

Systems, Roles, and Development Methodologies

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

Copyright © 2011 Pearson Education

Start Oct, 23, 2023

2 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.

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 ارباش
Sys Are ruled &
managed by skilled
workers, who are
processing the data
to produce knowledge

لا شك انه عامي ارباش بحاجة لمعالجة

* لما نكفي عن
MIS Sys
computer technology
Info stored
بالا

Kendall & Kendall

Copyright © 2011 Pearson Education

1-3

Major Topics

- Fundamentals of different kinds of information systems → تختلف حسب اختلاف
ال level اي تعامل معه بالشركة وال Enterprise
- 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

Kendall & Kendall

Copyright © 2011 Pearson Education

1-4

① Systems Analysts Recommend, Design, and ② ③ Maintain Many Types of Systems for Users

عدد ارياس المستخدم لا يكاد يحصى

- Transaction Processing Systems (TPS) تقريباً كل نظام
- Office Automation Systems (OAS) عم بطور ارياس
- Knowledge Work Systems (KWS) الخاص فيه
- Management Information Systems (MIS) حالياً موني كل
- Decision Support Systems (DSS) شبكة موني ارياس
- Expert Systems (ES) الخاص فيها
- Executive Support Systems (ESS) Softwares
- Group Decision Support Systems (GDSS) Standard
- Computer-Supported Collaborative Work Systems (CSCWS) زي Oracle ERP العمل

على مستوى Enterprise
على مستوى
مجموعة منظمات
على مستوى Global

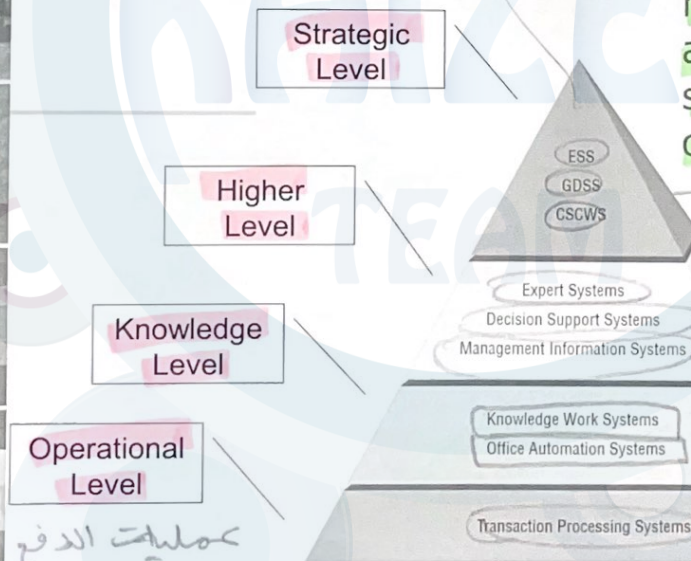
ومني لغات برمجة ممكن من خلالها كلمة IS
أطور IS زي Oracle Application dependent.

Kendall & Kendall

Copyright © 2011 Pearson Education

1-5

نظام CANVAS
طورت الجامعة الأردنية
نظام مشابه فيه



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

Based on the knowledge & conclusion
يجب يكون عندي ESS

وح ابدأ أستعمل ارياس Knowledge
القرارات على مستوى ال
Managerial level

على مستوى أعلى
ال Knowledge عندي مهمة
Knowledge to conclude
نظام التشغيل اليومي
بومي ال Knowledge تقير
متوفرة كل مشر أو أمين
و بليس العاقبة

عمليات الدفع
والشراء الروتينية
Daily.

