Ministry of Higher Education
Saudi Electronic University
College of Computing and Informatics

Final Examination Cover Sheet

First Semester: 1435-1436 / 2014-2015

Course Instructor:		**Exam Date:**	**January 11th, 2015**
Course Title:	**System Analysis and Design**	**Course Code:**	**IT243**
Exam Duration:	**120 minutes**	**Number of Pages:** (including cover page)	**11**

Exam Guidelines

- **Mobile phones are not permitted.**
- **Calculators are permitted.**

Marking Scheme

Questions	Achieved Score
Q1 (40)	
Q 2 (20)	
Q 3 (12)	
Q 4 (12)	
Q 5 (8)	
Q 6 (8)	
Total Marks= 100 Final Weightage = 50	

Student Name: _____ **Student ID:** _____

Question 1(MCQs): Please circle the appropriate choice. [40]

1. The _____assists and guides the project team so the team develops the right system in an effective way.
   i) Systems Analyst
   ii) Business Analyst
   iii) Infrastructure Analyst
   iv) Change management Analyst

2. System analysts skills are;
   i) Introduces change to the organization and people
   ii) Leads a successful organization change effort
   iii) Understands what to change and knows how to change it
   iv) All of the above

3. The SDLC is composed of four fundamental phases:
   i) Planning, Analysis, Design& Implementation
   ii) Project, business, system & infrastructure management
   iii) Systems analyst, Infrastructure analyst, Change management analyst & Project manager
   iv) None of the above
4. Three Analysis steps involves;
   i) Analysis strategy
   ii) Requirements gathering
   iii) System proposal
   iv) All of the above
5. RAD is an acronym for:
   i) Real Application Development
   ii) Rapid Application Design
   iii) Rapid Authentic Development
   iv) Real Autonomous Development
   v) Rapid Application Development

6. Which of the following might result in version 1; version 2 (etc.) of a system?
   i) System Prototyping
   ii) Waterfall Development
   iii) Iterative Development
   iv) System Prototyping
   v) Parallel Development

7. What the MAIN difference between systems prototyping and throwaway prototyping?
   i) Systems prototyping involves users while throwaway prototyping does not
   ii) Throwaway prototyping involves users while systems prototyping does not

iii) Systems prototyping is a rapid application development methodology; while throwaway prototyping is not
iv) Systems prototyping works with users to quickly develop a simplified working version of the proposed system; while throwaway prototyping focuses more on exploring design alternatives
v) Throwaway prototyping develops systems that will be use as 'stop-gap' systems – and generally for less than six months; while systems prototyping results in systems that will be used extensively for several years.

8. Extreme Programming (XP) is BEST characterized as:
   i) A 'Quick and Dirty' system
   ii) A series of versions
   iii) A method for exploring design alternatives
   iv) A method for stressing customer satisfaction
   v) More explicit testing
9. An example of a functional requirement is _____
   i) Access to the customer order system
   ii) System should be available in English and Spanish
   iii) System can be accessed through a Blackberry device
   iv) System is automatically updated every 5 seconds
10. Two Business Process Automation (BPA) techniques commonly used to identify possible problems in the current system are _____.
    i) Problem Analysis and benchmarking
    ii) Problem Analysis and activity based costing
    iii) Duration analysis and informal benchmarking
    iv) Problem analysis and root cause analysis
11. Moderate changes to existing processes falls under the _____ analysis.
    i) Business Process Automation (BPA)
    ii) Business Process Improvement (BPI)
    iii) Business Process Reengineering (BPR)
    iv) None of the above
12. Logical process models are:
    i) Models that describe processes without suggesting how they are conducted
    ii) Coded logic models
    iii) Models based upon implementing the if-then-else programming structure
    iv) Developed by the infrastructure analyst
13. The Use-case is:
    i) A set of activities
    ii) Showing Inputs and outputs
    iii) Both (a) and (b)
    iv) None of the above
14. The relation between use cases and data flow diagrams is generally:

i) Use cases are developed by users and data flow diagrams are developed by systems analysts
ii) Data flow diagrams are developed first and then use cases ensue
iii) Use cases are developed first and then data flow diagrams
iv) There is not a relationship between use cases and data flow diagrams

