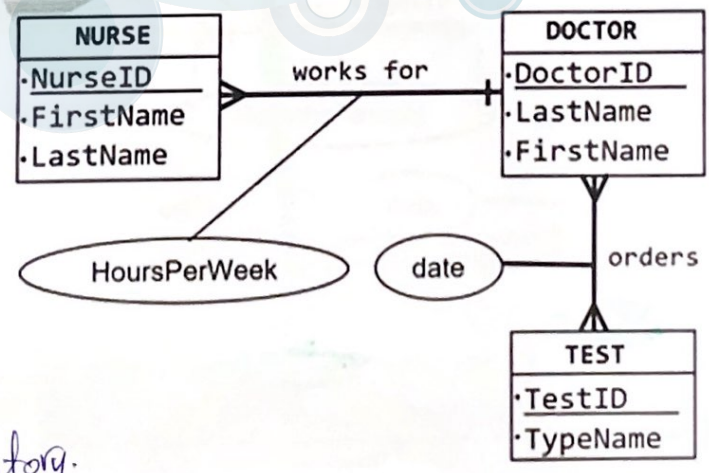


6. Only a **Doctor** can order a type of **Test**, but not all Doctors order **Tests**.

Test can be ordered by different Doctors (e.g. both Dr. A and Dr. B can order a MRI).

STEP 6

Step 6: Decide on the **participation** of each entity in each relationship and *add* if required.

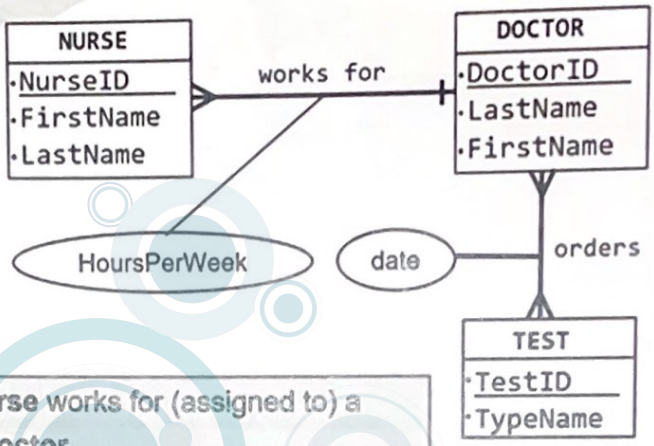


Nurse كل لازم
يكون إلها على الأقل
Doctor
وكل Doctor لازم يكون
Nurse على الأقل
و
واحدة

وبالتالي
Participation
↳ Mandatory.

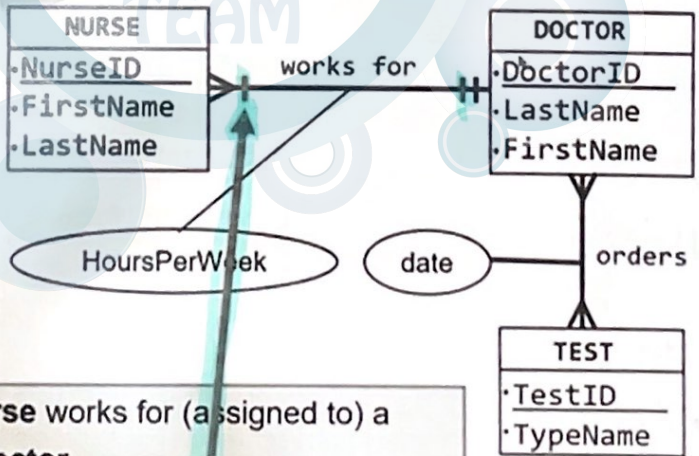
STEP 6

Step 6: Decide on the **participation** of each entity in each relationship and *add* if required.



2. Each **Nurse** works for (assigned to) a **single Doctor**.
3. Every **Doctor** has **one or more Nurses** working for (assigned) them.

Mandatory participation 改善



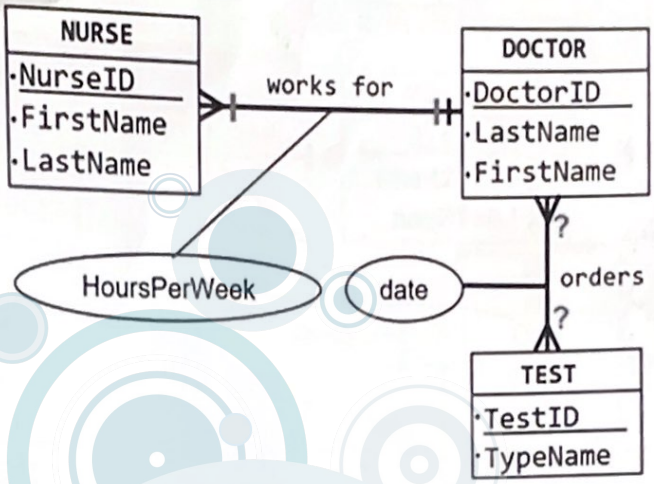
Cardinality many
& Participation mandatory

1

2. Each **Nurse** works for (assigned to) a **single Doctor**.
3. Every **Doctor** has **one or more Nurses** working for (assigned) them.

1+

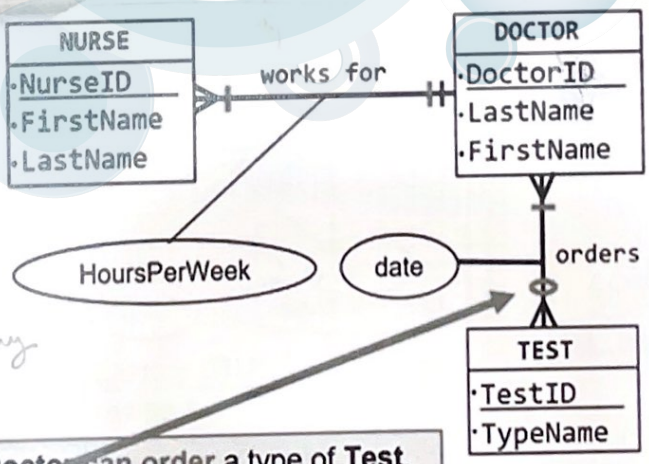
Step 6: Decide on the **participation** of each entity in each relationship and *add* if required.



على وقت الدكتور مع الـ Test optional.

Relationships العلاقات — Cardinality — Participation — هيك بكون حدنا — عن طريق تحديد

Step 6: Decide on the **participation** of each entity in each relationship and *add* if required.



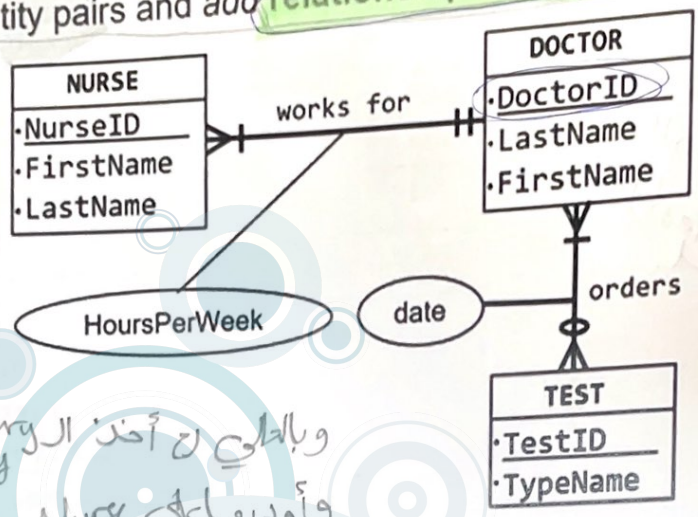
one or many

6. Only a **Doctor can order a type of Test**, but **not all Doctors order Tests.**

zero or one or many.