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

Kendall & Kendall

Copyright © 2011 Pearson Education

1-7

Knowledge Level

بجعل نوع من office Management
بشكل منطوق منه منتج
Knowledge

خاص بالإدارة المكتبية
أي عمل السكرتارية

- **Office Automation System (OAS)**
 - Supports data workers who share information, but do not usually create new knowledge. Share info don't create new.
 - Examples: word processing, spreadsheets, desktop publishing, electronic scheduling, communication through voice mail, email, teleconferencing
- **Knowledge Work System (KWS)** → منتج Knowledge
أنشأ
مختلف
OAS عن
Same level
 - Supports professional workers such as scientists, engineers, and doctors
 - Examples: computer-aided design systems, virtual reality systems, investment workstations

Kendall & Kendall

Copyright © 2011 Pearson Education

1-8

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

ما يميزها
الكس ممكن من خلال
جميع ال Data
إيه ملعت فيها وباستخدام
AI
تطور ال
Decision Support engine.

أعلى كفاءة
على إطلاق
من ال I.S.I
Copyright © 2011 Pearson Education

أقرب أمرف مجموعة
منها أقرر
أعمل
facing & Reasoning.
وحاين تطلع على Conclusions معينة
أو توصيات معينة
عملية ال
مكتوبة جدا
ومتواصلة ومتطورة
دائمة.

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

باعدة في اتخاذ قرارات
بعدة المدي

أكثر متخيل

على مستوى
Enterprise

على مستوى
Group members
أو مجموعة

على مستوى
Global

كيف ممكن تم عمل تقويم ار كسبي

Integrating New Technologies into Traditional Systems

الجزء الثاني
Software Engineering
* How to develop IS?
كيف ممكن تطوير وتطبيق
تكنولوجيا جديدة؟

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

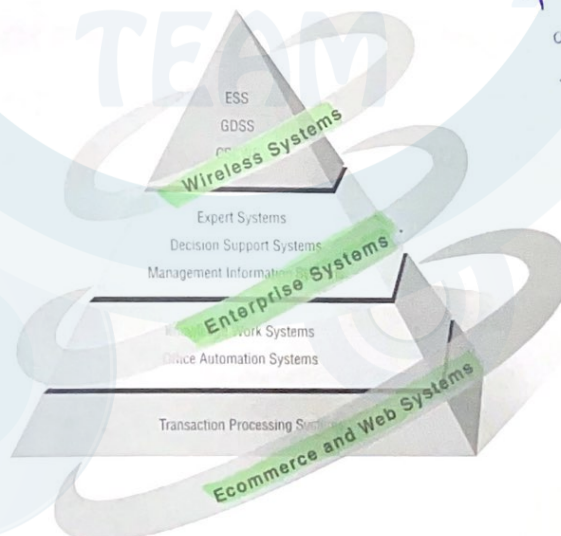
Kendall & Kendall

Copyright © 2011 Pearson Education

1-11

* التكنولوجيا الحديثة
أثرت على قطاع التعليم
والتعليم 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
قدرته To adapt w/ new technologies

ار IS مكلفة جداً
* حل لانه شغلي
يسر النفقات تبعها
ولا لانه المردود تبعها

Kendall & Kendall

Copyright © 2011 Pearson Education

1-12

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

Kendall & Kendall

Copyright © 2011 Pearson Education

1-13

Enterprise Resource Planning Systems (ERP)

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

Kendall & Kendall

Copyright © 2011 Pearson Education

1-14

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.

Kendall & Kendall

Copyright © 2011 Pearson Education

1-15

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 3 من خلال إعلانيات Network marketing
للأوسر بيلاش

Revolutionary
Development

Kendall & Kendall

Copyright © 2011 Pearson Education

1-16

* The heart of the MIS is the Data!
أهم وظيفة هي (Skilled worker)

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

Kendall & Kendall

Copyright © 2011 Pearson Education

1-17

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 منيرة رغبة
في التغيير نحو الأفضل
أومي (optimization)

Kendall & Kendall

Copyright © 2011 Pearson Education

1-18

Qualities of the Systems Analyst

وظائف التحليل مع مختلف
المشاكل بالشروط!

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

Kendall & Kendall

Copyright © 2011 Pearson Education

1-19

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

Systems Development Life Cycle (SDLC)

أول Methodology رح نتعلمها لتطوير
Software's or
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.

