



Undergraduate Programme
Department of Computer Science And Mathematics
Semester 2 Year 2019

FINAL COURSE EXAMINATION PAPER

ITC 325 – GAMES PROGRAMMING TECHNIQUES

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes 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 the supervisor. Write your name, course code and student identification number in the answer booklet and on the attendance sheet.
5. **This Final Course Examination Paper is worth 100 marks contributes 50% of the total course assessments.**
6. This paper contains two (2) sections.
7. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
8. 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	1-4	Short Answer Questions	80	144 Minutes
B	1-2	Long Answer Questions	20	36 Minutes
		TOTAL	100	180 Minutes

SECTION A: SHORT ANSWER QUESTIONS**80 Marks**

All questions in this section are compulsory.

Question 1 – Computers, C#, XNA and You & Programs, Data and Adding Colors**[20 Marks]**

- A. It is said that programming is not rocket science and that there are many people in the world who have learned programming than rocket science. What are the keys to learning programming? [2]
- B. Developing games for a particular platform itself is a difficult task, what are some of the other platforms that allows users to create games for PC, XBOX, PlayStation, and Nintendo? [1]
- C. Define the following terms: [2]
- C# Programming
 - XNA Framework
 - IDE
 - SDK
- D. Explain in detail how would you install Visual Studios with XNA Framework 3.0/3.1? [1]
- E. Elaborate on the steps you need to follow in order to run a game from within a folder. [1]
- F. When you click on the button to run the program or game, a number of things happen in quick succession. Describe the steps what actually happens. [1]
- G. Explain what you understand by the term "Deployment Targets". You can refer to the figure below for a clearer idea. [1]

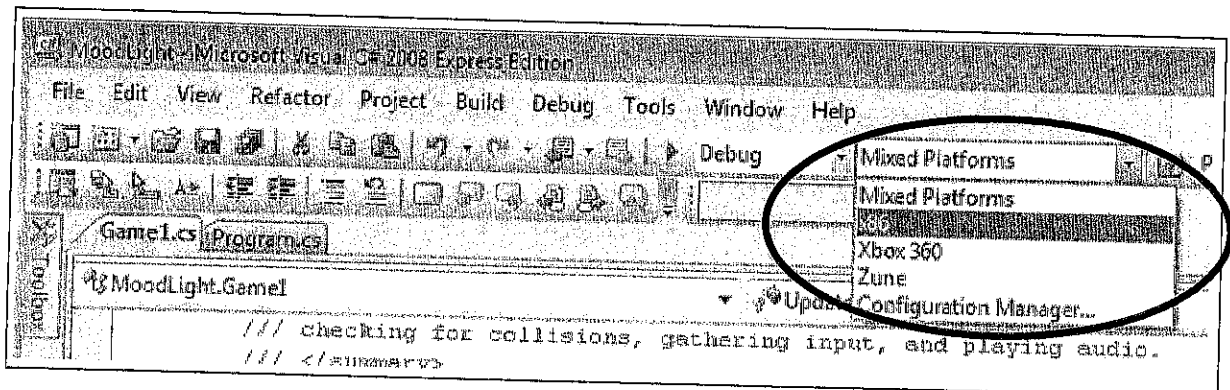


Figure 1: Sample Application

- H. Why is C# considered the best programming language than the rest for developing games? [1]
- I. Explain what these methods are doing in the XNA visual studios: [3.5]
- Game1()
 - Initialize()
 - LoadContent()
 - Run()

- V. Update()
- VI. Draw()
- VII. UnloadContent()

J. Write the line of code that will make the background of your game or screen to colour *Yellow*. [1]

K. The below code is of a *Update Method*, explain in your words what is happening in that method. [2]

```
if (redIntensity == 255) redCountingUp = false;
if (redIntensity == 0) redCountingUp = true;
if (redCountingUp) redIntensity++; else redIntensity--;

if (greenIntensity == 255) greenCountingUp = false;
if (greenIntensity == 0) greenCountingUp = true;
if (greenCountingUp) greenIntensity++; else greenIntensity--;

if (blueIntensity == 255) blueCountingUp = false;
if (blueIntensity == 0) blueCountingUp = true;
if (blueCountingUp) blueIntensity++; else blueIntensity--;
```

L. In C# methods are in block format, explain what a block method is. [1]

M. Explain the process of how a gamepad used in Xbox console is able to connect and communicate with a PC. [1.5]

N. What are some video game genres and also identify some of the popular games you are familiar with. [1]

Question 2 – Getting Player Input & Adding Images, Sound and Text

[20 Marks]