STEP 7

Step 7: Add the foreign keys of each relationship for each entity pairs and add relationship attributes if present.



* دائما الـ Foreign Keys بتكون للجهة إلي الـ Cardinality فيها Many

وبالحالي لـ أخذ الـ Primary Key من دكتور وأوديها لـ Nurse

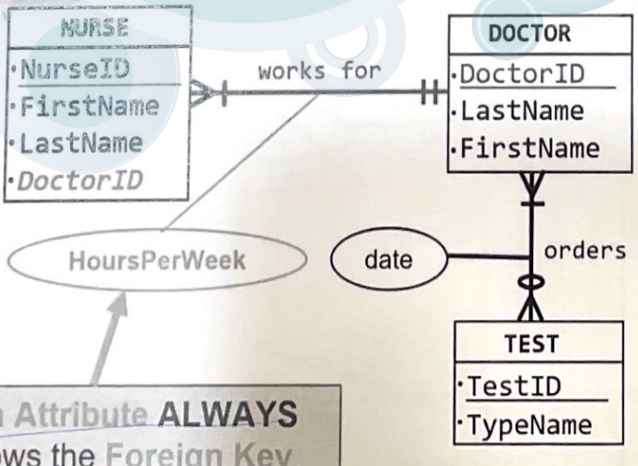
كونه كل Nurse لازم تشتغل مع طبيب واحد فقط يعني لازم أعرف اسم الطبيب اللي بتشتغل معه! وبالتالي الـ Doctor ID وهو الـ Primary Key ح يصير Foreign Key

حكينا كل Test لازم يكون مطلوب من Dr. واحد مفيد إني أنقل الـ Dr. ID.

STEP 7

Step 7: Add the foreign keys of each relationship for each entity pairs and add relationship attributes if present.

تحديد الـ Foreign Keys.



* الـ Foreign Keys لازم تكون Primary Keys في entity مختلفة عن الـ entity إلي بدخل عليها الـ Foreign Keys.

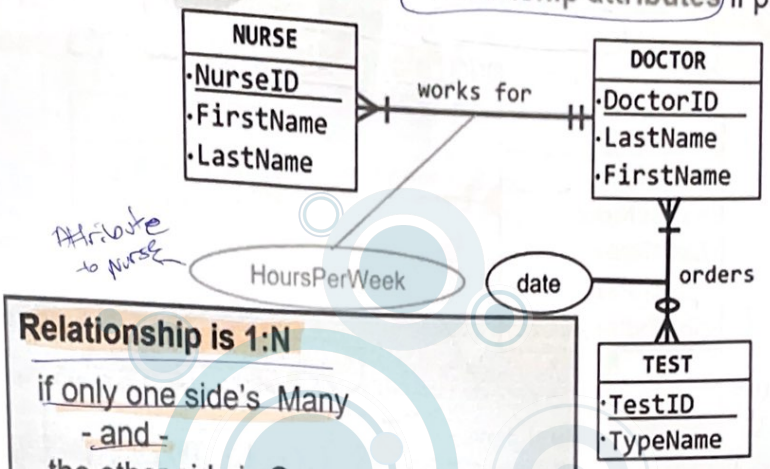
Attribute بدخلها لـ Nurse

- Relation Attribute ALWAYS follows the Foreign Key

Relation Attribute دائماً بتتبع الـ Foreign Key

STEP 7

Step 7: Add the foreign keys of each relationship for each entity pairs and add relationship attributes if present.

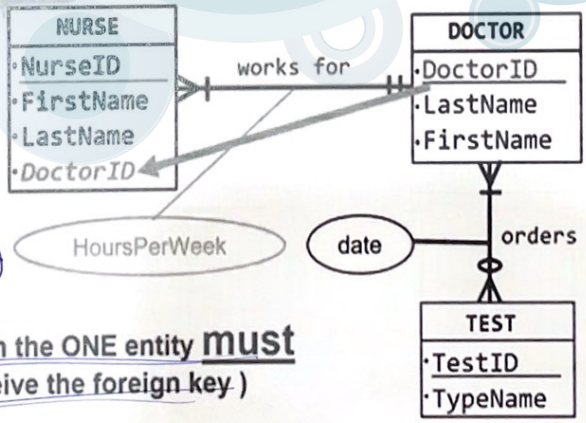


Relationship is 1:N

if only one side's Many
- and -
the other side is One
(then the ONE entity must receive the foreign key)

STEP 7

Step 7: Add the foreign keys of each relationship for each entity pairs and add relationship attributes if present.



1:N ⇒ one to Many

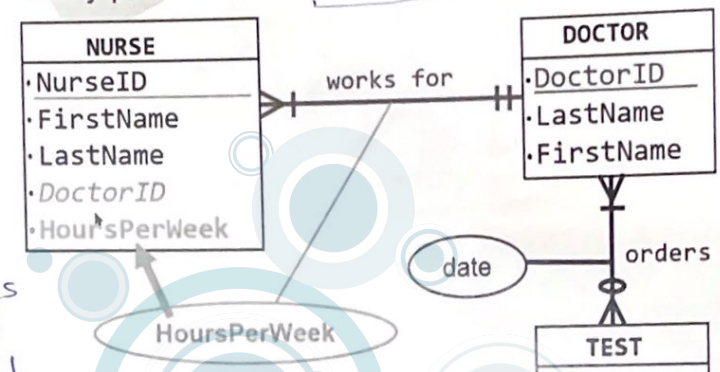
(1:N - then the ONE entity **must** receive the foreign key)

- This is a 1:N connection : so **Primary** from MANY entity becomes **Foreign** in the ONE entity

Primary Many.
Foreign ONE entity.

STEP 7

Step 7: Add the foreign keys of each relationship for each entity pairs and *add* relationship attributes if present.



Foreign Keys

ONE to MANY Relation → Single entity

Relation Attributes

Foreign Key

Many to ONE ONE to MANY Relations

Single entity

So Primary Key Many Doctor Nurse

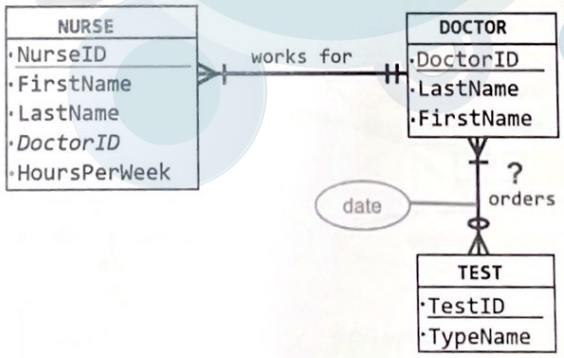
Single entity of the Relation.

Many to Many

New entity.

STEP 7B: SPECIAL CASE

Step 7b: Special case: Resolve N:M relationships (create relationship entities).



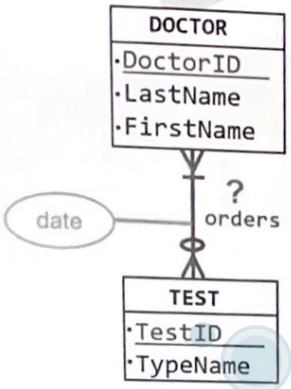
Special case.

Many-to-Many = N:M

will be small letter bcuz its NOT Data entities.

STEP 7B: SPECIAL CASE

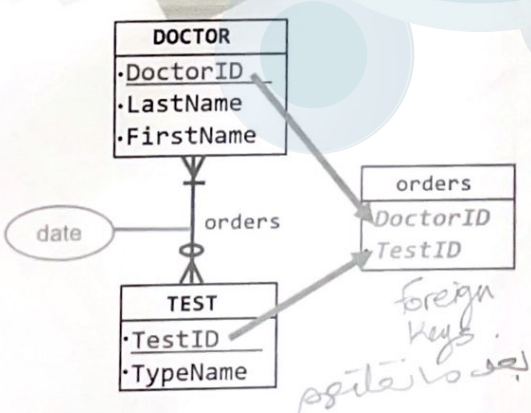
Step 7b: Special case: Resolve N:M relationships (create relationship entities).