Kendall & Kendall

Copyright © 2011 Pearson Education

1-20

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.

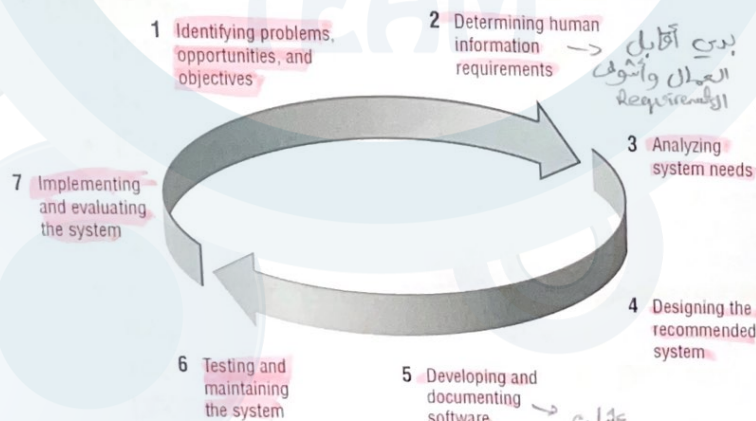
- * Planning
- 2 Requirement Analysis
- 3 Designing.
- 4 Implementation
- 5 Testing
- 6 Deployment

Kendall & Kendall

Copyright © 2011 Pearson Education

1-21

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



(HCI)
Human
Computer
Interaction

Kendall & Kendall

Copyright © 2011 Pearson Education

1-22

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.

Kendall & Kendall

Copyright © 2011 Pearson Education

1-23

Identifying Problems, Opportunities, and Objectives

- Activity: *بوي أحود ال Scope ← الذي تبج الزود*
 - Interviewing user management
 - Summarizing the knowledge obtained
 - Estimating the scope of the project
 - Documenting the results
- Output: *تصريف المشكلة، والمدى إلى ممكن أهل فيه حاي المشكلة*
 - Feasibility report containing problem definition and objective summaries from which management can make a decision on whether to proceed with the proposed project

أتم شي هو ال Problem Definition

Kendall & Kendall

Copyright © 2011 Pearson Education

1-24

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.

Kendall & Kendall

Copyright © 2011 Pearson Education

optimize

حل ممكن اعمل
لما يال software ؟

1-25

Analyzing System Needs

- 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

★ هون رح أفهم الـ Sys Needs
شوا احتياجاته وشو يقدح

Kendall & Kendall

Copyright © 2011 Pearson Education

1-26

Designing the Recommended System

بعد الـ Red ← Designing

• Activity:

- Design procedures for data entry.
- Design the human-computer interface.
- Design system controls.
- Design database and/or files.
- Design backup procedures.

الطريقة كيف
الانتر فيس
يستعمله
or GUI
Graphical User
Interface

• Output

- Model of the actual system

Model أولي
لـ sys صورة أولية

Kendall & Kendall

Copyright © 2011 Pearson Education

لا شك ان تتعدل 1-27

Developing and Documenting Software

Not an option.

use it in
Grad Proj.

* كوني بـ Procedures
Documentation
لازم يكون منه 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

أصم التخلتين

Kendall & Kendall

Copyright © 2011 Pearson Education

1-28

Testing and Maintaining the System

• Activity:

- Test the information system.
- System maintenance.
- Maintenance documentation.

