Athlone Institute of Technology

School of Engineering

Semester 1 Examinations 2016

December Session

Bachelor of Science in Software Design (Game Development)

Year 3

Software Development for Gaming 3

External Examiner(s): Mr. Jerh O'Connor
Dr. Steven Davy

Internal Examiner(s): Mr. John Barrett

Instructions to candidates:
Read all questions carefully.
All questions carry equal marks.
Answer **Three** out of **Four** questions.

Time Allowed: 2 Hours

No. of pages including cover sheet: 4

Q.1. (a) Explain inheritance in relation to C++.

(2 Marks)

(b) Describe the difference between Public, Private and Protected inheritance?

(3 Marks)

(c) Explain, using an example, Polymorphism in C++.

(5 Marks)

(d) Explain the difference between a statically bound function and a dynamically bound function.

(2 Marks)

(e) What is a pure virtual function?

(2 Marks)

(f) Implement a base class **Body**. Derive classes **RigidBody** and **SoftBody** from **Body**. A **Body** has a mass and a pointer to an array of 2d positions. A **RigidBody** has elasticity and a **SoftBody** has viscosity. Write the class definitions and the constructors for all classes. All data members of your classes should be private.

(6 Marks)

[20 Marks]

Q.2. (a) Memory in C++ is divided into four categories. List and describe each of the four categories.

(8 Marks)

(b) In C++ what is an activation record?

(2 Marks)

(c) Describe the contents of an activation record.

(4 Marks)

(c) What is a dangling pointer?

(2 Marks)

(d) Explain, using an example, the role of the constructor and destructor of an object.

(4 Marks)

[20 Marks]

Q.3. (a) Compare the Standard Template Library list container and the Standard Template Library vector container in terms of efficiency when:

- Adding/Removing the element in the middle of the container.

(4 Marks)

- Adding/Removing the element at the end of the container.

(4 Marks)

(b) Give an example of when it is appropriate to use a list data structure and when it is appropriate to use a vector data structure.

(4 marks)

(c) Describe the following Standard Template Library containers:

- Stack

(4 marks)

- Queue

(4 marks)

[20 Marks]

Q.4. (a) In relation to C++, describe operators and operands.

(2 Marks)

(b) Describe the function of operator overloading in C++? Provide an example of operator overloading in your answer.

(4 Marks)

(c) What does a C++ compiler do when it encounters a function template?

(2Marks)

(d) Write a function template which compares two parameters of the same type. It should return true if they are equal and false if they are not.

(3 Marks)

(e) Write a function template that will print an array of any type.

(4 Marks)

(f) Write a container class that can hold an object of any type. You should provide accessors and modifiers for the contained object.

(5 Marks)
[20 Marks]