STEP 7B: SPECIAL CASE

Step 7b: Special case: Resolve N:M relationships (create relationship entities).

I will make New entity. which is NOT info nor data entity.

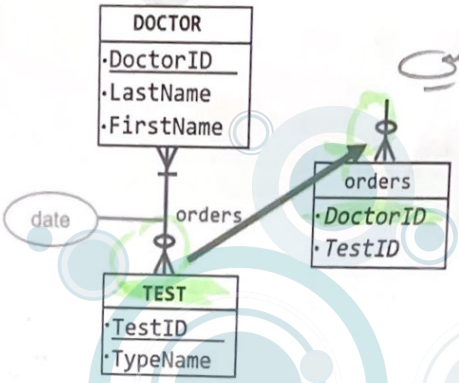


في إسمها رح يكون Small letter! عشان أميزها عن Data entities

Create new **relationship entity** with **primary keys** from both entities as **foreign keys** in the new **relationship entity**.

STEP 7B: SPECIAL CASE

Step 7b: Special case: Resolve N:M relationships (create relationship entities).



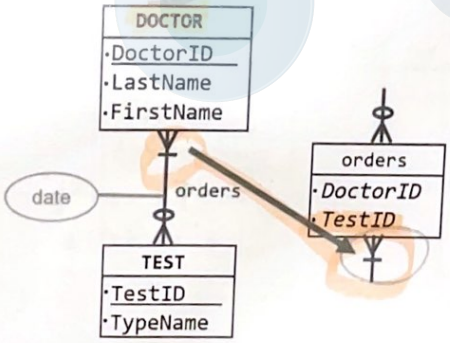
رح أنقلها بشكل عكسي

Participation الـ
و الـ cardinality
إلي لجهة الـ Test
رح تكون الجهة إلي فوق
إلي هي جهة الدكتور orders

و الـ cardinality و الـ Participation لجهة الدكتور رح تصير لجهة الـ Test

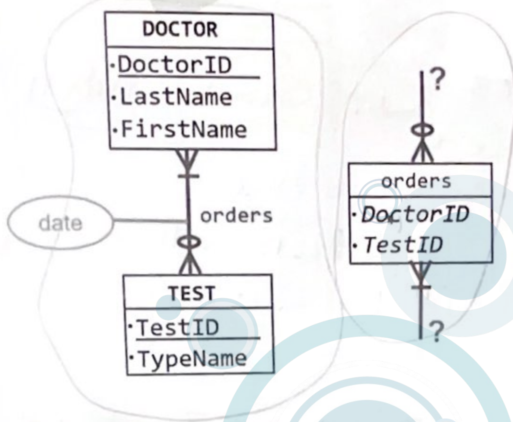
STEP 7B: SPECIAL CASE

Step 7b: Special case: Resolve N:M relationships (create relationship entities).



STEP 7B: SPECIAL CASE

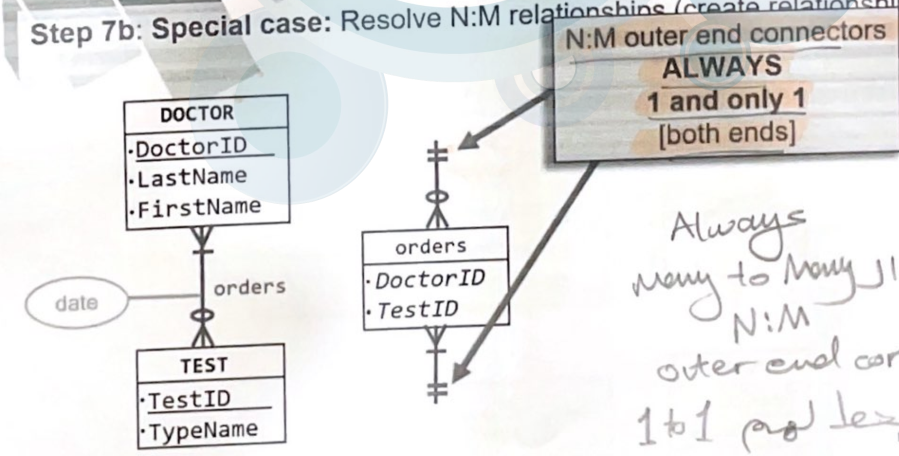
Step 7b: Special case: Resolve N:M relationships (create relationship entities).



طلب شو بخصوص
ال Cardinality
وال Participation
إلي على الجهة الثانية؟

STEP 7B: SPECIAL CASE

Step 7b: Special case: Resolve N:M relationships (create relationship entities).



Always
ال Many to Many
N:M
outer end connectors
بجعل لهم 1to1

STEP 7B: SPECIAL CASE

Step 7b: Special case: Resolve N:M relationships (create relationship entities).

Doctors بين Cardinality الـ
& orders
many to one.
Participation will be optional
Here it will be a must.

Date Attributes تتبع الـ foreign keys بالتالي بتيجي أوتوماتيك جوا الـ orders

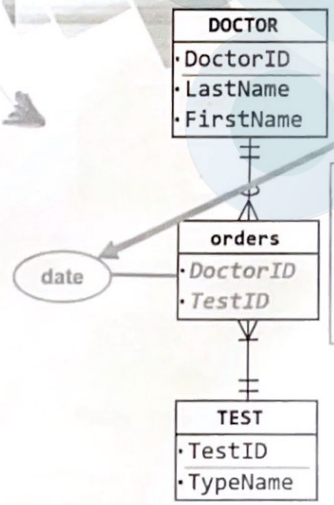
كل Test ممكن يتطلب أكثر من مرة
So, many orders لـ Test

Test can be ordered many times
Cardinality = Many!

كل order بلزم Test واحد على الأقل
ولازم يكون في Test لكل order
So participation = MUST
Cardinality = Single.

STEP 7B: SPECIAL CASE

Step 7b: Special case: Resolve N:M relationships (create relationship entities).

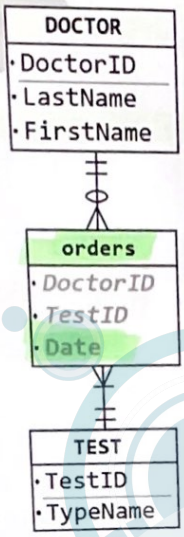


- Relation Attribute **ALWAYS** follows the Foreign Key

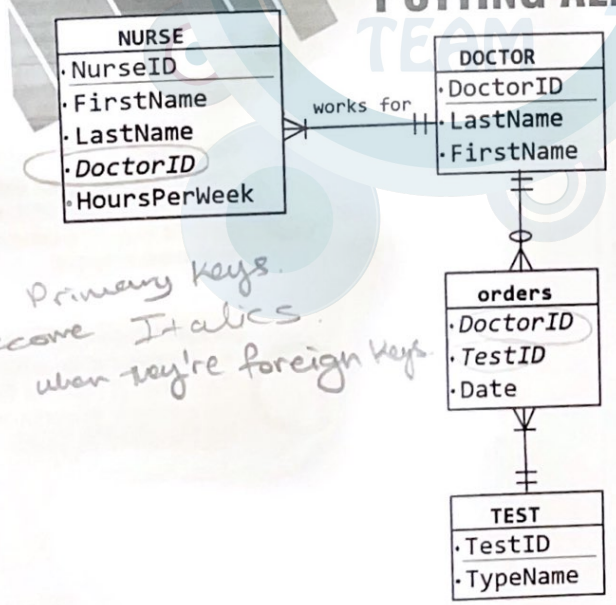
- This is a **M:N** relation : so **Primary** from both entities are **Foreign** keys in the new **orders** relationship entity.

