

TUNKU ABDUL RAHMAN UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

ACADEMIC YEAR 2023/2024

JANUARY EXAMINATION

AACS2123 COMPUTER GAME DEVELOPMENT

THURSDAY, 18 JANUARY 2024

TIME: 9.00 AM – 11.00 AM (2 HOURS)

DIPLOMA IN COMPUTER SCIENCE

Instructions to Candidates:

Answer **ALL** questions. All questions carry equal marks.

AACS2123 COMPUTER GAME DEVELOPMENT**Question 1**

- a) Briefly describe *Unified Modelling Language (UML)*. (2 marks)
- b) Discuss **TWO (2)** out of five key design elements for a game. (4 marks)
- c) Based on the case study below, draw the necessary use case diagram for a zombie action game that you are assigned to develop. (11 marks)

In this zombie action game, players take on the role of a teenager who has survived the zombie apocalypse, racing against time to save their family. In the game, players navigate through various challenges, utilizing walking, running, jumping, and dodging to avoid zombie attacks. The player uses melee weapons to slay zombies and also throw grenades to create explosions, killing hordes of zombies at a distance. Additionally, players have the ability to reload bullets and upgrade weapons to effectively combat zombies with higher damage.

To enhance their chances of survival, players also have access to vehicles, using them to search resources and a secure place for their family. As the game progresses, players can switch between different weapons to effectively handle various types of zombies encountered in later stages.

- d) Describe **TWO (2)** contents that should be covered in a *Game Design Document*. (4 marks)
- e) List **FOUR (4)** out of five steps for core workflows of the *Unified Software Development Process*. (4 marks)

[Total: 25 marks]

Question 2

- a) In the realm of software engineering, the analysis model serves as an important component in the development process. Describe **TWO (2)** functions of the analysis model. (4 marks)
- b) Create a simplified class diagram with attributes and properties for the description below. (13 marks)

In a fantasy role-playing game, a player may select a character with a different class to embark on the adventures, exploring a magical world, battling monsters, and completing quests. Each character has a name, level, health points, and a set of abilities. The game consists of items that can be used in battling monsters. The items include weapons, armors, and potions. This game comprises several levels, each featuring a different magical world. Players can manage the game, performing actions such as starting the game, pausing the game, and quitting the game.

AACS2123 COMPUTER GAME DEVELOPMENT**Question 2 (Continued)**

- c) In the field of developing game, understanding the concept of reverse engineering is crucial. Describe *reverse engineering* and explain how it can be performed. (4 marks)
- d) Two essential UML diagrams that can be used in explaining the software systems are *package diagram* and *deployment diagram*. Briefly explain these two diagrams. (4 marks)

[Total: 25 marks]

Question 3

- a) In the process of developing games, understanding the roles of input manager and sound manager is important. Explain *input manager* and *sound manager* components of the *Unity* Game Engine. (4 marks)
- b) Answer the following questions based on **Figure 1.0** below



Figure 1.0. Source: <https://farmville3.com/>

- (i) Describe the camera perspective for the illustration above. (5 marks)
- (ii) The illustration above is made from sprites. Briefly explain *Sorting layer* and *Order in Layer settings* in *Sorting Group* of Unity. (4 marks)
- c) *Parallax scrolling* technique is widely used in the development of 2D games. Explain how it works. (4 marks)
- d) Explain *game scripting* and how it contributes to the overall game development. (4 marks)

AACS2123 COMPUTER GAME DEVELOPMENTQuestion 3 (Continued)

- e) Explain **TWO (2)** advantages of using *prefabs* in Unity. (4 marks)

[Total: 25 marks]

Question 4

- a) In a 2D game that you are developing, you will include physics to create realistic experience to the player.
- (i) Explain the *kinematic* and *static* body type of *Rigidbody* in Unity. (4 marks)
 - (ii) Identify objects that are suitable to be applied with *Box collider* and *Edge collider*. (4 marks)
- b) Identify **THREE (3)** settings of *Audio Source* in Unity. (6 marks)
- c) Describe **TWO (2)** divisions that can be found in a computer game development team. (6 marks)
- d) Identify **ONE (1)** testing procedures that can be found in a test plan and explain how it works. (5 marks)

[Total: 25 marks]