A. For the following lines of code, find the out the issues and write the correct line of code: [2.5]

- I. If(keys.IsDown(Keys.R)) redIntensity++;
- II. If(keys.IsKeyDown(Keys.B)); blueIntensity++;
- III. If(keys.IsKeyDown(Keys.G)) greenIntensity++;
- IV. If(keys.IsKeyDown(Keys.Y) yellowIntensity++;
- V. If(keys.IsKeyDown(Key.B)) blackIntensity++;

B. Suppose you are required to use a keyboard as a means of communication for your game, how will you initialize the keyboard? Write the appropriate line of code that initializes. [2]

C. Explain the term *KeyboardState* and wherein the Game1.cs class it is being used? [1]

D. Write the series of codes for the update method whereby it will allow the users to press 'R', 'B', and 'G' on the keyboards and on the screen the colours *Red*, *Blue*, and *Green* increases. Be sure to use appropriate declarations. [2]

- E. Explain what you understand by the term Content Manager? What types of files can be added to the content manager? What are three ways of adding files to the content manager? [2]
- F. Why is it important to think about your design before you start writing any code? [1]
- G. Explain which is better a GamePad controller or a Keyboard while playing games. Identify some pros and cons for both. [1]
- H. The given code creates a Sprite class. Explain what the properties of the sprite class are. [1]

```
using Microsoft.Xna.Framework.Graphics;
using Microsoft.Xna.Framework;
class clsSprite
{
    public Texture2D texture { get; set; }
    public Vector2 position { get; set; }
    public Vector2 size { get; set; }
    public clsSprite (Texture2D newTexture, Vector2 newPosition, Vector2
newSize)
    {
        texture = newTexture;
        position = newPosition;
        size = newSize;
    }
}
```

- I. Explain step by step how would you use an image named "ToyotaCorrolla.png" and display it on screen. Use codes to support your answer. Also, you are to write down the appropriate variable declarations and rectangle codes. [2]
- J. Identify what is wrong with the following codes and write the corrected versions as your answer. [1.5]

```
I. protected override void LoadContent()
{
    spriteBatch = new SpriteBatch(GraphicsDevice);
    houseTexture = this.Content.Load<Texture>("modelHouse1");
}

II. houseTexture = new Rectangle(30, 20, 600, 450, 20, 30);

III. protected override void Draw(GameTime gameTime)
{
    graphics.GraphicsDevice.Clear(Color.CornflowerBlue);
    spriteBatch.Begin();
    spriteBatch.Draw(rectHouse, houseTexture, Color.Black);
    spriteBatch.End();
    base.Draw(gameTime);
}
```

- K. Differentiate between using the Add Links to Resources and the default Add options which appear while adding an existing item. [2]
- L. Suppose you have a Sprite called *Wizard*, write down the series of codes that will allow the users to move the sprite around from up to down and from left to right all over the screen. [2]

Question 3 – Writing Text, Creating Multiplayer Game & Playing Sounds

[20 Marks]

- A. Sounds are just another item of content, along with images and fonts. You add them to your project in the same way you add pictures to the project. Write the C# statements to load a sound file named *kick.mp3* in the *LoadContent* method. [2]
- B. Write the steps in code and text format of how you are going to load a *font* through *Content Folder* and through *LoadContent()* method. [2]
- C. Write a series of draw method code that will print out "GO FIJI GO" on the screen with background colour as white and font colour as blue in the following coordinates 200 and 250. [2]
- D. What procedures should a programmer follow if he/she has to create the Button Bash game for 8 players? [2]
- E. Differentiate *spriteBatch.Draw* and *spriteBatch.DrawString*. Can you use both at once? If so, than when? [1]
- F. What are the four components inside of the play method? Elaborate on all. [1]
- G. Differentiate between the types *SoundEffect* and *Song* in XNA terms. [2]
- H. Write down the codes for the Variable Declaration, Load Content Method, and Update Method if someone wants to add a sound to the game named "bassdrop.wma" [2]
- I. How can you apply a shadow effect to any particular text? [1]
- J. Differentiate between a *Vector* and a *Rectangle*. [1]
- K. What are the parameters within a *Vector* and also within a *Rectangle*? [1]
- L. Answer the below questions regarding the *DateTime* type used in XNA Framework; [4]
- I. How would you initialize current *DateTime*? Write the line of code.
 - II. Write the line of code that will store the above initialized time in a string variable using the *ToLongTimeString* method.
 - III. write a draw method that show the current time as output in the following coordinates "10" and "20" and in colour blue.
 - IV. Identify all five *DateTime* methods and its appropriate outputs.

