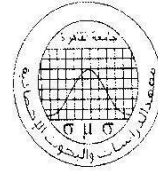


Cairo University  
Institute of Statistical Studies and Research  
Department of Computer and Information Sciences  
Exam of CS 508  
Time Allowed: 3 hours  
Examination by: Dr. Tarek Elghazaly



**(Q1) [20 marks]**

Determine whether each of the following statements is true or false:

*Please draw a table with two columns like the table below in your answer book. Fill the left column with the "Question Number" and the right column with your answer:*

Question Number	Answer
1	—
2	—

1. Control is NOT a category of problems represented by the PIECES framework.
2. Rapid Application Development (RAD), Rational Unified Process (RUP), and Project Management (PM) are three examples of System Development Methodologies.
3. The 1<sup>st</sup> CMM level at which measurable goals for quality and productivity are established is level 3.
4. Project scope, goals, initial schedule, and budget requirements are determined during the system initiation phase.
5. System Analysts focus on only the technical aspects of systems analysis and design.
6. One of the problem-solving steps in systems analysis is to identify the problem.
7. Process Management is the activity of defining, planning, directing, monitoring, and controlling a project.
8. The term used to describe those people whose jobs involve sponsoring and funding the project to develop, operate, and maintain the information system is "System Builders".
9. Non-functional requirements are information systems requirements that refer to definitive services that the system must perform, for example a weekly sales summary report.
10. The information systems development phase that has the highest relative error cost is mostly considered to be "System Design".
11. System requirements are verifiable means: Requirements are defined so they can be demonstrated during testing.
12. Agile development is one of the considered fact-finding techniques.

13. The "Stakeholder" term refers to anyone who should have some direct or indirect influence on the system requirements.
14. Joint Requirements Planning (JRP) is the fact finding technique in which highly structured group meetings are conducted to analyze problems and define requirements.
15. An information system (IS) is an arrangement of people, data, processes, and information technology that interact to collect, process, store, and provide as output the information needed to support an organization.
16. Information technology is a contemporary term that describes the combination of computer technology (hardware and software) with telecommunications technology (data, image, and voice networks).
17. Project Manager is an experienced professional who accepts responsibility for planning, monitoring, and controlling projects with respect to schedule, budget, deliverables, customer satisfaction, technical standards, and system quality.
18. Globalization of the Economy is one of the Business Drivers for the today's Information Systems.
19. Business process redesign (BPR) is the continuous monitoring of business processes to effect small but measurable improvements in cost reduction and value added.
20. Questionnaire is always considered the best Fact-Finding technique.

**(Q2) [25 marks]**

1. List 7 types of Information Systems [7 marks]
2. Describe (briefly) the 5 levels of CMM [5 marks]
3. Consider the below phases and activities for the information system life cycle:
 

i. <u>Documentation and Presentation</u>	viii. <u>Decision Analysis</u>
ii. <u>Fact-Finding</u>	ix. <u>Physical Design &amp; Integration</u>
iii. <u>Feasibility Analysis</u>	x. <u>Construction and Testing</u>
iv. <u>Scope Definition</u>	xi. <u>Installation and Delivery</u>
v. <u>Problem Analysis</u>	xii. <u>Project Management</u>
vi. <u>Requirements Analysis</u>	xiii. <u>Process Management</u>
vii. <u>Logical Design</u>	
- b. Extract the 5 cross life-cycle activities. [5 marks]
- c. Re-arrange the rest 8 phases from the start to the end (Classic Project Phases). [8 marks]

**(Q3) [10 marks]**

1. Define the lifetime ROI (use the following format) [1 mark]

$$\frac{A - B}{C}$$

2. Define the Annual ROI (use the following format) [1 mark]

$$\frac{A}{B}$$

3. Considering the table below, calculate the following:

- Total Present Value for the lifetime cost. [3 marks]
- Total Present Value for the lifetime benefits. [3 marks]
- Net Present Value for this Alternative. [2 marks]