STEP 7B: SPECIAL CASE

Step 7b: **Special case:** Resolve N:M relationships (create relationship entities).



PUTTING ALL TOGETHER

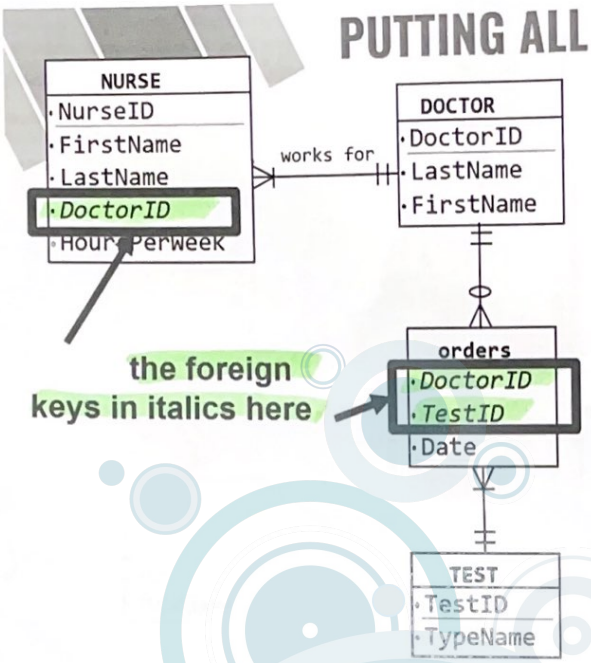


Primary keys become Italics when they're foreign keys.

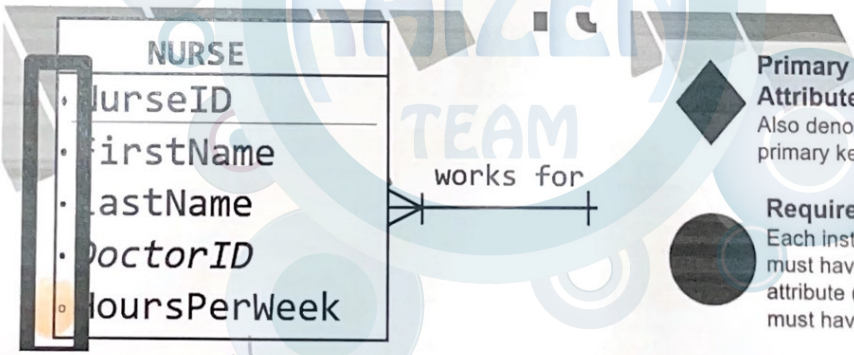
No primary key in orders entity

- Allowed in relationship entities.
- Can have multiple orders for same Doctor and Test.

PUTTING ALL TOGETHER



Attributes & Relations



ممكن تكون موجودة
وممكن ماتكون
فحطينا
Nullifiable Attribute

Primary Key Attribute
Also denotes a primary key.

Required Attribute
Each instances of an entity must have a value of this attribute (e.g. all students must have a name).

Nullifiable Attribute
An instances of an entity may have no value for this attribute (e.g. students are **NOT** required to have a date of birth).

USAGE

PRIMARY KEYS: (always!)

Nullable (NO) - can NOT be blank (empty)

Unique (YES) - the data can NOT be the repeated

A Primary Key must be filled in and must be unique.

Information System Management

Chapter Five – Part 3:
Microsoft Access

Dr. Baha'eddin Alhaj Hasan
Department of Industrial Engineering

HOW DO I BUILD A DATABASE?

Once the **E-R model** is built, it is used as a blueprint to build the real **database**

Translate (take) the model and use it as the 'instruction manual' to build the database.

رح يكون المخطط
إلي رح أمشي عليه

HOW DO I BUILD A DATABASE?

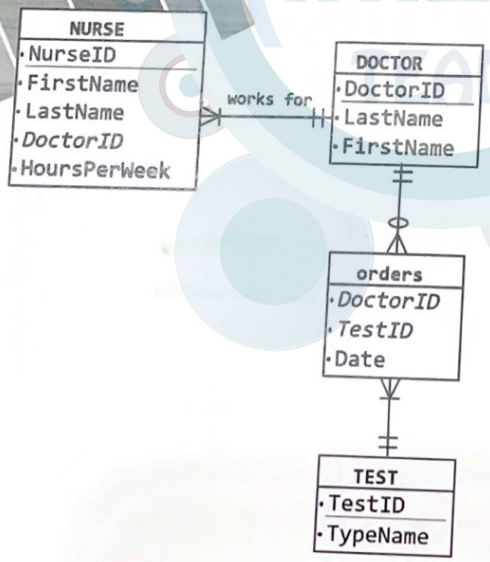
Once the **E-R model** is built, it is used as a blueprint to build the real **database**

- Model is mapped to an actual relational database
- Visualization (diagram) of the data

Diagrams Used to:

- document a model
- describe structured data

OUR EXAMPLE FROM LAST WEEK

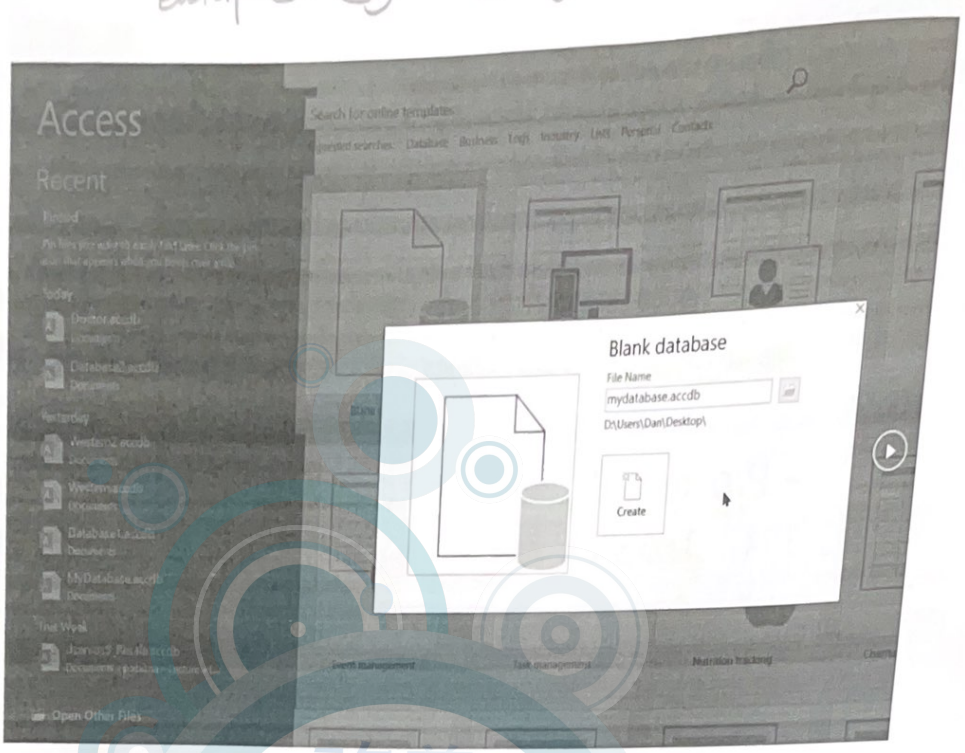


DATABASE DESIGN

- Will be converting the ERD to a Relational Database (in MS Access)

- Process of converting data model
  1. Transforms entities into tables
  2. Add attributes as table fields
  3. Define field metadata and keys
  4. Enforce relationships and constraints

