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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree
Year I Semester II Examination –2014 March/April

COM 1305 – OBJECT ORIENTED PROGRAMMING

Answer all questions.   Time Allocation: Three (03) hours.

Instructions to candidates

- This paper contains three (3) pages including this page.

- Start each question on a new page.

- Clearly state the assumptions if any.

- Calculators not permitted.

1.

    a) What do you mean by Object Oriented Programming (OOP)? *(02 marks)*

    b) "*Java programming language* is more suitable to solve real-world problems than *C* programming language". Explain. *(03 marks)*

    c) What is a Constructor? And what are the roles of a constructor in a class? *(04 marks)*

    d) A company manufactures parts of cars (e.g. engines, chassis, bodies, etc.). At the production time all bodies are look like the same. The color of the body is "ash" and the strength of the body is "$37.5Nm^{-2}$" at its production time. Later these bodies may be modified according to the demand. As an example, the body can be painted in white color and its strength may be increased to 55 Nm^{-2} for a luxury car. Write a **constructor** for the class "body" at the production time. *(06 marks)*

2. Access modifiers are used to determine the visibility and the scope of an element in OOP.

    a. Explain the concept of Data Hiding in OOP. *(02 marks)*

    b. Write a simple short note on three (3) other access modifiers used in OOP. *(06 marks)*

    c. What are the difference between abstract class and interface? *(05 marks)*

    d. A compilation error was detected by the Java compiler during the compilation of the following statement of a class.

```
companyName = "Global Commodity (pvt) Ltd.";
```

Within the class, the variable *companyName* has been declared as String type variable. What could be the reason for this error? And how you are going to fix this error?

(08 marks)

    e. What will be the output of the following: *(05 marks)*

```
class A {
        public void method(String x){
                System.out.println(x+" class A"); }
}
class B extends A{
        public void method(String x){
                System.out.println(x); }
        public void method(String x, String y){
                System.out.println(x+" class B"); }
        public static void main(String args[]){
                A x = new B();
                x.method("inside"); }
}
```

What OOP concepts have been used in the above class in (e)? *(04 marks)*

3. Assume "Moretel" is a mobile service providing company in Sri Lanka. Until last three years it has only few thousands of customers. So the Board of Management of the company decided to increase its customer number to a remarkable amount by introducing a customer friendly online system. In this online system users can purchase company products (SIMMs, Dongles, etc.) and services. They can also check the available prepaid and postpaid package details through the system. If a customer wishes to purchase a product then he/she should log in to the system. At the login stage system requests a username and a password which are requested with customer information (customer name, address, NIC no, email address and security question) at user registration. After registration process system automatically creates user accounts for each successfully registered customer. Customer has to pay online through the system to complete each ordering process. Company delivers the product to local customers within three (03) working days or less and the international customer has to wait ten (10) working days after completion of successful ordering process. Scheduler is a person who working for modification of a delivery date. Modification of the delivery date will be informed by the system via email to each customer who involve with a successful ordering process. System also provides facilities to each customer to check their package status (due amount…etc.) in any time and to swap from a package to another package with some conditions. The system administrator of the company is responsible to do the maintenances and the updates of the system. Security Administrator (SA) ensures the security of the system and installs the security updates from time to time. SA's latest update was a blocking of services of the system for the IP address which tried more than three (3) failed logging attempts. Customers have to log into the system to get all the services from the company except searching for package details and the common information (contacts, branches ... etc.).

a) Draw the use-case diagram for the online system.

(20 marks)

b) Write down the **pre conditions**, **post conditions** and **events description** for one use-case.

(10 marks)

4. A large amount of employees are working in different departments in the same company mentioned in question number three (3) above. Basically employees can be divided in to two departments: Business Department (BD) and Administration Department (AD). Managing Director is a person who is the head of a department. Department name, Name of the director and number of sections are the details of a department. Each employee has employee number, employee address, department id, designation, and password. Department id and password are used to log into the above online system of the company. In each working day, each employee has to update their works to the system.

a) Propose a suitable class diagram.

(10 marks)

b) Write suitable classes.

(15 marks)