Department of Computer Science & Engineering
University of Asia Pacific (UAP)

Final Examination **Fall 2021** **3rd Year 1st Semester**

Course Code: CSE 305 **Course Title: System Analysis and Design** **Credits: 3**

Full Marks: 150 **Duration: 3 Hours**

Instructions:

1. There are **Six (6)** Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

1. a. Define Return on Investment (ROI). [5]

   b. The cost summary of business includes facilitation fees of Tk.50, 000, materials costing Tk.100, 000, salaries of staffs amounting Tk.150, 000. The total annual benefit results as Tk.500, 000. Calculate Return on Investment (ROI). [10]

   c. An investor purchases property A, which is valued at $500,000. Two years later, the investor sells the property for $1,000,000. Calculate Return on Investment (ROI). [10]

2. a. Inspect how an Activity diagram can be used to model business requirements. [10]

   b. Analyze the workflow for a word process to create a document using an Activity diagram through the following steps: [15]
   - ❑ Open the word processing package.
   - ❑ Create a file.
   - ❑ Save the file under a unique name within its directory.
   - ❑ Type the document.
   - ❑ If graphics are necessary, open the graphics package, create the graphics, and paste the graphics into the document.
   - ❑ If a spreadsheet is necessary, open the spreadsheet package, create the spreadsheet, and paste the spreadsheet into the document.
   - ❑ Save the file.
   - ❑ Print a hard copy of the document.
   - ❑ Exit the word processing package

3. a. Analyze the swimlanes of activity diagram. [10]

   b. Compare the types of message arrows of sequence diagram. [15]

4. a. Identify the major notations of the sequence diagram. [10]

b. There is a volume of students renting books from the library. To regulate this, it's essential for students to have online access to the record of available books. The system will also inform the student if they exceeded the allotted time for renting a book and a penalty will apply accordingly. [15]

Develop a library management system using sequence diagram.

5. a. Identify the major components of class diagram. [10]

b. An automated teller machine (ATM) lets you access your bank account. With it, you can check your balance, enter the amount to withdraw, you can deposit the money and many more. [15]

Design a class diagram for the ATM.

OR

5. a. Categorize the relationships of class diagram with examples. [10]

b. Through the help of a hospital management system, the establishment will be able to manage the volume of information. Moreover, doctors or nurses will be able to track the status and health history of patients. [15]

Design a class diagram for a hospital management system.

6. a. In the following example there are seven tasks, labeled *A* through *G*. Some tasks can be done concurrently (*A* and *B*) while others cannot be done until their predecessor task is complete (*C* cannot begin until *A* is complete). Additionally, each task has three time estimates: the optimistic time estimate (*o*), the realistic time (*r*), and the pessimistic time estimate (*p*). Calculate the expected time (*et*) using the data of the following Table. [25]

Activity	Predecessor	Time estimates		
		Optimistic (*o*)	Realistic (*r*)	Pessimistic (*p*)
A	—	2	4	6

B	—	3	5	9
C	*A*	4	5	7
D	*A*	4	6	10
E	*B, C*	4	5	7
F	*D*	3	4	8
G	*E*	3	5	8

OR

6. a. An Activity-On-Node (AON) diagram is given below. Fill in the blanks with appropriate data and then find out the critical path. [25]