Net Present Value Analysis for an alternative								
Cash flow description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Development cost	(\$418,040)							
Operation & maintenance cost		(\$15,045)	(\$16,000)	(\$17,000)	(\$18,000)	(\$19,000)	(\$20,000)	
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	0.507	
Present value for annual costs								
Total present value of lifetime costs								
Benefits	\$0	\$150,000	\$170,000	\$190,000	\$210,000	\$230,000	\$250,000	
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	0.507	
Present value of annual benefits								
Total present value of lifetime benefits								
Net present value of this alternative								

**(Q4) [25 marks]**

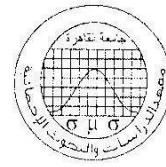
Use UML to design an ATM system which allows users to: Withdraw Cash, Transfer Funds, Deposit Funds, and Administrate the ATM (the admin users). Please provide the following:

- Use case diagram(s). [4 marks]
- Use case descriptions. [8 marks]
- Sequence Diagram (for only one use case). [3 marks]
- Class Diagram(s). [6 marks]
- Activity Diagram(s). [4 marks]

Good Luck \_\_\_\_\_



Cairo University  
Institute of Statistical Studies and Research  
Department of Computer and Information Sciences  
Exam of CS 508 - Jan 2012  
Time Allowed: 3 hours  
Examination by: Dr. Tarek Elghazaly



**(Q1) [20 marks]**

Copy the below table in your answer sheet and determine True or False for the following statements:

Sr.	Statement	Answer
1	The term used to describe those people whose jobs involve sponsoring and funding the project to develop, operate, and maintain the information system is "System Builders".	
2	Non-functional requirements are information systems requirements that refer to definitive services that the system must perform, for example a weekly sales summary report.	
3	The information systems development phase that has the highest relative error cost is mostly considered to be "System Design".	
4	Agile development is one of the considered fact-finding techniques.	
5	Business process redesign (BPR) is the continuous monitoring of business processes to effect small but measurable improvements in cost reduction and value added.	
6	Questionnaire is always considered the best Fact-Finding technique.	
7	Joint Requirements Planning (JRP) is the fact finding technique in which highly structured group meetings are conducted to analyze problems and define requirements.	
8	An information system (IS) is an arrangement of people, data, processes, and information technology that interact to collect, process, store, and provide as output the information needed to support an organization.	
9	Information technology is a contemporary term that describes the combination of computer technology (hardware and software) with telecommunications technology (data, image, and voice networks).	
10	Project Manager is an experienced professional who accepts responsibility for planning, monitoring, and controlling projects with respect to schedule, budget, deliverables, customer satisfaction, technical standards, and system quality.	
11	Globalization of the Economy is one of the Business Drivers for the today's Information Systems.	

Sr.	Statement	Answer
12	Project scope, goals, initial schedule, and budget requirements are determined during the system initiation phase.	
13	One of the problem-solving steps in systems analysis is to identify the problem.	
14	System requirements are verifiable means: Requirements are defined so they can be demonstrated during testing.	
15	The "Stakeholder" term refers to anyone who should have some direct or indirect influence on the system requirements.	
16	The Use case Diagrams describe the non-functional behavior of the system as seen by the user.	
17	The Class diagrams describe the dynamic structure of the system.	
18	The Sequence diagrams describe the static behavior between actors and the system and between objects of the system	
19	The State chart diagrams describe the static behavior of an individual object	
20	The Activity Diagrams model the static behavior of a system	

(Q2) [10 marks]

Net Present Value Analysis for an alternative								
Cash flow description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Development cost	(\$418,040)							
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Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	0.507	
Present value of annual benefits								
Total present value of lifetime benefits								
Net present value of this alternative								

Considering the previous table, calculate the following:

- 1.Total Present Value for the lifetime cost. [4 marks]
- 2.Total Present Value for the lifetime benefits. [4 marks]
- 3.Net Present Value for this Alternative. [2 marks]

**(Q3) [25 marks]**

a) Considering the phases and activities for the Information System Life Cycle:

