

Mahidol University International College
Computer Engineering International Program

- EGC1341: Software Engineering -

Midterm Exam (30%)

Tuesday 17th October, 2023 (10:00 – 11:50)

Instructor: Dr. Lalita Narupiyakul

Name: Student ID:

Please read the following instructions carefully:

1. This midterm examination consists of 5 questions distributed in a total of 3 pages (including this page). Please make sure that you have all the pages.
2. This is a closed book exam and no electronic device is allowed.
3. One A4 single-side page cheat sheet is allowed.
4. Print your name and student ID on cover page.
5. Fill all the answers in your booklet
6. Communication with other people is not allowed during the exam. You may only communicate with the instructor, the teaching assistants, or the invigilator/proctor.

Question No.	Marks	
1	11	
2	3	
3	4	
4	8	
5	4	
Total	30	

1. Short answers for question 1.1-1.6 (11 marks)

1.1. What are the functional properties and non-functional properties of the SKY+ system? (2 marks)

Show grade, calculate gpa, schedule

1.2. How to evaluate the capability and performance of the software development in an organization. Please explain. (2 marks)

stability, security

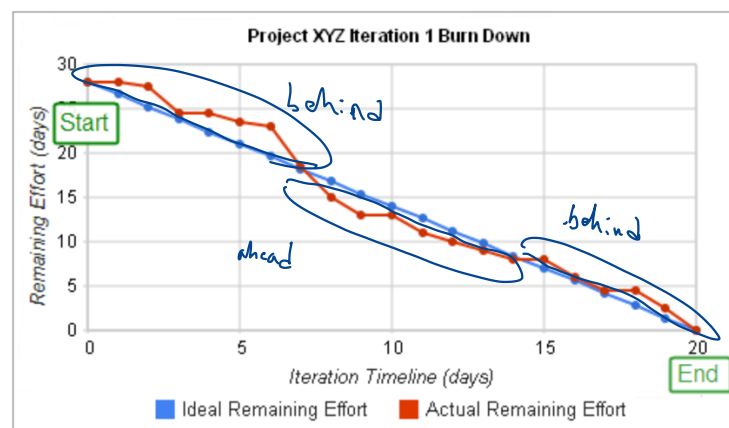
1.3. Compare the differences between Scrum and Kanban in software development processes. Explain by using the comparison table below. (2 marks)

Scrum	Kanban
1. <i>has daily meetings</i>	1. <i>no daily meeting</i>
2. <i>sprint per 2-3 weeks</i>	2. <i>continuous work, no sprint</i>

1.4. Where does the sprint backlog come from? (1 marks)

1.5. Provide two reasons to explain why does the software development team do the sprint retrospective in the SCRUM model. (2 marks)

1.6. According to Scrum process, there is a burn down chart to show the progress of software development in each sprint. Please consider the chart below and describe when the software development is behind or ahead the schedule. (2 marks)



2. When the system has low functional dependency inside the module and high functional dependency among modules, please answer the question below. (3 marks)

(i) What will be happen to this system (1 marks).

(ii) If the functional dependency has a problem, suggest the solution. If the functional dependency has no problem, explain the reason why there is no problem. (2 marks).

3. Draw the class diagram of the relationships in question no. 3.1 - 3.4 whether Association, Generalization, Aggregation or Composition relationship. (4 marks)

3.1. Class relationship between school class and teacher class

composition

if school has no teachers it's no longer school

3.2. Class relationship between pizza class and vegetable class

aggregation

3.3. Class relationship among accommodation class, hostel class and hotel class

generalization

main class & sub class

3.4. Class relationship between ticket class and passenger class

association



—|— generalization
—◇— aggregation
—◆— composition
— association

4. According to the description of the Lotto system below, please answer 4.1 and 4.2 (8 marks)

Lotto mobile application can be used to check whether a lotto number is win. User can input their lotto number from the UI and clicks the "Check Lotto" button. Then the mobile application will call the "checkLotto" API to send a lotto number to their backend system, which the "lottoService" web service. This web service will query the lotto number in the database to check whether the user's lotto number matches to one of the winning numbers. The "lottoService" webservice then responds the result whether is "win" or "lose" to the Lotto mobile application.

- Thin
- 4.1. What is the type of software architecture for this system? Explain your answer (1 marks)
 - 4.2. Draw the software architecture of system. (2 marks)
 - 4.3. Draw Class diagram for the Lotto system. (3 marks)
 - 4.4. Draw Sequence diagram to check the lotto number whether it is win. (2 marks)

5. According to the code below. Please answer the question 5.1 and 5.2. (4 marks)

- 5.1. Draw the class diagram based on the programming code below. (2 marks)
- 5.2. Which line no. are the encapsulation and information hiding of "Player" class? (2 marks)

line 14

```
1 public class BoardGame {
2     private List<ISquare> square;
3     private int size;
4     private Paladin arthur;
5     private Monster cyclopes
6     public function getNewGame(){
7         return 0;
8     }
9 }
10
11 public class Player {
12     private String name;
13     private ISquare square;
14     public function getPlayerInfo(String name){
15         return name;
16     }
17 }
18
19 public class Square implements ISquare {
20     protected int position;
21     private String game;
22     private String player;
23 }
24
25 public class Monster extends Player {
26     private int skill;
27 }
28
29 public class Paladin extends Player {
30     protected int weapon;
31 }
```

encapsulation

According to the code below. Please answer the question 5.1 and 5.2. (4 marks)

5.1. Draw the class diagram based on the programming code below. (2 marks)

5.2. Which line no. are the encapsulation and information hiding of "Player" class