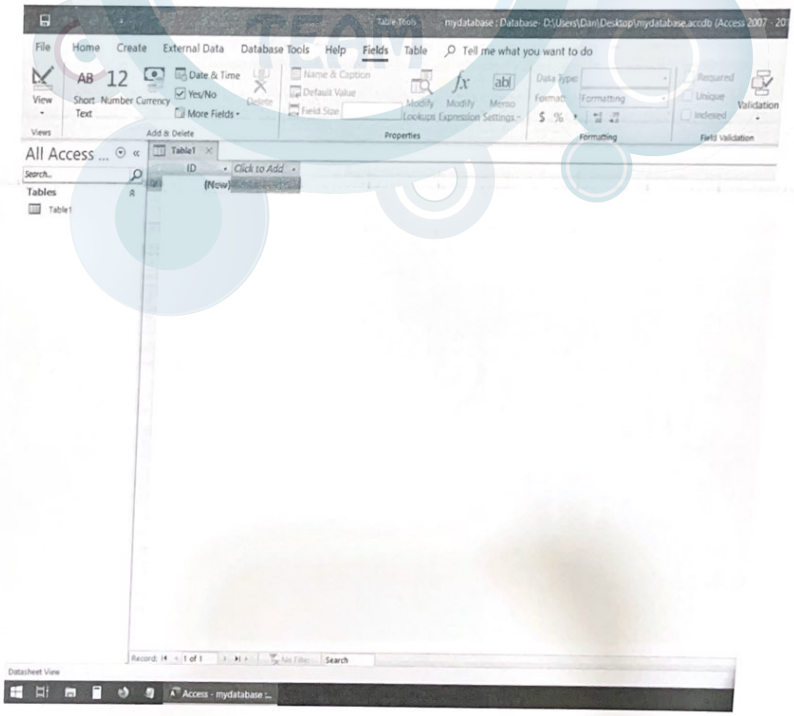
غالبة مستخدمة لنوع Database
بسيطة مش على مستوى الـ enterprise



على مستوى قسم في الكلية ممكن !

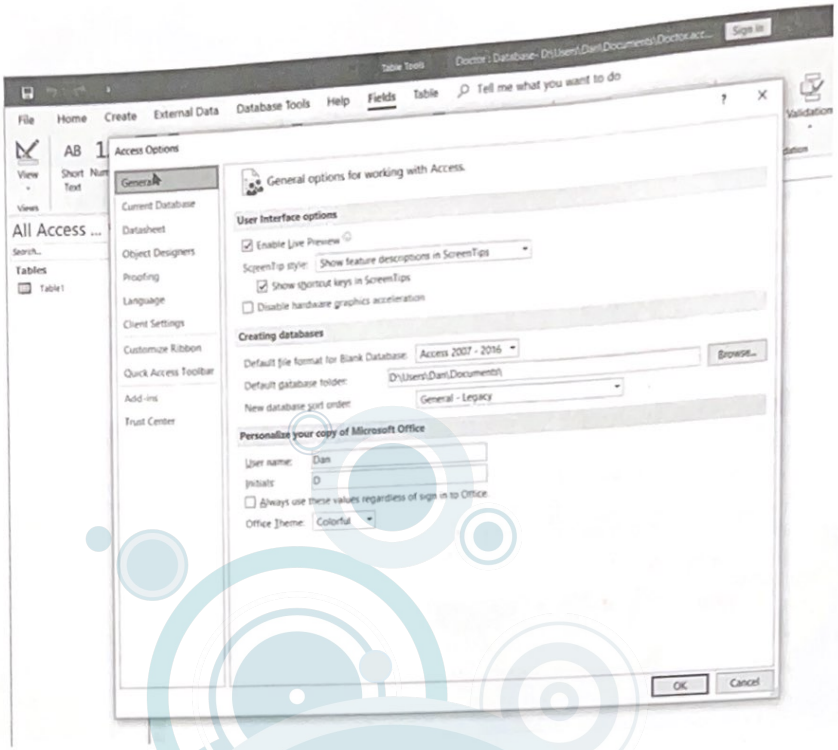
تشابه على حد بين Excel و Word و Access لإنهم من نفس الشركة

