

University of Central Punjab
Faculty of Information Technology
Final Term Exam (CSSE3113): Introduction to Software Development (ISD)

Duration	Semester	Percent Weight	Total Marks
2h 30m	Summer 2022	40%	40

Name: _____

Reg #

INSTRUCTIONS

1. This is a **CLOSED BOOK** and **CLOSED NOTES** exam; Cheat sheet is **NOT ALLOWED**.
 2. Attach this question paper with your answer sheet.
 3. There is a total of **9 questions**, and **3 printed pages**.
 4. **CALCULATOR SHARING IS NOT ALLOWED**
 5. **Providing multiple solutions to a question is not allowed. If multiple answers are found, only the first uncrossed will be checked, and the remaining will be ignored.**
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Q1. Consider the following scenario and draw class diagram for it. [5]

- All Vehicles have some common attributes (speed and color) and common behaviors/methods (turnLeft, turnRight)
- Bicycle and MotorVehicle are both kinds of Vehicle and are therefore shown to inherit from Vehicle. To put this another way, Vehicle is the superclass of both Bicycle and MotorVehicle
- Bicycle has behavior/method of ringbell along with inherited attributes and behaviors/methods
- MotorVehicle have engines and license plates as attributes and behavior/methods having same name have been added accordingly to examine the attributes
- MotorVehicle is the base class of both MotorBike and Car, therefore these classes not only inherit the speed and color properties from Vehicle, but also the additional attributes and behaviors/methods from MotorVehicle
- Both MotorBike and Car have additional attributes and behavior which are specific to those kinds of object

Q2. Create a UML diagram of a Student Attendance System. The USE CASE diagram can have many use cases and actors but it must have student, staff and admin as actors. [5]

Q3. There are three Designs given for solving a problem of faster execution of customer queries in a banking system. Each has different Benefits and Costs. For the Table given in Figure 3. [2+2+2+2]

- Compute the “Added value” when the company savings are \$4500 per year.
- Compute the Return on Investment (for 1 year)
- Compute the %gain on ROI (for 1 year)
- Based upon the results of ROI, suggest which design is best choice.

(Note: Added value is computed by calculating the additional requests per second that the system can process in a minute and multiplying that number with savings of company per year.)

- Q4.** Give an example of Include and Extend relationship in use case? [2]
- Q5.** How Aggregation is different from Composition? Briefly explain with example. [2]
- Q6.** Alpha soft is a software house which has completed a project of a retail software system for one of its client. During the development of this software, 40 errors were found before delivery of this software. After completion, this retail software was delivered to the client. But within only 6 months of operations after delivery, the client reported 10 errors.
- You are required to find the Defect Removal Efficiency for this project.
- Q7.** Suppose a website is being tested for customization index using Webapp based Metric. If the website has 30 static pages and 15 dynamic pages along with 40 executable functions.
- Calculate the customization index
 - Is the customization of website easy or difficult and why?
- Q8.** Considering that you would like to buy a new mobile phone and you have different alternatives [4+1] as shown in the Table given in Figure 4.
- Suppose your priority for defined criteria from top to bottom are 4,4,5,4,5,2,5,5,2,1.
 - Perform Trade-off analysis to decide which one is the best one for you.
- Q9.** A software has an estimated following values EI_s = 5, EO_s=2, EQ_s=7, ILF_s=9, EIF_s=2. [2+2+2+2]
- The adjustment factors of the 14 questions for a software application are: 5,1,0,4,3,5,4,3,4,5,2,3,4,2.
 - The weight factor is **simple** if EQ_s < 10. The weight factor is **average** if EQ_s > 10 and EQ_s < 30. The weight factor is **complex** if EQ_s > 30.
 - The average LOC per FP of technology used “Assembly language” is 320.

Calculate effort, development time and average staffing using CoCoMo. Suppose the software is developed within a set of tight constraints.

Use Figure 1 for FP weights and Figure 2 for CoCoMo constants.

Note: Attempt everything on your answer sheet. DO NOT attempt anything in any table/graph given below

Figure 1.

Parameters	Weight Factor		
	Simple	Average	Complex
External Input (EI)	3	4	6
External Output (EO)	4	5	7
External Inquiries (EQ)	3	4	6
Internal Logical File (ILF)	7	10	15
External Interface File (EIF)	5	7	10

Figure 2.

Software Projects	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi-detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

Figure 3.

	Plan A	Plan B	Plan C
Benefits			
Search Time	0.010 sec	0.012 sec	0.029 sec
Throughput	80 requests/sec	85 requests/sec	90 requests/sec
Added Value			
Costs			
Hardware	\$10000	\$15000	-
Software	\$50,000	\$200,000	\$200,000
Business Losses	\$50,000/yr	\$10,000/yr	-
Total Cost (1 st Year)			

Figure 4.

Criteria	Priority	Samsung	Infinix	Apple	Huawei
Color		2	4	1	5
Camera		3	4	2	4
Wifi		4	3	3	4
RAM		3	5	3	5
ROM		4	4	4	5
Bluetooth		4	3	3	5
Durability		5	3	5	4
Touchscreen		5	3	5	4
Price		5	3	5	4
Supplier		4	5	5	4