- a. List the 5 cross life-cycle activities. [5 marks]
- b. List the 8 phases from the start to the end (Classic Project Phases). [8 marks]

b) List 7 types of Information Systems [7 marks]

c) Describe (briefly) the 5 levels of CMM [5 marks]

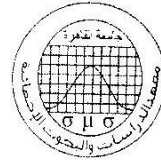
**(Q4) [15 marks]**

For an ATM system, please provide the following (start by stating your scope):

1. Use case diagram. [4 marks]
2. Use case description for only one use case. [3 marks]
3. Sequence Diagram for only one use case. [3 marks]
4. Class Diagrams. [5 marks]

Good Luck

Cairo University  
Institute of Statistical Studies and Research  
Department of Computer and Information Sciences  
Exam of CS 508- June 2012  
Time Allowed: 3 hours  
Examination by: Dr. Tarek Elghazaly



**(Q1) [25 marks]**

- a) List 8 skills needed for the system analyst [8 marks]
- b) List the 10 Commandments of Computer Ethics [10 marks]
- c) List 7 Business Drivers for Today's Information Systems [7 marks]

**(Q2) [30 marks]**

- 1. Draw a diagram illustrating the main seven types of Information System, their databases & the integration between them. [20 marks]
- 2. Define the CMM and describe (briefly) its 5 levels [10 marks]

**(Q3) [15 marks]**

- a) Draw a Use Case diagram for a *Point of Sale* system illustrating: [5 marks]
  - Actors: *Cashier, System Administrator, Payment Authorization Service, Tax Calculator, and Accounting System*
  - Use Cases: *Process Sale, Handle Returns, Process Rental, Manage Security, and Manage Users*
- b) Draw a System Sequence Diagram, illustrating the dialogue between only the Cashier & the System for the below scenario: [10 marks]
  - 1. Customer arrives at a POS checkout with goods and/or services to purchase.
  - 2. Cashier starts a new sale.
  - 3. Cashier enters item identifier.
  - 4. System records sale line item and presents item description, price, and running total. Cashier repeats steps 3-4 until indicates done.
  - 5. System presents total with taxes calculated.
  - 6. Cashier tells Customer the total, and asks for payment.
  - 7. Customer pays and System handles payment.

Good Luck





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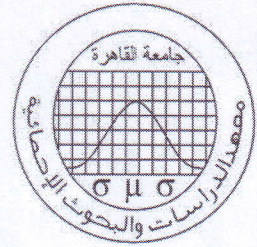
Institute of Statistical Studies and Research

Department of Computer and Information Sciences

Exam of CS 508 – Sep. 2015

Time Allowed: 3 hours

Examination by: Dr. Tarek Elghazaly



**(Q1) [20 marks]**

The below is a part of a requirements document “system domain”: Provide the complete class diagram including the classes’ details, relations (associations), relations directions and multiplicity.

*“The DVD Library holds DVDs of a number of films. It may have any number of copies of each film. The system should, for each film, hold the film’s title; no two films have the same title. A library member can borrow any DVD of a film that is not currently on loan. However, no member can have more than six DVDs on loan at once. A borrowed DVD must be returned within three days. When a library member returns a DVD it immediately becomes available for loan to other members. Each DVD has a unique identifying number. Each member of the library has a unique membership number; the system also holds each member’s name”.*

**(Q2) [20 marks]**

Draw a diagram illustrating the CASE tools architecture

**(Q3) [15 marks]**

Draw a diagram illustrating the Overlap of System Development Phases

**(Q4) [15 marks]**

Provide a statistical example illustrating the Impact of System Development “Process” on Quality for a 200,000 line code project.

**(Q5) [15 marks]**

Draw a diagram illustrating the main 7 types of information systems, their databases, and integration (connections).

**(Q6) [15 marks]**

Draw a **detailed** block diagram illustrating the different business drivers, technology drivers, detailed phases, players (stakeholders), and all detailed activities for building an information system.