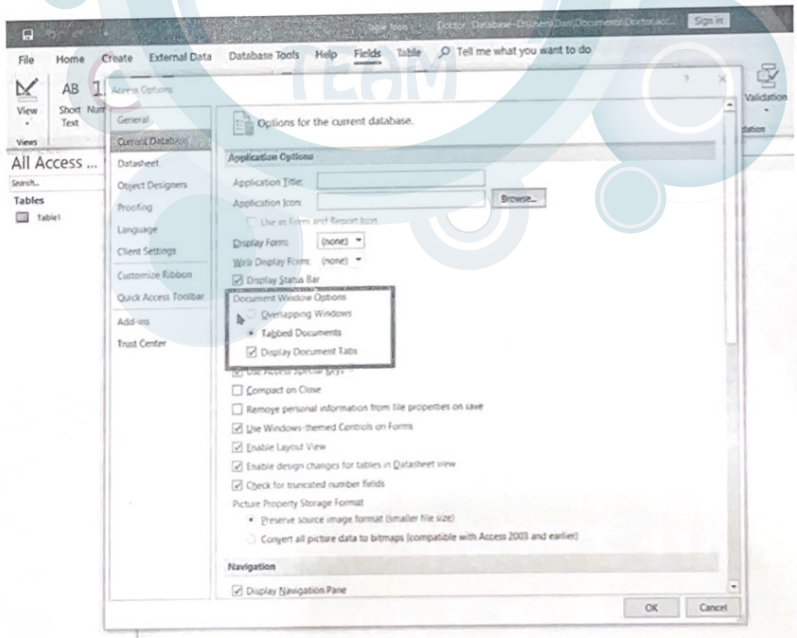
Tape View

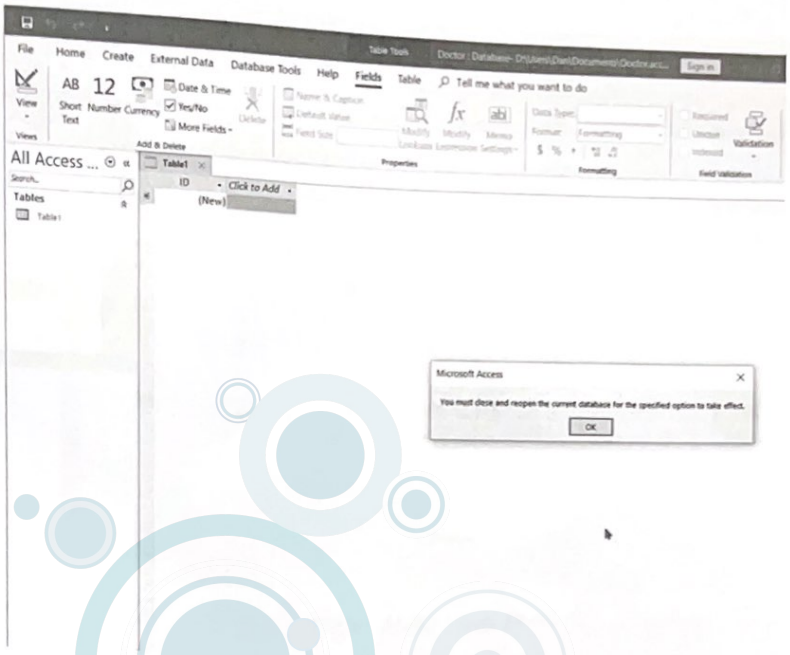


EXTRA ACCESS RESOURCES

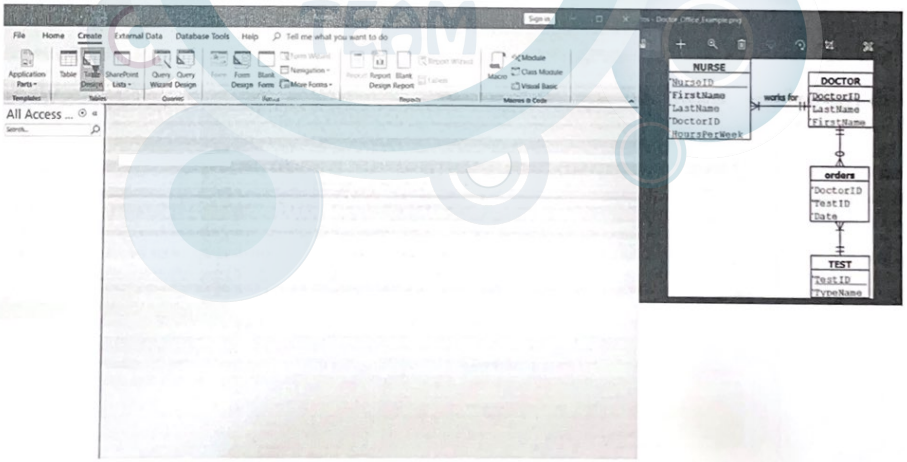
- Access help & learning (Official Microsoft Access documentation and resources)
  - Intro to Access
  - Create a database in Access
  - Add tables
  - Use relationships
  - Add and edit data
  - Manage data with queries
  - Create forms
  - Create reports

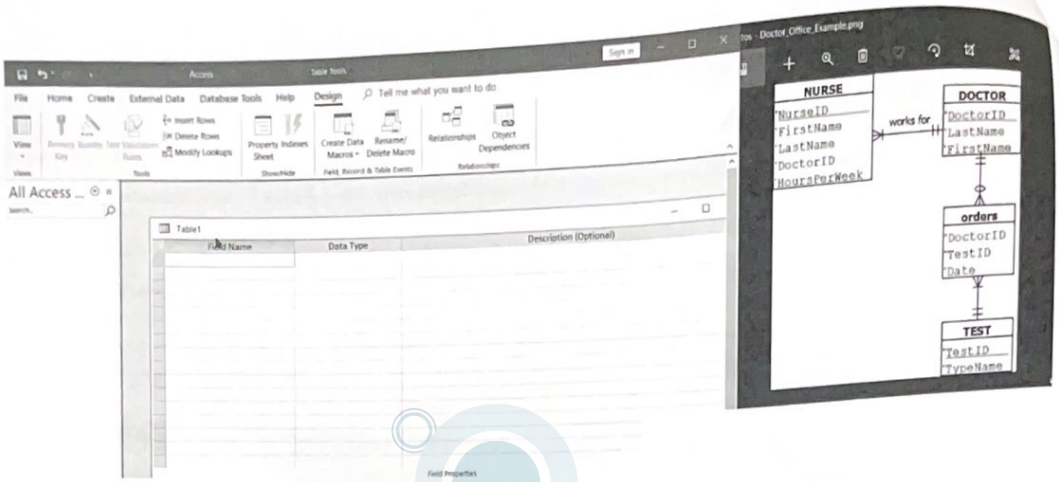

File
Home
Create
External Data
Database Tools
Help
Fields
Table
Tell me what you want to do
Access Options
General
Current Database
Datasheet
Object Designers
Proofing
Language
Client Settings
Customize Ribbon
Quick Access Toolbar
Add-ins
Trust Center
General options for working with Access.
User Interface options
Enable Live Preview
ScreenTip style:
Show feature descriptions in ScreenTips
Show shortcut keys in ScreenTips
Disable hardware graphics acceleration
Creating databases
Default file format for Blank Database:
Access 2007 - 2016
Browse...
Default database folder:
D:\Users\Dan\Documents\
New database sort order:
General - Legacy
Personalize your copy of Microsoft Office
User name:
Dan
Initials:
D
Always use these values regardless of sign in to Office.
Office Theme:
Colorful
OK
Cancel

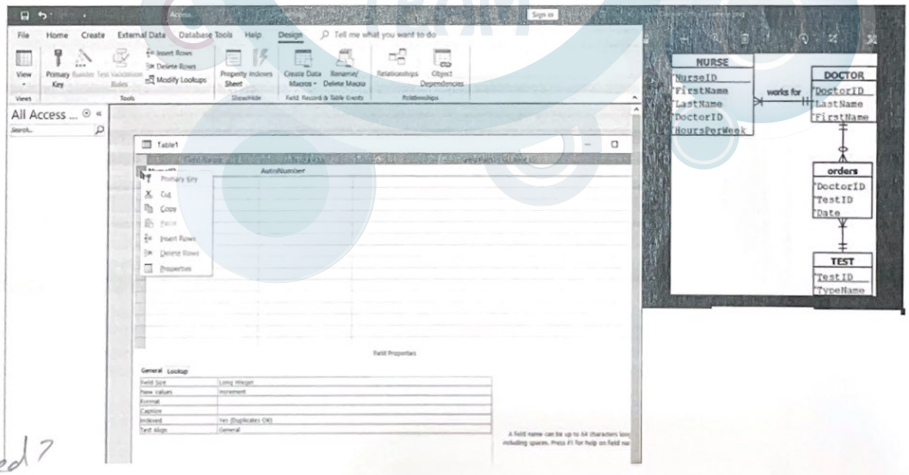

File
Home
Create
External Data
Database Tools
Help
Fields
Table
Tell me what you want to do
Access Options
General
Current Database
Datasheet
Object Designers
Proofing
Language
Client Settings
Customize Ribbon
Quick Access Toolbar
Add-ins
Trust Center
Options for the current database.
Application Options
Application Title:
Application Icon:
Browse...
Display Form:
(none)
Web Display Form:
(none)
Display Status Bar
Document Window Options
Overlapping Windows
Tabbed Documents
Display Document Tabs
Compact on Close
Remove personal information from file properties on save
Use Windows-themed controls on forms
Enable Layout View
Enable design changes for tables in Datasheet view
Check for truncated number fields
Picture Property Storage Format
Preserve source image format (smaller file size)
Convert all picture data to bitmaps (compatible with Access 2003 and earlier)
Navigation
Display Navigation Pane
OK
Cancel



Go to
Table design

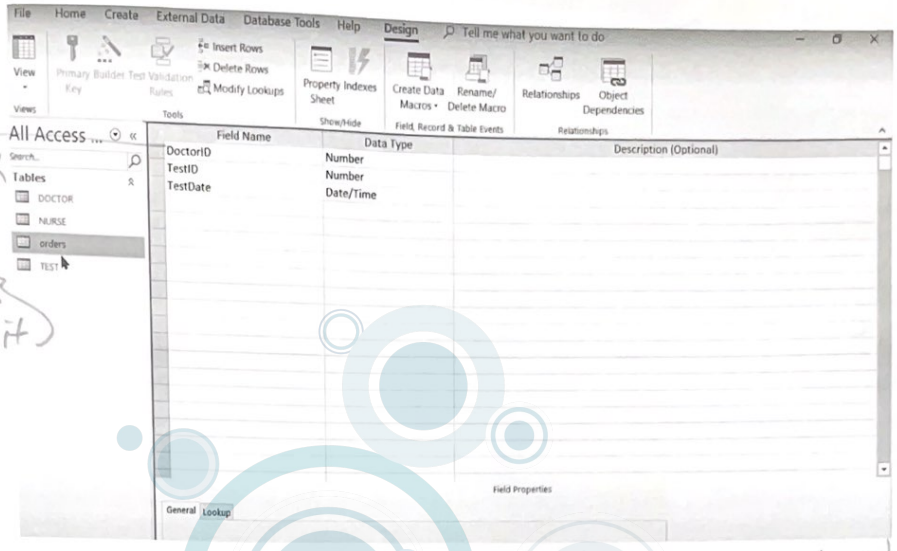






Required?

Yes.

