King Saud University

College of Computer and Information Sciences
Computer Science Department

Course Code:	**CSC 343**	
Course Title:	**System Analysis and Design**	
Semester:	**Third 1444 H**	
Exercises Cover Sheet:	**Solution: Midterm Exam**	**1:30 h**

Student Name: ……………………………………………….

Student ID: ……………………………………………….

Department Name: ……………………………………………….

	CLOs		Question No. Relevant Is Hyperlinked	Covering %	Full Mark	Student Mark
1	**Knowledge and Understanding**					
1.1-K1	Apply key elements and common methods for elicitation and analysis to produce a set of software requirements.		Ex-3	28%	7	
1.2-K2	Use necessary tools for analysis and design activities (process model, diagrams, …..).		Ex-2-4	48%	12	
2	**Skills :**					
2.1-S1	Choose an appropriate method to design the software using a software requirement specification, an accepted design methodology (e.g., structured or object-oriented), and appropriate design notation.					
2.2-S1	Use a software testing strategy.		---			
2.3-S3	Work on team and Write project reports.		---			
3	**Values:**					
3.1-V1	Make ethical professional decisions and practice ethical professional behavior.		Ex-1	24%	6	
	Total			**100%**	**25**	

This exam comprises 4 exercises. Make sure you read each exercise carefully before attempting an answer.
Be sure to clearly indicate your final answer for each exercise. Also, be sure to state any assumptions that you are making in your answers.

Good luck!

Exercise 1: *(6 points)*

Ali is a private consultant who advises small businesses about their computer needs. Ali examines a company's operations, evaluates their automation needs, and recommends hardware and software to meet those needs. Recently, Ali was hired by a small, private hospital interested in upgrading their system for patient records and accounting. The hospital had already solicited proposals for upgrading the system, and hired Ali to evaluate the proposals they'd received. Ali carefully examined the proposals on the basis of the systems proposed, the experience of the companies that bid, and the costs and benefits of each proposal. He concluded that Alpha Systems had proposed the best system for the hospital, and he recommended that the hospital should buy the Alpha system. He included a detailed explanation for why he thought the Alpha bid was the best. Ali did not reveal to the hospital that he is a silent partner (a co-owner) in Alpha Systems.

Read the above situation carefully and answer if there is a violation of the Software Engineering Code of Ethics and Professional Practice? Justify your answer if Ali's behavior was unethical and choose the code of ethics who supports your answer. We will assume for our discussion that Ali evaluated the bids in good faith, and sincerely believed that Alpha had given the best bid.

    a.   Ensure an appropriate method is used for any project on which they work or propose to work.
    b.   Ensure adequate documentation, including significant problems discovered and solutions adopted, for any project on which they work.
    c.   Ensure realistic quantitative estimates of cost, scheduling, personnel, quality and outcomes on any project on which they work or propose to work and provide an uncertainty assessment of these estimates.
    d.   Refuse to participate, as members or advisors, in a private, governmental or professional body concerned with software related issues, in which they, their employers or their clients have undisclosed potential conflicts of interest.
    e.   Use the property of a client or employer only in ways properly authorized, and with the client's or employer's knowledge and consent.
    f.   Disclose to appropriate persons or authorities any actual or potential danger to the user, the

Answer:

Ali is in violation of conflict of interest since he didn't reveal to the hospital that he is a silent partner in Alpha Systems. (3 points)
d. (3 points)

Exercise 2: *(6 points)*

You are a software development manager in a company that develops critical control software for commercial airplanes. You are responsible for the development of a software that controls some of the airplane critical systems.

Which process model is more suitable for the development of the critical control software for airplanes? Justify your answer.

Answer:

For critical systems such as the one mentioned in the question, a very structured development process is required, and a detailed design documents setting out precise and accurate descriptions of the system must be produced, (3 points) which makes waterfall model more suitable for such systems. (3 points)

Exercise 3: *(7 points)*

Decide, if following requirements are functional or non-functional (each 1 point)