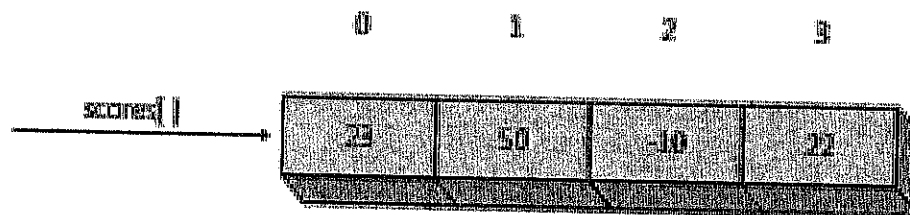
Question 4 – Creating a Timer & Reading Text Input in XNA

[20 Marks]

- A. What do understand by the term “For Loop”. A for loop consists of four parameters, what are these four parameters? [2]
- B. At any given point in the process, the program would have an idea of the best result it has seen so far if it sees a value that is better, it now has a new winner, and so on if you think about it, this is what people really do, particularly if they are working through 1,000 numbers instead of only a few in that case, you would take care to remember the best result that you had seen so far as you went through and probably write it down on a piece of paper. With all this in mind, consider the following code and explain what the codes are doing. [2]

```
int winningValue = 120;
for (int i = 0; i < 16; i ++)
{
    if (scores[i] > 0)
    {
        if (scores[i] < winningValue)
        {
            winningValue = scores[i];
        }
    }
}
```

- C. Define the term “Array”, what does an array hold? [2]
- D. Differentiate between an Element and an index? Give examples of each. [2]
- E. Write a line of code that will declare an array named “CustomerNames” which will contain 50 elements of String type. [1]
- F. Use the following array to answer questions I, II and III.



- I. How many elements does the above array hold? [1]
- II. What value is stored in the fourth index? [1]
- III. Write a line of code that stores the number “67” in the ninth element of the array named scores. [1]

G. Study the below update and draw method and elaborate on what the output will be.

[2]

```
string messageString;

protected override void Update(GameTime gameTime)
{
    KeyboardState keyState = Keyboard.GetState();
    if ( keyState.IsKeyDown(Keys.Escape) )
    {
        this.Exit();
    }
    Keys[] pressedKeys;
    pressedKeys = keyState.GetPressedKeys();
    messageString = "";
    for (int i = 0; i < pressedKeys.Length; i++)
    {
        messageString = messageString + pressedKeys[i].ToString() + " ";
    }
    base.Update(gameTime);
}

protected override void Draw(GameTime gameTime)
{
    graphics.GraphicsDevice.Clear(Color.CornflowerBlue);
    Vector2 messageVector = new Vector2(50, 100);
    spriteBatch.Begin();
    spriteBatch.DrawString(font, messageString, messageVector, Color.White);
    spriteBatch.End();
    base.Draw(gameTime);
}
```

H. Differentiate between the terms *IsKeyDown* and *IsKeyUp*, these functions are used in the update method and are triggered when any key is pressed. [1]

I. Write down a series of IF condition that will check whether the "Enter" button was pressed or not. [2]

J. What do the following lines of codes do? [1]

```
Keys[] pressedKeys ;
pressedKeys = new Keys[100];
```

K. Define Garbage Collector and its tasks in terms of XNA framework. [1]

L. Differentiate between *Reference* and *Value*. Provide examples for both to support your answer. [1]

SECTION B: LONG ANSWER QUESTIONS**20 MARKS**

All questions in this section are compulsory.

1. Discuss a game concept based on events from your own life. Choose something difficult or meaningful that you have experienced, something that changed you or made you who you are today. What were significant choices and challenges in this experience? Where did the resistance come from? Were there moments in which your experience felt more open to possibility or more constricted and constrained by what was happening around you? When did this experience get harder or easier? Describe how you would represent these things through a game system, and go into detail about how the rules of your game work and what various scenes might look like. **[10]**
2. Find an example of a game with an authored story that has a definite ending, where the story associated with the game resolves and closes. Write a new ending for this game, either one that alters the events of the existing ending or goes past it, describing what happens moments or years after the official ending. Describe how this extension to the story would be supported with gameplay. As a continuation or change to the ending, would you introduce new verbs or objects? Talk about how you might use exploratory elements or story choices to support your new ending. Finally, evaluate your own new ending compared to the "official ending". If the ending you created became part of the official canon of this game's authored story, would it improve the game and players' experience of playing it? What are the pros and cons for your story becoming official? **[10]**

THE END