15. Role-playing the use case with actual users is a good way to:
    i) Identify the use case
    ii) Identify the major steps within each use case
    iii) Identify elements within steps
    iv) Confirm the use case
16. A new patient calls up an optometrist office to make an appointment. On a DFD diagram, the new patient would be represented by:
    i) a data flow
    ii) a process
    iii) an external entity
    iv) a trigger
    v) a data store
17. Processes in data flow diagramming are represented by:
    i) Rounded boxes
    ii) Arrows
    iii) Rectangles that is open on the right end
    iv) Enclosed rectangles
18. What is probably NOT a part of a Use Case?
    i) Name
    ii) Number
    iii) Major inputs
    iv) Statement of business value
19. An entity relationship diagram (ERD):
    i) Is a use-case diagram enhanced graphically to show data and process modeling
    ii) Is a high-level CASE diagram of data modeling used in business systems
    iii) Is an illustration of external data flows to and from a business systems
    iv) Is a picture that shows the information that is created, stored and used by a business system
    v) Is a graphical display of the processes in a business system
20. On an ERD _____:

    i) Processes are listed alphabetically with relationship connections drawn between processes
    ii) Data elements are listed alphabetically with a cross listing to the processes that manipulate them
    iii) Data elements are described as singular (1:1); plurals (1:N); or didactic (M:N)
    iv) Data elements are grouped in a hierarchical structure that is uniquely identified by number

v) Data elements are listed together and place inside boxes called entities.

21. Modality refers to:

i) Relationships of one-to-one; one-to-many; or many-to-many
ii) Whether a child entity can exist with or without a related instance in the parent entity
iii) The hierarchical structure that was developed in process models applied to data models
iv) The number of attributes generated by an entity
v) Whether the entity has a unique identifier (aka 'primary key') or a concatenated identifier (aka 'composite key')

22. Information in the data dictionary is called: _____

i) Metadata
ii) Cached information
iii) Compiled data
iv) Data repository
v) File silo

23. Value-added projects are:

i) When the outsourcer earns a percentage of the completed systems benefits
ii) Not a feasible option for any project at any time
iii) Gaining popularity
iv) i and iii
v) None of the above

24. Requests for Proposals (RFPs) serve what purpose?

i) Integrate systems with one another
ii) Create synergy amongst staff members
iii) Solicit information from providers
iv) Engage mobile computers with mainframe technology
v) Develop morale amongst managers

25. When only a price is needed from a vendor, the following will likely be requested from the possible vendors:

i) Request for Proposal (RFP)
ii) Request for Information (RFI)
iii) Request for Quote (RFQ)
iv) Request for Efficient Information Distribution (REID)
v) More Optimal Desires (MOD)

26. A table that can be used to look at various design options is a(n):

i) RFP
ii) CRUD
iii) Gantt Chart
iv) Alternative Matrix
v) SQL query

27. The user interface defines how the system will interact

i) with external entities

ii) with internal entities
iii) with both
iv) none

28. Menus should show
    i) where you are
    ii) where you came from to get there
    iii) both i) and ii) is correct
    iv) only i) is correct
    v) only ii) is correct
    vi) both i) and ii) are incorrect
29. Consistency means
    i) Enables users to predict what will happen
    ii) Reduces learning curve
    iii) Considers items within an application and across applications
    iv) All above statement are correct
    v) None of these are correct
30. The goal of the output mechanism is
    i) to provide accurate information to users that minimize information overload and bias
    ii) to provide accurate information to users that maximize information overload and bias
    iii) both statement a) and b) correct
    iv) both statement a) and b) are wrong
31. Physical DFDs will be shared with ___
    i) Project sponsors
    ii) Users
    iii) Programmers / Designers
    iv) Business managers
    v) External entities
32. The fifth step in creating a Physical Data Flow Diagram is
    i) Update the metadata in the CASE repository
    ii) Draw a human-machine boundary
    iii) Add implementation references
    iv) Add system-related data stores, data flows and processes
    v) Update the data elements in the data flows
33. By definition, external entities on the DFD:
    i) Are used as the starting point for the physical data flow diagram
    ii) Are outside the scope of the system
    iii) Will be the top of the structure chart
    iv) Will become database table entries
    v) Are updated with metadata to become part of the physical DFD
34. Processes from logical DFDs might show up on a physical data flow diagram as:
    i) Tables in a database
    ii) External entities
    iii) Outside the human-machine boundary
    iv) Audit log files

