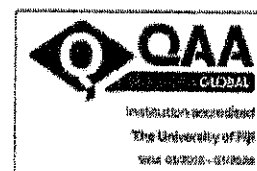
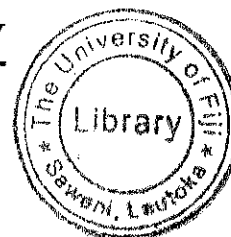




The University of Fiji
(An Entity of Arya Pratinidhi Sabha of Fiji)



SCHOOL OF SCIENCE AND TECHNOLOGY
Semester 2, 2024



FINAL EXAMINATION PAPER

ITC325: GAMES PROGRAMMING TECHNIQUES

Important Instructions to Students:

1. Read the questions and instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes of reading time** (during this time, you are not allowed to write with a pen) and **180 minutes (3 Hours) to complete this paper**.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code, and student identification number in the answer booklet and in the attendance sheet.
5. This paper contains two (2) sections A and B. All questions are compulsory to answer.
6. Write all your answers legibly. The marker has the right to award a zero for answers that are not legible.
7. This is a **Closed Book Examination**. The University views plagiarism, cheating, and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1-30	Short Answer Questions	75	135 minutes
B	31-32	Long Answer Questions	25	45 minutes
		TOTAL	100	180 Minutes

SECTION A: Short Answer Questions

All questions in this section are compulsory.

1. Identify at least three game development engines that are available and explain how they are different from one another. **[3 Marks]**
2. In your own terms, explain why you think Unity would be the best tool for developing games. **[2 Marks]**
3. Provide at least four objects that are considered game objects. **[2 Marks]**
4. Explain what happens in the Interpreter and Compiler phases. **[2 Marks]**
5. Explain the process of linking a C# script to a sprite. Also, mention how you would start first by creating the script from scratch. **[2 Marks]**
6. So far, we have looked into four different functions, what are they? **[2 Marks]**
7. What is the purpose of the Console section? **[1 Mark]**
8. How would you print out a message in debug mode when the message is "It's Game Time"? Also, indicate which function will it be part of just by looking at the message. **[2 Marks]**
9. If I want an object to fall out of the sky, how would I do it? Identify all the necessary steps. **[2 Marks]**
10. What are some important principles to note when it comes to choosing an appropriate variable name? **[2 Marks]**
11. Identify the purpose of the `isTrigger` property with an example. **[2 Marks]**
12. Explain what is .NET Framework and what are some of the libraries associated with it. **[2 Marks]**
13. Explain by providing steps, how would you set up a collision between two objects and add functionality that could perform a task such as subtracting score every time the two objects collide? **[2 Marks]**
14. Write three lines of code that will make an object's position, rotation, and scale change automatically during runtime. **[3 Marks]**
15. How would you add a Physics Material and why is it important? Provide a necessary example. **[2 Marks]**
16. Elaborate on the following Physics 2D Components: **[4 Marks]**
 - a. Box Collider
 - b. Circle Collider
 - c. Polygon Collider
 - d. Rigidbody 2D
17. Elaborate on what the following function means and what are the parameters it accepts: **[3 Marks]**
 - a. `transform.Translate`
 - b. `transform.Rotate`
 - c. `transform.localScale`

18. Explain how would you implement the Canvas and add a Text component to display the scores.

[2 Marks]

19. Explain the purpose of the following code:

[2 Marks]

```
public Text scoreText;
```

20. Explain what the following lines of code do:

[2 Marks]

```
switch (treasure)
{
    case 1:
        Debug.Log("I can buy a pack of gum.");
        break;
    case 10:
        Debug.Log("I can buy a milkshake!");
        break;
    case 100:
        Debug.Log("I'm rich!");
        break;
    default:
        Debug.Log("Unknown amount");
        break;
}
```

21. Differentiate between OnCollisionEnter2D() and OnTriggerEnter2D().

[2 Marks]

22. Describe how you would adjust collider boundaries with an example.

[2 Marks]

23. Elaborate on the term "Sort Layers".

[2 Marks]

24. What do you understand by Tagging Game Objects?

[2 Marks]

25. What are classes? Elaborate with appropriate examples.

[2 Marks]

26. Identify the difference between Primitive Data types and Numeric Data Types. Support your answer with examples.

[2 Marks]

27. Describe the purpose of the Parent-Child relationship and explain how you would make two Game Objects share the Parent-Child relationship. Provide two examples where game objects are considered to be in parent-child relationships.

[3 Marks]

28. Identify the purpose of the MonoBehaviour class and why is it important for game development.

[2 Marks]

29. Suppose you are designing a game called Shark Tag and, in the game, there are two sprites if the shark sprite collides with the fish sprite, then the score would increment by 1, this would be done every time the shark collides with the fish. Write codes that will initialize the score, increment it, and show the updated scores in a text component in the game. Below is a skeleton that hints at what codes are missing.

[6 Marks]

```

using UnityEngine;
using System.Collections;
???

public class SharkScript : MonoBehaviour
{
    ???
    ???
    void Start ( )
    {

    }
    void Update ( )
    {

    }
    void OnCollisionEnter2D (Collision2D otherObject)
    {
        ???
        ???
    }
}

```

30. There is a rocket launcher game that allows players to land the rocket at a certain velocity. The code below explicitly converts fractional data into integers; use that to write a Switch decision structure as well as an IF conditional statement that will follow these arguments: **[8 Marks]**

- a. For a speed of 0 or 1, display "SAFE".
- b. For a speed of 2, display "OUCH".
- c. For a speed of 3, display "CRASH".
- d. For all other speeds, display "PANCAKE".