• Output:

- Problems, if any
- Updated programs
- Documentation

Kendall & Kendall

Copyright © 2011 Pearson Education

1-29

Implementing and Evaluating the System

عملية متواصلة

عملية تغيير العملية

بم لما تكلف الصيانة
يجب أن يكون أحسن من إني
أجيب واحد جديد

• Activity:

- Train users. ~~***~~ ^{موسم}
- Analyst plans smooth conversion from old system to new system. ^{Bottle Neck}
- Review and evaluate system. ^{أهم في أدرب}

• Output:

- Trained personnel
- Installed system

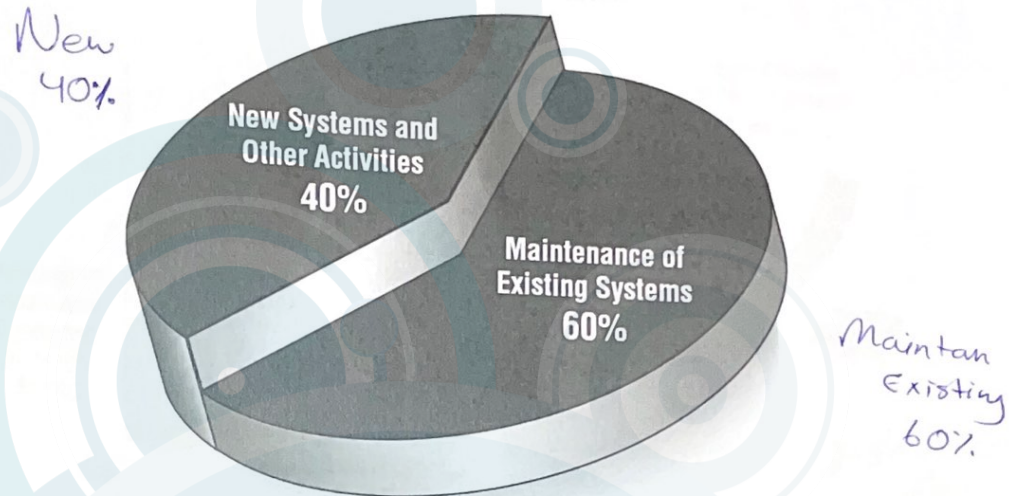
العملان ونوا الاختلافات
الأساسية بين القديم والجديد

Kendall & Kendall

Copyright © 2011 Pearson Education

1-30

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)



Kendall & Kendall

Copyright © 2011 Pearson Education

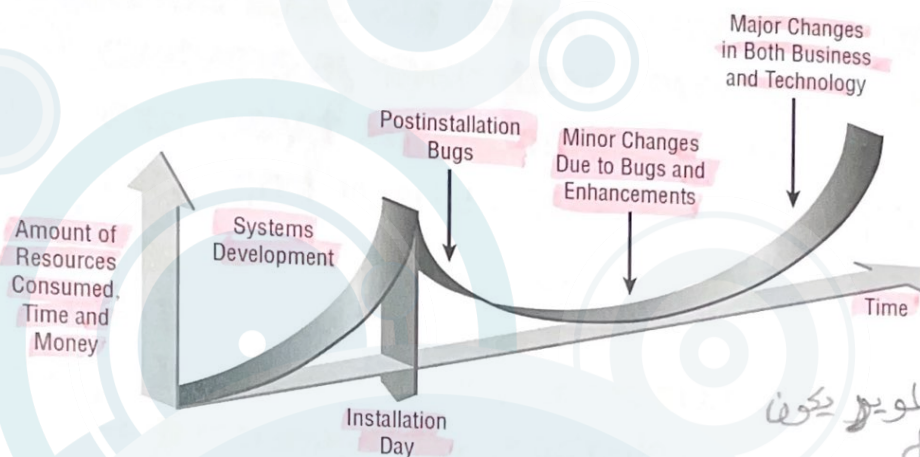
End of Lec
Oct, 23, 2023
1-31

خطوات تطوير الـ Software . مع يلاحظ ان ابيس Software جديد ؟
higher Tendency 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)



Kendall & Kendall

Copyright © 2011 Pearson Education

يلزم التطوير يكون
مستوى
متى بتتوقف أعمال
الحياة؟ التكلفة
New sys is less
than maintenance.