v) HTML screens or Visual Basic forms

35. Pseudocode is:
    i) The same as structured English
    ii) A technique similar to structured English
    iii) A subset of the Java programming language
    iv) A coding environment sponsored by Oracle
    v) The term for designing language prototyping screens with Visual Basic or HTML
36. The data storage design activity is done in which phase of the Systems Development Life Cycle?
    i) Planning
    ii) Analysis
    iii) Design
    iv) Implementation
    v) Evaluation
37. This type of file is used to update a master file:
    i) Roster Files
    ii) Training files
    iii) Master files
    iv) Transaction files
    v) Integrated files
38. Which of the following is NOT a relational database management system product?
    i) MySQL
    ii) Access
    iii) Photoshop
    iv) Oracle
    v) Informix
39. Which of the following is a concept not generally associated with decision support systems?
    i) Data warehouses
    ii) Data marts
    iii) Aggregated data
    iv) Object orientation
    v) Multidimensional databases
40. Which is NOT a step in moving from a logical data model to a physical data model?
    i) Change entities to tables (or files)
    ii) Change data flows to create / read / update / delete (CRUD) operations
    iii) Change Attributes to Fields
    iv) Add primary keys
    v) Add foreign keys

Question 2 (TFs): Please write T (True) or F (False) in front of the statement. [20]

1. Systems analysts must understand how to apply technology in order to solve problems. T
2. The Parallel Methodology breaks the overall project into a series of release versions. T
3. The output of the analysis phase is the 'system proposal'. T
4. Server-based architecture is no more secure than client-based architecture. F
5. "The inventory database must be updated in real time" in an example of speed requirement. T
6. A process model is a formal way of representing how a business system operates. T
7. The role of the Actor in Use-case diagram is to define the Logic of the program. F
8. Processes in DFDs are shown as rounded triangles in the Gane and Sarson notation. F
9. Data flow diagrams (as the name implies) focus on the physical data in a system. F
10. A data model is a formal way of representing the data that are used and created by a business system. T
11. CRUD stands for create, relate, update and define and can be used to verify DFDs and ERDs. F
12. System requirements are communicated through a collection of design documents and physical processes and data models. T
13. The only skills that are applied during systems projects are technical. F
14. The acronyms of HTML is Hyper Text Markup Lesson F
15. Message tips should be clear, concise, and complete T
16. In content awareness all interfaces should not have any titles. F
17. Analysts design programs in the design phase of the SDLC, programmers code programs in the Implementation phase. T
18. Physical DFDs show additional details, such as what tables in the database replace data stores on the logical DFD. F
19. Generally, transaction structures on a structure chart will have many efferent processes. T
20. The purpose of creating physical ERDs is to show implementation details and to explain more about the 'how' of the final system. T

Question 3(a): List 4 major benefits and four limitations of client server architecture. Differentiate between thick and thin client? [7]

Ans: Benefits

- **Scalable**
- **Works with multiple vendors/products through middleware**
- **Improved modularity of web-based systems**
- **No central point of failure**

Limitations

- **Complexity**
- **New programming languages and techniques (adds stress for personnel)**
- **More complex to update**

Thick and thin clients are found in client-server applications and they are categorized as thick or thin based on the proportion of application logic stored on the client terminal. Thick, or sometimes referred to as fat, clients are those that house a majority of the application logic. Thin clients are those where the majority of the systems' application logic is stored on the server.

(b) List the major guidelines for outsourcing during System Design. [5]

Ans: Outsourcing

- Keep the lines of communication open between you and your outsourcer.
- Define and stabilize requirements before signing a contract.
- View the outsourcing relationship as a partnership.
- Select the vendor, developer, or service provider carefully.
- Assign a person to manage the relationship.
- Don't outsource what you don't understand.
- Emphasize flexible requirements, long-term relationships, and short-term contracts.

Question 4: Read the following case study and draw an ER diagram by identifying all the entities, attributes and their relationships. [12]

The following is a description of some data requirements for a chain of pharmacies. Draw the appropriate entity-relationship (E-R) diagram.