Good Luck





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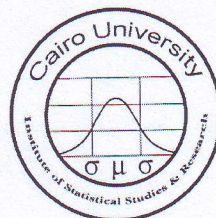
**Cairo University – Institute Of Statistical Studies  
And Researches**

**Department: Computer Science**

**Academic Year: 2015-2016 Semester: Spring**

**Date: June 2016**

**Level: Diploma**



<b>Course Title:</b> Software Engineering I	<b>Course code:</b> CS 508	<b>Time:</b> 3 Hours	<b>Exam marks:</b> 70	<b># Exam. Sheets:</b> 1
<b>Exam. Instructions : Answer all questions in a clear way</b>				

**Question One: ( 25 Marks)**

- Draw a **detailed** block diagram illustrating the different business drivers, technology drivers, detailed phases, players (stakeholders), and all detailed activities for building an information system. [15 marks]
- Draw a diagram illustrating the main 7 types of information systems, their databases, and integration (connections). [10 marks]

**Question Three: ( 20 Marks)**

- Draw a diagram illustrating the classical phases of System Development Life Cycle [10 marks]
- Draw a diagram illustrating the CASE tools architecture [10 marks]

**Question Five: ( 25 Marks)**

The below is a part of a requirements document “system domain” for a Pharmacies Prescriptions System: Provide the complete class diagram including the classes’ details, relations (associations), relations directions and multiplicity. [25 marks]

“-Every patient has a primary doctor. Every doctor has at least one patient. Doctors prescribe drugs for patients. A doctor could prescribe one or more drugs for several patients, and a patient could obtain prescriptions from several doctors.

-Each prescription has a date and a quantity associated with it.

-Each pharmacy sells several drugs and has a price for each. A drug could be sold at several pharmacies, and the price could vary from one pharmacy to another.

-Pharmaceutical companies have long-term contracts with pharmacies. A pharmaceutical company can contract with several pharmacies, and a pharmacy can contract with several pharmaceutical companies. For each contract, you have to store a start date, an end date, and the text of the contract. Pharmacies appoint a supervisor for each contract. There must always be a supervisor for each contract, but the contract supervisor can change over the life time of the contract.

-Each drug is sold by a given pharmaceutical company, and the trade name identifies a drug uniquely from among the products of that company.

-Patients are identified by an SSN (Social Security Number), and their names, addresses, and ages. Doctors are identified by an SSN, the name, specialty, and years of experience. Each pharmaceutical company is identified by name and a phone number. Each drug is identified by the trade name and formula. Each pharmacy has a name, address, and phone number.”



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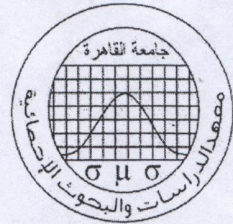
Institute of Statistical Studies and Research

Department of Computer and Information Sciences

Exam of CS 508 – May 2015

Time Allowed: 3 hours

Examination by: Dr. Tarek Elghazaly



**(Q1) [10 marks]**

Draw a **detailed** block diagram illustrating the different business drivers, technology drivers, detailed phases, players (stakeholders), and all detailed activities for building an information system.

**(Q2) [10 marks]**

Draw a diagram illustrating the main 7 types of information systems, their databases, and integration (connections).

**(Q3) [10 marks]**

Provide a statistical example illustrating the Impact of System Development “Process” on Quality for a 200,000 line code project.

**(Q4) [10 marks]**

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**(Q5) [15 marks]**

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**(Q6) [15 marks]**

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*“The DVD Library holds DVDs of a number of films. It may have any number of copies of each film. The system should, for each film, hold the film’s title; no two films have the same title. A library member can borrow any DVD of a film that is not currently on loan. However, no member can have more than six DVDs on loan at once. A borrowed DVD must be returned within three days. When a library member returns a DVD it immediately becomes available for loan to other members. Each DVD has a unique identifying number. Each member of the library has a unique membership number; the system also holds each member’s name”*

