UOW MALAYSIA KDU PENANG UNIVERSITY COLLEGE

PART OF THE UNIVERSITY OF WOLLONGONG AUSTRALIA GLOBAL NETWORK

School of Engineering, Computing and Built Environment
Department of Computing
Bachelor of Computer Science (Hons) in Computer and Network Technology

Bachelor of Computer Science (Hons)

Software Engineering (CSE3033/N)

May 2022 Semester
Final Examination

Duration: 2 hours
Total Marks: 100

Instructions

1. This examination paper consists of **4 pages**, including this cover page.
2. There are 3 sections: Section A (40 marks)
   Section B (30 marks)
   Section C (30 marks)
3. Read carefully the instructions printed at the beginning of each section.
4. All answers are to be written in the answer booklet(s) provided. Use black or blue ink only. Pencils may be used for sketches and diagrams.
5. Examination paper and answer booklet(s) are **not allowed** to be taken out from the examination room.

Section A (40 marks)

Answer all questions.

1. Software engineering methods and tools used depend on the type of application being developed. List and explain 4 different application types. (8 marks)

2. a) Briefly explain extreme programming (XP) in software engineering. (3 marks)

   b) Pair programming is one of the practice in XP. Briefly explain about pair programing and the roles involved in pair programming. (3 marks)

3. a) Describe what user story is. (3 marks)

   b) SMART is a set of criteria to evaluate user stories. Explain each of the criteria. (10 marks)

4. A development team with 4 members has 8 working days to complete a sprint. Assume that they are working 8 hours per day and the total hours they work from day 1 to 5 is shown in Table 1.

Table 1: Total effort for all team members in a Sprint

Day of Sprint	Total Effort (hours)
1	50
2	16
3	48
4	40
5	28

   a) Draw a burn down chart to track the progress of development in the sprint. Only show the actual effort from day 1 to 5. (10 marks)

   b) Assume the product owner would like to add one story with high priority in this sprint. According to the burn down chart, will the team be able to accept the additional story? Explain your answer. (3 marks)

Section B (30 marks)

Answer all questions.

1. Use Application Composition Estimation Model to estimate the effort required to build software for a simple kiosk system that produces 6 screens, 2 reports and required approximately 75% of new software components. Assume that the complexity for the screen is simple and complexity for report is medium. The system has no 3GL component. The developer's experience and capability in similar environment is normal.

   Use the tables provided below to calculate the effort to develop the project by showing the steps of calculating the application point count, new application points and effort to develop. The effort is measured in person per month. (10 marks)

Table 1: Complexity Weight

Application Type	Complexity Weight		
	Simple	Medium	Difficult
Screen	1	2	3
Report	2	5	8
3GL Component	-	-	10

Table 2: PROD reference

Developer's experience and capability; ICASE maturity and capability	Very Low	Low	Normal	high	Very high
PROD (NAP/person per month)	4	7	13	25	50

2. A fresh graduate just joins your team and construct a class definition as given below. The code is syntactically correct but may not following conventional programming style. As a senior developer, identify and explain which coding style are violated and provide appropriate corrections. (12 marks)

```
class employee{
private int employeeid;
private String name, department;
public employee(){
…
}
public void setEmployee(int id, String name, String department){
…
}
public int getemployeeid(){
…
}
public String getName(){
…
}
public String getDepartment(){
…
}
}
```

3. a) Briefly explain what refactoring is in software engineering. (2 marks)

   b) List 3 benefits of refactoring. (6 marks)

Section C (30 marks)

Answer all questions.

1. Answer the following questions based on the codes below:

1	`double a1, a2, fe, total = 0;`
	`String status;`
	`Scanner reader = new Scanner(System.in);`

2	`do{`

3	`   a1 = reader.nextDouble();`
	`   a2 = reader.nextDouble();`
	`   fe = reader.nextDouble();`
	`   total = a1 * 0.3 + a2 * 0.3 + fe * 0.4;`

4	`} while (total < 0 || total > 100);`
5	`if(total > 80)`
6	`   status = "Outstanding";`
7	`else if(total > 50)`
8	`   status = "Good";`
9	`else` `   status = "Fail";`
10	`System.out.println("Total marks: " + total);` `System.out.println("Status: " + status);`

   a) Draw the control flow graph (CFG). (12 marks)
   b) List all basic path set according to the CFG. (6 marks)

2. Availability and reliability can both be expressed as probabilities. Define availability and reliability precisely. (4 marks)

3. Suggest and justify the appropriate reliability metrics for the following system and give appropriate values for the reliability metrics.
   a) Hotel room reservation system (4 marks)
   b) Student attendance report generator (4 marks)

THE END

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