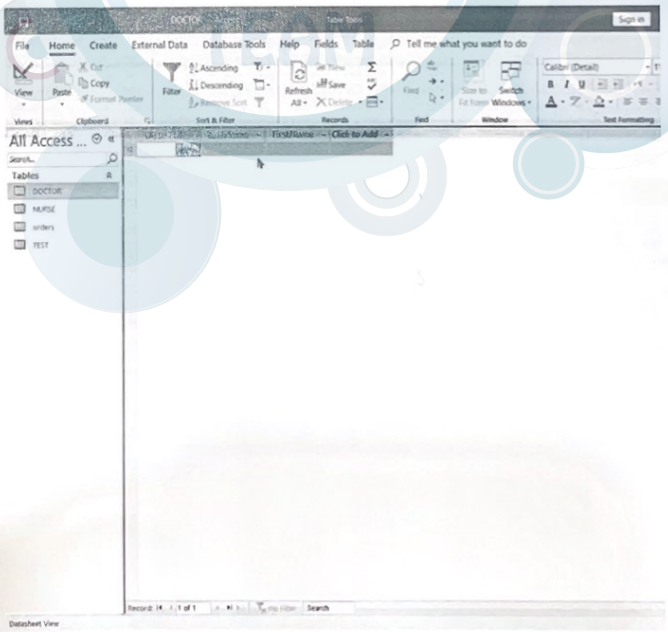


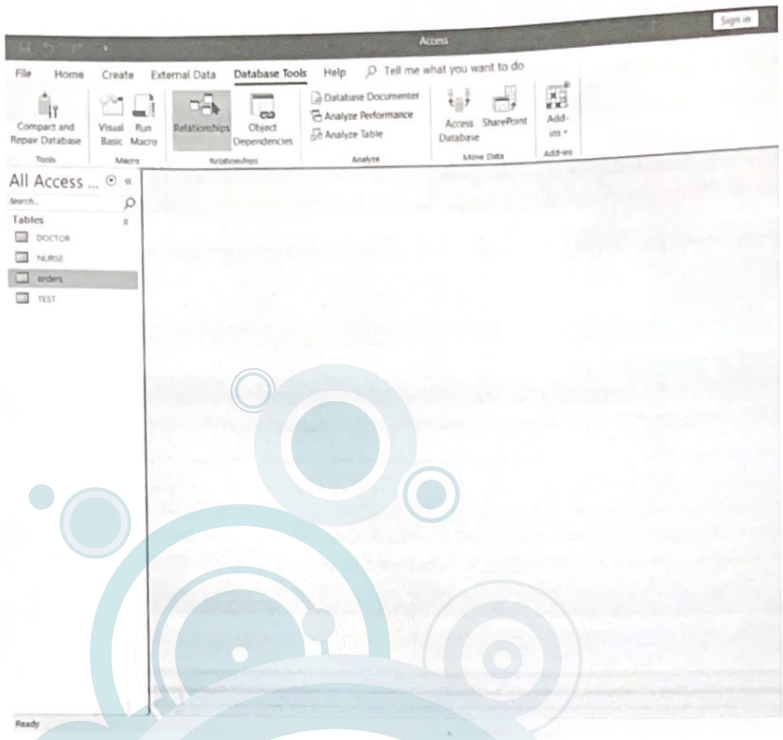
Right Click
(Primary Key
then make it)

Put the names

Data type
Long integer
short test
Number

Hourse per week
Field size Double
Required? No

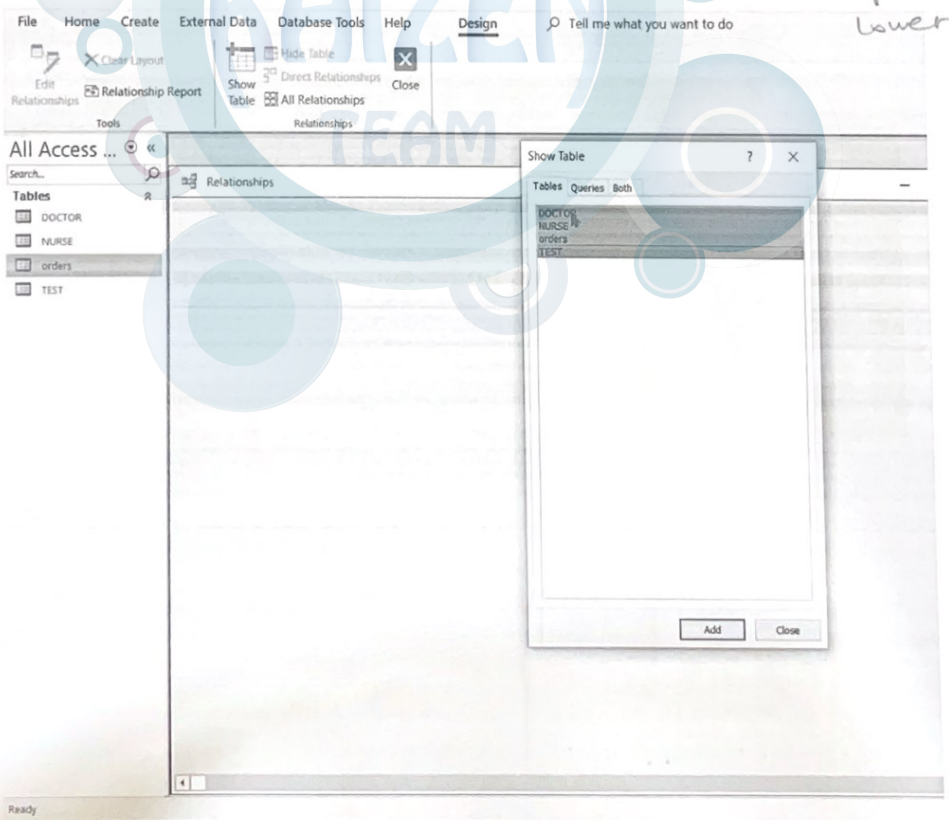


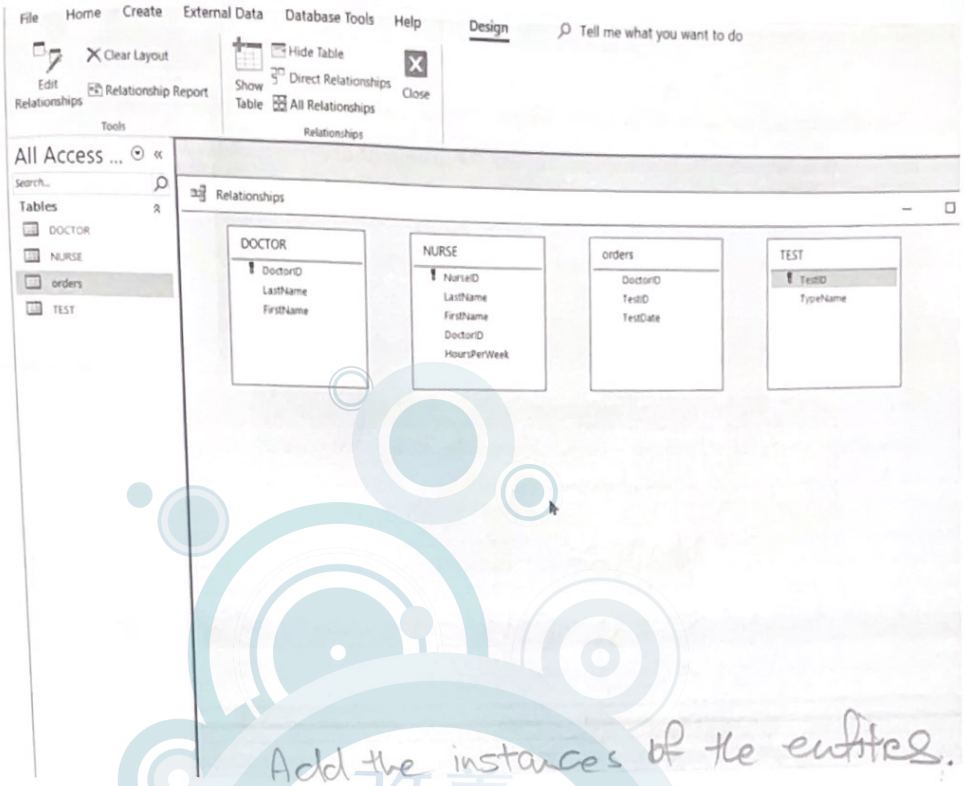


Capital ←

◇ Primary Key

Orders is a Relationship entity not an item entity so NOT capitilized. Lowercase.





