



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 2, Examination in Engineering, March 2014

Module Number: EE2201    Module Name: Object Oriented Programming

[1 hour and 30 minutes]

[Answer all questions, each question carries 5 marks]

Q1. a) Explain the following terms found in Object Oriented Programming.

- i) Abstraction
- ii) Encapsulation

[1 mark]

b) Explain how to implement the following properties in C#, by using an example.

- i) Properties with read and write access
- ii) Properties with only read access

[1 mark]

c) Explain the advantage of using C# properties over the public member variables.

[1 mark]

d) The Listing 1 shows a partially implemented Rectangle class.

Listing 1: Rectangle class

```
public class Rectangle
{
    public double _area;
    public double _height;
    public double _width;
    public double _x;
    public double _y;
}
```

- i) Implement a constructor for Rectangle which takes the input parameters; width, height, top left corner x and y coordinates. [0.5 mark]
- ii) Implement a method which will calculate the area of the rectangle and store it in the member variable. [0.5 mark]
- iii) Explain the problems of the above approach. [0.5 mark]
- iv) Correct the problems of the earlier approach using C# properties. [0.5 mark]

Q2. a) Explain the difference between a class and an object. [1 mark]

b) Explain via an example program, what is meant by static member variables and static method in a class. [1 mark]

- c) Explain what is an exception and explain how you handle exception in C#? [1 mark]
- d) What are the differences between a constructor and a method in C#. [0.5 mark]
- e) Explain how you would store 100 random numbers in an array and find the sum and maximum values of the array without using any library methods. [1.5 marks]

- Q3. a) What is the difference between an abstract class and an interface in C# language? [1 mark]
- b) What is method overriding and give an example?
- c) The figure Q3.c shows the relationship among four classes. [1 mark]

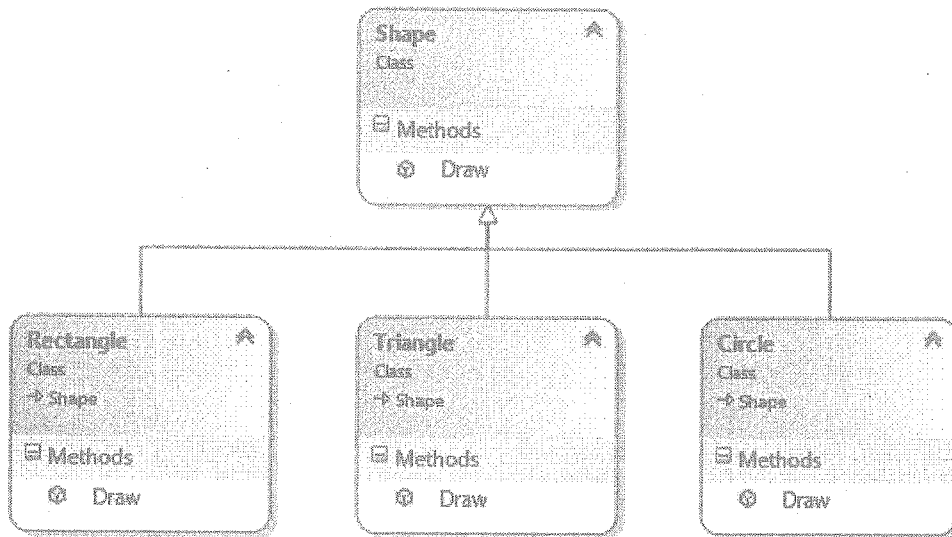


Figure Q3.c: Class diagram

- i) Implement the four classes using C# language.
  - ii) Store rectangle, triangle and circle objects in a list and use polymorphism to draw the figure. (You do not need to implement actual drawing inside the draw function. Print "drawing shape name" when calling the method.) [2 marks]
- d) Explain the following access modifiers.
- i) public
  - ii) private
  - iii) protected
  - iv) internal

[1 mark]