



Rajarata University of Sri Lanka
Faculty of Applied Sciences

Bachelor of Science (General) Degree
Year II Semester I Examination – September/October 2013

COM 2302 – Object Oriented Programming

Answer all questions.

Time: 2 1/2 Hours

1.

- (a) What do you mean by object and class?
- (b) "A class can contain constructor as well as accessor and mutator methods". Explain this statement.
- (c) Write a simple account on "Life time of the variables".
- (d) Explain method overloading and method overriding with a simple example.
- (e) Following is a java class. At the compilation it shows errors. What are the reasons for those errors and how do you debug them?

```
private class OOP
{
    final double unit;
    protected int count;
    private void calculating()
    {
        // some text are here
    }
}
```

(30 marks)

2. A library has a large collection of books. A book has a title, author/s, number of pages, ISBN no and book no. The cost of a book can be estimated using the following equation.

$$\text{Cost of a book} = (\text{cost for one page} \times \text{number of pages}) + \text{cost for cover page}$$

A book can be a hard copy book or a soft copy book. If a book is a hard copy book then it has a size (Ex: A4, A5...etc) and if it is a soft copy book then it has a capacity (Ex: 5MB, 24MB...etc). Soft copy books are available as e-books. Each of these e-books has a format and a quality. They should be in .pdf format. Every soft copy book is checked for its format before registered as an e-book in the library as follows:

```

if (format == ".pdf")
{
    System.out.println("Book is entitled to registration.");
}
else
{
    System.out.println("Book is not entitled to registration.");
}

```

- a) Illustrate the class structure of the above library system.
- b) Declare the suitable classes.
- c) Create suitable methods for each class according to the requirements.
- d) How the instance variable "format" should be declared in its class? And why?

(35 marks)

3. University Student Service wishes to extend their website as the request of students. They extend their services allowing students to check their results and current GPA through an online system. The system allows students to check their results of past examinations, GPA for selected course units (best credit) and remaining credits to complete for their degree program in each subject. System also allows students to have their results as hardcopies of. Each student should have valid user name and password to log in to the system. During the registration process student must provide the username and the password. At the end of the registration process, system requests a pin number which can collect after the authentication of an administrative staff member. Student should submit their University ID or Record Book for authentication process. If a student loses his/her pin number then he has to pay Rs. 100.00 to an administrative staff member to collect a new pin number. Academic staff members can log in to the system and they can update examination results. Each academic staff member has university email account. The user name and the password of the academic staff members are sent via their university email accounts from the administrative staff member who manages the system. If the system meets any exception in any time then the system shows an error message and reloads automatically.

- (a) Draw the use-case diagram for the above system.
- (b) Write down the **pre conditions** and **post conditions** for each of the use-cases.
- (c) Give the **events description** for one use-case.
- (d) Draw the activity diagram for **log in to system** use case.

(35 marks)