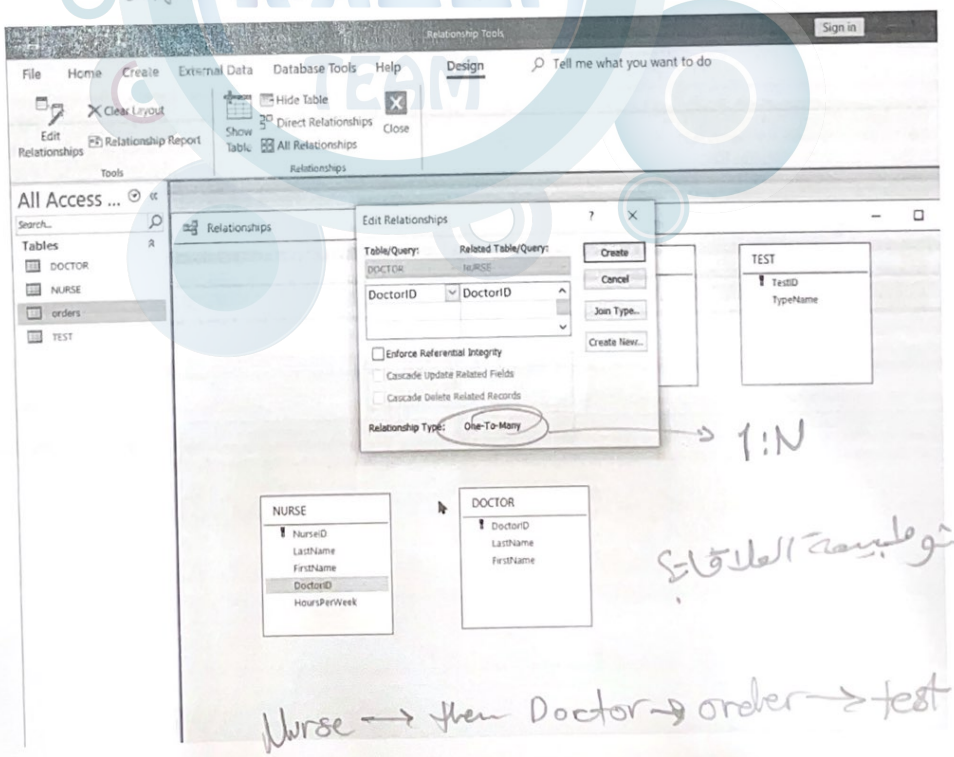
Add the instances of the entities.

then نعرف

Database tools ← من خلال Relationships

Relationship.

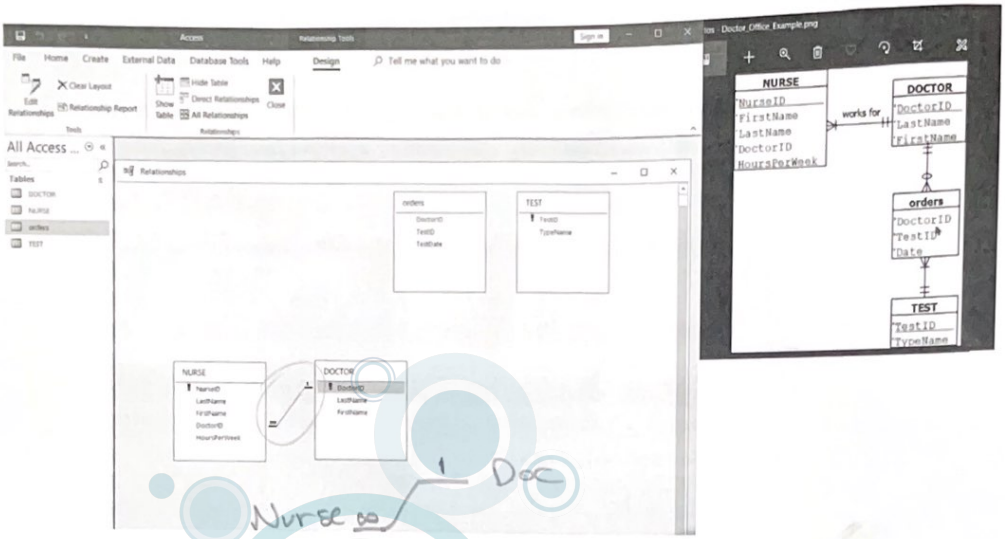
→ Shift → select → to add them all.



→ 1:N

نوع علاقة العلاقة

Nurse → then Doctor → order → test



Nurse ∞ —— 1 Doc

شو طبيعة العلاقات إلي عندي؟ ← أحا شو هل سؤال (١١)

محظوظين إنها زبطت مع الدكتور

هون صار عنا Mapping عملية بالكامل

NURSE ∞ —— 1 DOC 1 —— ∞ orders ∞ —— 1 TEST

MIS MS ACCESS Forms

How to make forms using Access.

Create → Form Wizard.

choose a table of ours. to make a form for it.

Select fields.

Choose a layout Columnar
Tabular
Datasheet
Justified.

One of the adv of Database is the ease of updating.

View → Layout
Form View
Design view

Property Sheet → [illegible]

Form Design Tools
↳ Design.

XXXX Command Button Wizard.

I want a record Navigator

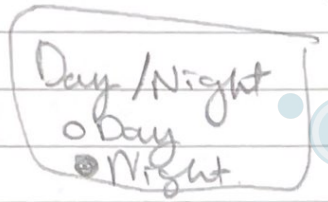
Go to the Previous record.

Put a meaningful name : Back.

Add another one : Forward.

Hours per week → Day shift or Night shift?

What caption do you want for the option group?



Don't forget to save

Combo Box Wizard.

Using Reports & Using forms أهم شيء الفرق بين

Report عبارة عن تقرير

عبارة عن تسجيل المعلومات

Report : I take info.

form : Info بدخل

أول نوع من أنواع الـ Database application

How to Make a Report Using Access?

Choose a table.

Create → Report icon.

Starting fixing the report's design.

الخط أو ال Margin بيصير لشو رح ينطبع
إي برا ال Margin لازم يتعدل

Delete Nurse ID و Jasig ممكن أختار
table
ما بدي كل الناس تعرف

ممكن أروح على Format أغير لون ال Header

Format → Shape layout → Transparent.

Page layout → Print view.

ممكن اتضيف أشكال ألوان ...

Design
↓
Add Existing Fields

ممكن أضيف أشياء من Tables ثانية

Format ← أعدل على الكتابة

ممكن أخزنه ك PDF file.
أو ك Excel sheet

ميزة ال Database لما أسوي update for any Info I have It will also be updated in the report!

Another way to create a Report!

Report Wizard
1 Choose Table
2 Insert the fields you want.
3. Any Grouping along w/ the Rest?
4. Next.
5. You can sort records up to 4---
6. Layout & Orientation.
7. Put everything within the Page Printing Margin.
8. Print view -to see how it'll be printed.
9. You can add External data.
10. Save it as any type of file, excel, PDF, etc.