Dublin Business School
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HETAC

ICT

SUMMER 2012 EXAMINATIONS

Module Code: **ICT1714**

Module Description: **Object Oriented Programming 1**

Examiner: **Kevin Coady**

Internal Moderator: **Paul Kelly**

External Examiner: **Prof John Rees**

Date: *Monday, 16th July 2012*
Time: *2pm-4pm*

INSTRUCTIONS TO CANDIDATES:

Time allowed is 2 hours.

QUESTION 1 IS COMPULSORY

Answer any 2 other questions.

Question 1 – Compulsory – 30 Marks

1. Discuss what is meant by inheritance in Object Oriented Programming giving C# examples? **(10 Marks)**
2. Explain the differences between abstract classes and interfaces. Give examples, including appropriate C# code, to show how abstract classes and interfaces are both defined and used **(10 Marks)**
3. Name four access modifiers (in order from least to most restrictive). **(5 Marks)**
4. Explain what is meant by overriding and overloading. Give C# examples for each. **(5 Marks)**

(30 Marks)

Question 2 - 35 Marks

EvenMoreVision is a video store which allows its customers to rent Movies. The following is the Movie Interface.

```
public interface IMovie
{
    string Title { get; set; }
    int ReleaseYear { get; set; }
    double Price { get; set; }
    string Director { get; set; }
    List<string> Actors { get; set; }

    void SetPrice(double price);
    void AddActor(string name);
}
```

I. Provide C# code which implements the Movie Interfaces. **(5 marks)**
II. Create a class named MovieStore which contains a property named Catalogue of type Movies.
    a. Create a class Movies which should implements the ICollection interfaces. All methods and properties from ICollection must be implemented. **(10 marks)**
    b. The class Movies should contain a method named GetNewReleases which returns a collection of movies which have been released this year. **(5 marks)**
    c. Movies should also provide a method which sorts all movies in the store by year and then by title. **(10 Marks)**
III. You must provide a console application which tests your code **(5 marks)**

(35 marks)

Question 3 - 35 Marks

Please answer both A **AND** B for this question.

I. Provide a UML class diagram for the details below **(15 marks)**
II. Provide C# implementation for the details below **(20 marks)**

I. An Address Class
   - Include properties for the following
     - House number
     - Street
     - City
     - County
   - A ToString method which returns the details held in this class. (i.e. the properties of the class).

II. A Person Interface
   - Include properties for the following
     - Title
     - First Name
     - Surname
     - Address (Use the class already created)
   - A method to update a person's name (has parameters title, first name and surname)
   - A method to update a person's address (i.e. has parameter of type Address)

III. A Person Class
   - This class must implement the Person interface
   - A constructor which includes the following parameters
     - person's title
     - first name
     - surname
     - address
   - A default constructor which has no parameters

IV. A Student Class which extends a Person
   - Create the properties for the following
     - Student Id
     - Course
   - A constructor which accepts a student's title, first name, address, student id and course.
   - Override the ToString method to display all properties in this class as follows:

Name: Mr John Murphy
Address: 1 Main St, Dublin City, Dublin
Student Id: 1799999
Course: Higher Diploma in Science in Computing

(35 Marks)

Question 4 – 35 Marks

Dublin Software Solutions is a software company that has two types of workers, full time and contractors. Full time staff are paid a fixed monthly salary, while contractors are paid a daily rate. You are required to develop software to help keep track of company wages. Write a program with the following details

An abstract class named Employee. It should have the following: **(10 marks)**

- Private properties to hold the following information:
  - Name
  - Id
- Implement a method which accepts a name and id as parameters.
- A method with no implementation named CalculateWages, which returns the employee monthly wage.

A class named FullTimeEmployee which is based on Employee. It should have the following: **(7 marks)**

- A default constructor which accepts no parameters.
- A constructor that allows a name, a staff id and a yearly salary to be passed as parameters
- A private property for setting and retrieving the yearly salary
- An implementation of CalculateWages which returns the monthly salary.

A class named Contractor which is based on Employee. It should have the following:
(7 Marks)

- Properties for the following
  - The daily rate
  - The amount of days worked in a month
- A constructor with parameters for specifying the name and the staff id and the daily rate.
- A constructor with parameters for specifying the name and the staff id, the daily rate and the number of days worked in the month.
- An implementation of CalculateWages which will return the amount to be paid to the contractor for the amount of days they have worked.

Note: you must also provide at least one implementation of overriding the ToString method. **(4 marks)**

Provide a program which tests the implementation of you code. Output similar to the following should be displayed on screen. **(7 Marks)**

Full Timer:
Name: John Doe
Id: 123
This Months Wages: 1200.50

Contractor
Name: Mary Doe
Id: 124
This Months Wages: 909.25 **(35 marks)**