CRT02

UNIVERSITY OF BOLTON

SCHOOL OF CREATIVE TECHNOLOGIES
GAMES PROGRAMMING

SEMESTER ONE EXAMINATIONS 2024/2025

GAMES HARDWARE DEVELOPMENT

MODULE NO: GAP5005

Date: Wednesday 8th January 2025 **Time: 10:00 – 12:00pm**

INSTRUCTIONS TO CANDIDATES:

Section A:

You MUST ANSWER ALL THREE questions.
These are worth 20 marks each and are technically based questions.

Section B:

You MUST ANSWER THIS question.
This is worth 40 marks and is an essay style question.

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SECTION A

You MUST ANSWER ALL THREE questions from this section

Question 1:
Data Persistence

a) Using the .NET Binary Formatter, explain the process used to save/load data in games. You should take the time to detail what is happening in each step.

[5 Marks]

b) Draw a diagram to illustrate the process of serialization and deserialization for the .NET Binary Formatter.

[5 Marks]

c) When dealing with custom parsing for game data serialization and deserialization, challenges emerge when certain data types, like Vector3, lack native support. Using Vector3 as an illustration, outline steps to address this limitation through a customized parsing technique.

[4 Marks]

d) Outline the benefits of using Binary files over JSON for data persistence systems in multiplayer games, particularly when saving data over the network to a server.

[4 Marks]

e) Discuss a scenario where it would be beneficial to save data to JSON files on the user's computer instead of saving to binary and highlight why it could be problematic to save all of your data using this method.

[2 Marks]

Total 20 marks

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Question 2:
Mobile Development

a) In cross-platform development, highlight input method discrepancies, often stemming from menu system feedback. Propose solutions to mitigate these issues.

[4 Marks]

b) In mobile devices, explain how gyroscopes work and explain what they measure. You are expected to use diagrams to illustrate your answer.

[4 Marks]

c) Discuss the practical limitations and challenges game developers face when working on cross-platform projects for both Desktop (Windows, MacOS, Linux) and Mobile (Android, iOS) platforms. Provide multiple examples of technical and design challenges and describe how developers can identify and address these challenges effectively.

[12 Marks]

Total 20 marks

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Question 3:
Virtual Reality

a) List and explain the difference between 3DoF and 6DoF in the context of virtual reality devices.

[4 Marks]

b) Pinpoint two causes of typical symptoms associated with virtual reality sickness and suggest relevant solutions.

[4 Marks]

c) Compare and contrast in detail the strength and weakness between the mainstream virtual reality headsets currently on the market. Mainstream virtual reality headsets are split into four categories: **Holder** (Google's Cardboard), **No Tether – Mobile** (Samsung Gear VR), **Tethered to Console** (PlayStation VR), and **Tethered to PC** (Oculus Rift).

[12 Marks]

Total 20 marks

END OF SECTION A

PLEASE TURN THE PAGE FOR SECTION B

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SECTION B

The question below is worth 40 marks and a long-form response is expected.

Question 4:
Game Engines

In the world of video game development, Unity and Unreal stand out as the dominant commercial game engines, catering to developers across various skill levels, from aspiring students to industry giants like Lucid Games, with a substantial workforce exceeding one hundred developers.

a) As a representative of a major game development studio who develops for multiple resolutions and platforms, analyse the advantages and drawbacks associated with the decision to adopt either Unity or Unreal as the primary game engine. Additionally, explore alternative options available to these studios and delve into the potential implications of choosing a non-commercial alternative on the dynamics of the development team.

[40 Marks]

10 Marks – Introduction, conclusion, and structure.
30 Marks – For the answer itself.

END OF PAPER