Good Luck



**Question 1:** Determine whether each of the following statements is true/false.  
[each question is worth 1.5 points]

- a. The term used to describe those people whose jobs involve sponsoring and funding the project to develop, operate, and maintain the information system is system builder.
- b. TPS is an information system that supports the planning and assessment needs of executive management.
- c. Rapid Application Development (RAD) and Rational Unified Process (RUP) are two examples of system development methodologies.
- d. A data flow diagram is one example of a process model.
- e. Open database connectivity (ODBC) tools allow application programs to work with different database management systems without having to be re-written. This is an excellent example of middleware.
- f. The first CMM level at which measurable goals for quality and productivity are established is level 3
- g. Control is NOT a category of problems represented by the PIECES framework
- h. System owners specify the business processes in terms of process requirements for a new system.
- i. Decision support system is not a class of information system applications.
- j. Internal system users include customers, suppliers, and partners.
- k. Systems analysts are frequently involved in the customization of the ERP applications and the redesign of business processes to use the ERP solutions.
- l. Project scope, goals, schedule, and budget requirements are determined during the system initiation phase of the system development process.
- m. Business analyst focuses on only the non-technical aspects of systems analysis and design.
- n. One of the problem-solving steps in systems analysis is to identify the problem.
- o. If software programs need to be written for an information system, they are written during system analysis.



- p. Process management is the activity of defining, planning, directing, monitoring, and controlling a project.

**Question 2** Multiple Choice (only one answer is correct)  
[each question is worth 1.5 points].

1- Management information systems (MIS)

- A) create and share documents that support day-to-day office activities
- B) process business transactions (e.g., time cards, payments, orders, etc.)
- C) capture and reproduce the knowledge of an expert problem solver
- D) use the transaction data to produce information needed by managers to run the business
- E) none of the above

2- The term used to describe those people whose jobs involve sponsoring and funding the project to develop, operate, and maintain the information system is

- A) information worker
- B) internal system user
- C) systems owner
- D) external system user
- E) systems builder

3- The person who ensures that systems are developed on time, within budget, and with acceptable quality is a

- A) systems designer
- B) project manager
- C) systems owner
- D) external system user
- E) systems builder

4- Which one of the following is not a business driver for an information system?

- A) business process redesign
- B) knowledge asset management
- C) proliferation of networks and the Internet
- D) security and privacy
- E) collaboration and partnership

5- A task of developing a technical blueprint and specifications for a solution that fulfills the business requirements is undertaken in the following phase of the system development process

- A) system initiation
- B) system implementation
- C) system analysis
- D) system design
- E) feasibility analysis

6- Contemporary Information Systems are interfacing with customers and suppliers using:

- A) BPR
- B) CRM
- C) SCM
- D) Both A and B
- E) Both B and C

7- Information systems that support the business functions that reach out to suppliers are known as:

- A) back office information systems
- B) decision support systems
- C) expert information systems
- D) front office information systems
- E) none of the above

8- Which of the following is not a class of information system applications?

- A) database management system
- B) decision support system
- C) expert system
- D) management information system
- E) office automation system

9- Who are the people that actually use the system to perform or support the work to be completed?

- A) system analysts
- B) system designers

- C) system owners
- D) system builders
- E) none of the above

10- Contemporary Information Systems are interfacing with customers and suppliers using :

- A) BPR
- B) CRM
- C) SCM
- D) Both A and B
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- D) system builders
- E) none of the above



... strategy level at which measurable goals for quality and productivity are established is

- A) Level 1
- B) Level 2
- C) Level 3
- D) Level 4
- E) Level 5

15- Project Management ensures that

- A) project's risk is assessed
- B) project's feasibility is assessed
- C) system is developed at minimum cost
- D) both A and B
- E) none of the above

16- The deliverable of the problem analysis phase is

- A) system improvement objectives
- B) problem statement
- C) statement of constraints
- D) statement of work
- E) none of the above

17- Which one is NOT a category of problems represented by the PIECES framework?

- A) control
- B) efficiency
- C) service
- D) economics
- E) technology

18- Which one is NOT a phase of the systems development life cycle?