(a) A pharmaceutical company manufactures one or more drugs, and each drug is manufactured and marketed by exactly one pharmaceutical company. The name of each Pharmaceutical company is unique. The other attributes of company are its address, PO Box, Telephone Number, Email address, Fax.

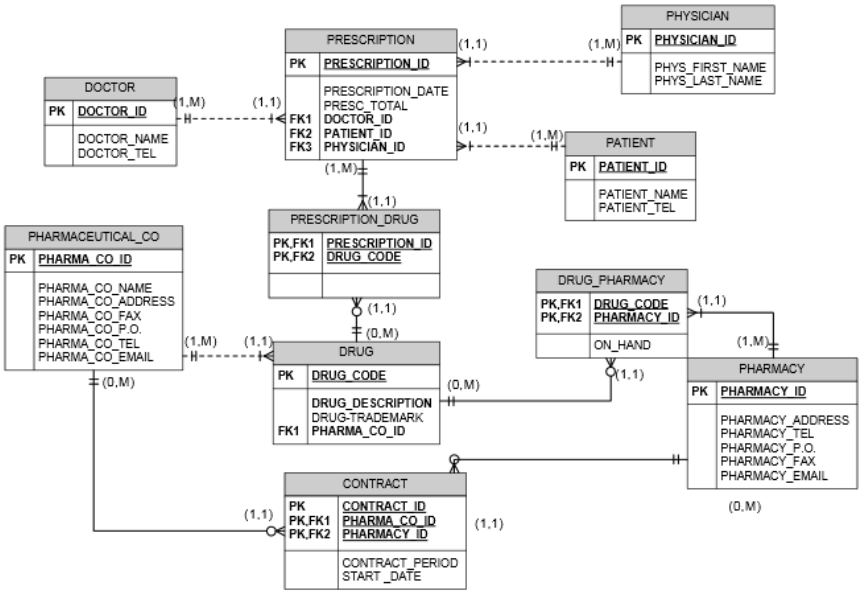
(b) Drugs are sold in pharmacies. Each pharmacy has a unique identification. Every pharmacy sells one or more drugs, but some pharmacies do not sell every drug. The other details of pharmacy include Pharmacy Name, Telephone, Fax and PO Box.

(c) Drug sales must be recorded by prescription, which are kept as a record by the pharmacy. A prescription clearly identifies the drug, name Doctor ID, and patient ID, as well as the date it is filled. A prescription is identified by its Prescription number.

(d) Doctors prescribe drugs for patients. A doctor can prescribe one or more drugs for a patient and a patient can get one or more prescriptions, but a prescription is written by only one doctor. A doctor has his own medical ID and has his name and telephone number.

Ans: The ER model for question is derived from the following larger ER diagram. You can assess the correctness of answer by checking this model.

Ans: This is complete model of given question. However, students don't need to write PK with the primary keys or write type of relationship. If they show sufficient attributes and proper relationships, answer should be considered correct.



Question 5: Explain the terms in terms of user interface design, guidelines for (a) Aesthetics (b) Consistency [8]

Ans: Aesthetics

- **Interfaces need to be functional and inviting to use**
- **Avoid squeezing in too much, particularly for novice users**
- **Design text carefully**
  - **Be aware of font and size**
  - **Avoid using all capital letters**
- **Colors and patterns should be used carefully**
  - **Test quality of colors by trying the interface on a black/white monitor**
  - **Use colors to separate or categorize items**

Consistency

- **Enables users to predict what will happen**
- **Reduces learning curve**
- **Considers items within an application and across applications**
- **Pertains to many different levels**
  - **Navigation controls**
  - **Terminology**
  - **Report and form design**

Question 6: Explain how optimization in data storage can be achieved by (a) Clustering and (b) Indexing [8]

Ans: After you have optimized your data model design for data storage efficiency, the end result is data that is spread out across a number of tables

- **There are several techniques that the project team can use to try to speed up access to data:**

Clustering:

- **Reduce the number of times storage must be accessed by physically placing like records close together.**
  - **Intrafile clustering – similar records in a table are stored together**
  - **Interfile clustering – combine records from more that one table that are typically retrieved together**

Indexing

- **A minitable that contains values from one or more fields in a table and the location of the values within the table**
- **Similar to the index of a book**