The output should be presented in the console. Use the below structure to complete the codes:

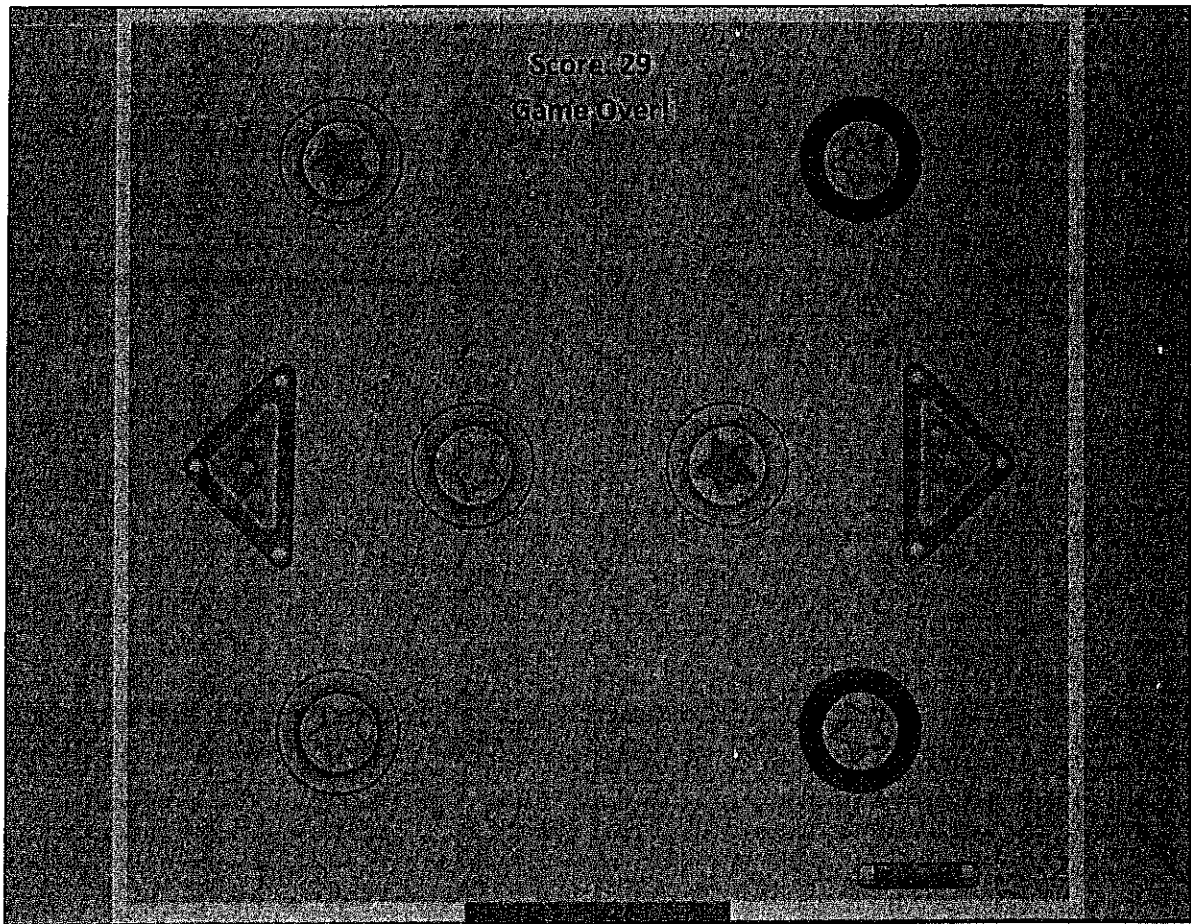
```

void OnCollisionEnter2D (Collision2D otherObject)
{
    float relativeVelocity = otherObject.relativeVelocity.magnitude;
    int speed = (int)relativeVelocity;
    ???
}

```

All questions in this section are compulsory.

31. For the below Pin Ball game scenario, answer the following questions:



- a. Write the missing necessary codes for a script called "BallScript.cs" which employs a scoring mechanism and a game-over scenario. Comments are provided to help you write the missing codes. **Missing codes are denoted by "???"**. [7 Marks]

```
using UnityEngine;
???
using System.Collections;

public class BallScript : MonoBehaviour {
    // declare variable to keep score
    ???

    // declare Text variable to display score
    ???

    // declare Text variable to display game over
    ???

    void Start()
    {
        // initialize game score
```

```

        ???
        // game is not over yet; display nothing
        ???
    }
    void OnTriggerEnter2D(Collider2D otherObject)
    {
        // display game over message
        ???
    }
    void OnCollisionEnter2D(Collision2D otherObject)
    {
        // increase the score
        ???
        // display new score
        ???
    }
}

```

- b. Write the necessary paddle movement codes in the "PaddleScript.cs" file and explain how you will configure the controls using the Input Manager. **Missing codes are denoted by "???"**.

[3 Marks]

```

???
using System.Collections;

public class PaddleScript : ???
{
    // Update is called once per frame
    void Update ()
    {
        // move the paddle based on Horizontal input
        ???
    }
}

```

32. In Unity 2D game development, creativity, and technical execution are essential in creating an engaging player experience. Imagine you are tasked with developing a 2D platformer game where the main character can manipulate the environment to overcome obstacles. The game takes place in a futuristic city where players must solve puzzles to progress through various levels. Describe your game concept in detail, focusing on how you would design the core mechanics, such as the character's ability to manipulate objects (e.g., moving platforms, activating switches, or altering gravity). Explain how you would use Unity's 2D tools, such as sprite animation, physics, and UI design, to bring this concept to life. Discuss the challenges you might face in designing these mechanics and how you would ensure they are intuitive and engaging for players. Finally, consider how you would make the game visually appealing and accessible to a wide audience.

[15 Marks]

THE END