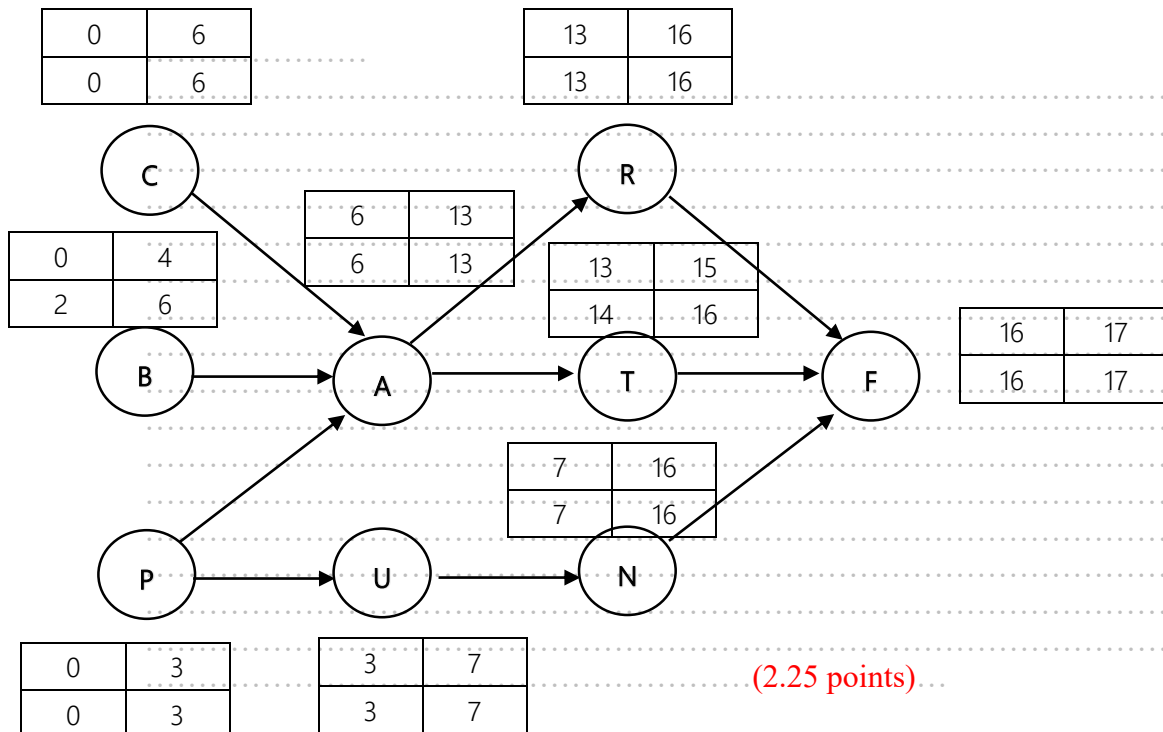|	Functional	Non-Functional
The system shall be usable by novice users without any prior training		√
System shutdown in the case of a cyber-attack.	√	
Verification email is sent to user whenever he/she registers for the first time on some software system.	√	
A strong password might contain a certain number of characters and a capital letter.		√
The system shall print a login prompt when the program starts up	√	
The system shall ensure that all data is stored securely and that unauthorized access is prevented		√
For every presented vocable the student should be able to choose "Agree", "Neutral", or "Disagree".	√	

Exercise 4: *(6 points)*

Consider a project with the following activities. Times are given in weeks.

Activity	Preceding	Time (week)
C	--	6
B	--	4
P	--	3
A	B, C, P	7
U	P	4
T	A	2
R	A	3
N	U	9
F	T, R, N	1

1. Draw the network activity diagram and find the earliest and the latest start/finish time for each activity?
2. Identify critical path(s).
3. What is the free float of activity T.
4. What is the impact to the project if activity B takes three weeks longer than planned?
5. What is the impact to the project if activity T takes one week longer than planned?

Answer:

0	6
0	6

(C)

13	16
13	16

(R)

0	4
2	6

(B)

6	13
6	13

(A)

13	15
14	16

(T)

16	17
16	17

(F)

0	3
0	3

(P)

3	7
3	7

(U)

7	16
7	16

(N)

(2.25 points)

2. Critical paths: (1.5 points)

   - CARF
   - PUNF
   - PARF

3. Free Float of T = min(suc. ES) – ES – Duration = 16 -13 – 2 = 1 (0.75 point)

4. If activity B takes three weeks longer than planned, the latest finish of it will be at week 7 (delayed by 1 week). This is will affect the critical task A (will be delayed by 1 week) and the final project be delayed by 1 week. (0.75 point)

5. The free float of T = 1, then T can be delayed one week without delaying the Early Start of its successor task (F: final task). No delay of the final project. (0.75 points)