- A) problem analysis
- B) scope definition
- C) requirements analysis
- D) post-implementation review
- E) decision analysis

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- B) scope definition
- C) requirements analysis
- D) post-implementation review
- E) decision analysis

19- If a university sets up a web-based information system that faculty could access to record student grades and to advise students, that would be an example of a/an

- A) CRM
- B) intranet
- C) ERP
- D) extranet
- E) none of the above

20- Which of the following is not a technology driver for an information system?

- A) enterprise applications
- B) object technologies
- C) knowledge asset management
- D) collaborative technologies
- E) networks and the Internet

**Question 3 (UML) Multiple Choice (only one answer is correct)**

[ each question is worth 4 points]

1- Consider the following statement of requirements for the first iteration of a Library System. Books and Journals : The library contains books and journals. It may have several copies of a given book. Some of the books are for short term loans only. All other books may be borrowed by any library member for three weeks. Members of the library can normally borrow upto six items at a time, but members of staff may borrow upto twelve items at one time. Only members of staff may borrow journals. Borrowing : The system must keep track of when books and journals are borrowed and returned, enforcing the rules described above.

Which of the following classes are part of the Library System?

- a. book, journal, copy (of book), library member, member of staff
- b. item, copy (of book), library member, member of staff
- c. item, library member, member of staff
- d. system, rule, week, item, member

2- An Automated Teller Machine (ATM) is offered to bank customers as a convenience . At the ATM, customers can make deposits to or withdrawals from their account(s). They can also transfer funds between their accounts, and can make inquiries as to account balances. In order to access the services of the ATM, customers must have an ATM card and a Personal Identification Number (PIN). The components of the ATM include a User Interface, a card reader, an envelope slot, a cash drawer and a printer. The User Interface has a display and buttons. There are 10 numeric entry buttons, 4 transaction selection buttons, an "Enter" button and a "Cancel" button. Each ATM is connected to the bank computer via a network . Each ATM has a unique network identification number. The ATM validates account balances and account status by communicating with the bank computer . ATM's require periodic servicing. This servicing can include maintenance , restocking cash in the money holder, and removing deposited envelopes from the envelope repository. When the rear service panel is open, the ATM suspends interactions with the customers. Each ATM has a particular branch of the bank that is responsible for service and maintenance.

Which of the following objects is not part of the ATM application described below?

- a. Transaction
- b. Envelope Slot
- c. Printer
- d. Funds

3- Use Case : Submit a loan request Actor(s) : Applicant, Loan Clerk Description : The applicant submits a loan request for processing by the bank's integrated loan processing system. The applicant fills out a loan application and submits it to the bank for processing. The system validates information on the loan application and calculates the applicant's credit score based on credit reports and the applicant's account history with the bank. The applicant is contacted for additional information, if needed. The system makes an initial approval recommendation. The loan is now ready for the loan officer's evaluation, pending any needed manual validation of credit references.

Which of the candidate object is NOT part of the above use case :

- a. Customer (applicant)
  - b. Loan Request
  - c. Loan Application
  - d. Credit Score
  - e. Credit Report
  - f. Account History
  - g. Processing System
  - h. Loan Officer
- 4- If "Submit loan request" and "Offer line of credit" both use "Perform credit check" use case, the relationship between Perform credit check and other used cases is :
- a. extend relationship
  - b. include relationship
  - c. eneralization relationship
- 5- Use cases CANNOT be used for :
- a. modeling the nonbehavioral aspects such as data requirements, performance and security.
  - b. capturing behavioral aspect of a system.
  - c. capturing functional aspect of a system.
- 6- Which of the following is NOT a strong motivation to partition a class into a subclass?
- a. The subclass has additional attributes of interest.
  - b. he subclass has additional associations of interest.
  - c. he subclass needs to remove or renounce properties of its superclass.
  - d. he subclass concept is operated on, handled, reacted to, or manipulated differently than the superclass or other subclasses in ways that are of interest.
  - e. The subclass concept represents an animate thing (for example, animal, robote) that behaves differently that the super class or other subclasses in ways that are of interest.