1-33

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

أدوات بمساعدة الحاسوب
بمجال الـ Computer Software Engineering
ممكن اعتبارها 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

Kendall & Kendall

Copyright © 2011 Pearson Education

1-35

Case Tool Classifications

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

بمستوى
بالبرمجة
أدوات

Kendall & Kendall

Copyright © 2011 Pearson Education

1-36

Upper CASE Tools

Performance Tools
أدوات الأداء

بالنسبة للنظم
Sys

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

Like the Anti-virus.

مثل ذاكرة الذاكرة

RAMs.
Optimize capacity of PC's.
Cybersecurity Tools.

1-37

Kendall & Kendall

Copyright © 2011 Pearson Education

Lower CASE Tools

بالنسبة للخوارزميات
Algorithms

- 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

Like compilers

مثل المترجمين
code
Java , C++

Kendall & Kendall

Copyright © 2011 Pearson Education

1-38

The Agile Approach

↓ philosophy or mindset

- Based on:

more than being a Methodology.

- Values
- Principles
- Core practices

Kendall & Kendall

Copyright © 2011 Pearson Education

1-39

Agile Values

- Communication → مرات صعب تحفل عليه
- Simplicity → صعب تقسيم بعض الأنظمة لأجزاء بسيطة
- Feedback → مرات صعب تحفل عليه بكل جزء
- Courage → من خلال الثقة بالنفس من خلال المشاريع

→ ممكن بترك معلومات سرية من بالضرورة تطلع عليها

→ مش الكل بتحلى بالشجاعة وفي نسبة خطورة

Kendall & Kendall

Copyright © 2011 Pearson Education

1-40

4 Resources Four Agile Resources

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

Kendall & Kendall

Copyright © 2011 Pearson Education

1-41

5 stages Five Stages of Agile Development

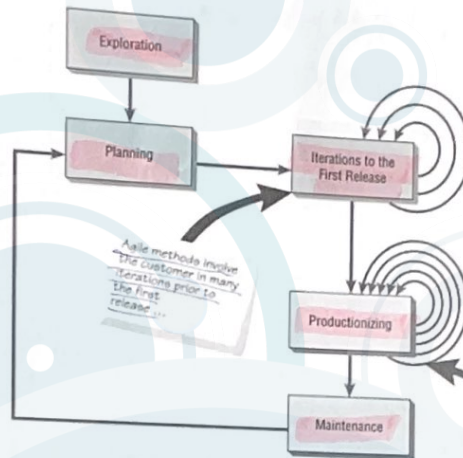
- Exploration
- Planning
- Iterations to the first release
- Productionizing
- Maintenance

Kendall & Kendall

Copyright © 2011 Pearson Education

1-42

Agile Project Development Process (Figure 1.7)



I Release part of the sys
I check the mistakes
then I enhance them
& performance
then the next part
& the next . . .
Production along with
while I'm working
on the sys.
3yours along

Productionizing along w/ development

Kendall & Kendall

Copyright © 2011 Pearson Education

more safe approach 1-43
= SDLC.

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

sys development life cycle.

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 time frame allocated to deploy or changes for a software product in real time environ.
most softwares used are developed using waterfall model.

like CISCO → Agile → SAP ← waterfall

Agile was introduced to overcome the downfalls of the waterfall model.

↓ breaking the process into micro services or phases which is faster to create.

Kendall & Kendall

Copyright © 2011 Pearson Education

1-44

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

Classes
or objects.

قسم المشروع
أو Classes

- 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

طبيعة المشروع
و Structurally
في تع
Project

main objects
و Inheritance.

Obj oriented language
لوفضل
Kendall & Kendall Copyright © 2011 Pearson Education

1-45

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

<https://www.youtube.com/watch?v=A38y70080K4>

object oriented Concepts 6:49

languages that use

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

Key: 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 don't 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 enviro for reviews from clients & stakeholders to check deliverables
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~~ ^{efficiently} 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 جزيء للبرنامج
والى بعدد بكن ال SDLC