KENYA METHODIST UNIVERSITY

END OF 2ND TRIMESTER 2010 EXAMINATIONS

FACULTY   :   SCIENCE AND TECHNOLOGY
DEPARTMENT   :   COMPUTER SCIENCE & BUSINESS INFORMATION
UNIT CODE   :   CISY 111/BBIT 212
UNIT TITLE   :   OBJECT ORIENTED PROGRAMMING
TIME   :   2 HOURS

Instructions:

- *Answer ALL questions in Section A and any other TWO questions in Section B.*

Section A

Question One (30 Marks)

i.   Describe the 3 OOP principles.   (3 mks)

ii.   Briefly describe the java programming environment.   (4 mks)

iii.   Write a program that reads an integer between 0 and 1000 and adds all the digits in the integer. For example, if an integer is 932, the sum of all its digits is 14.   (6mks)

iv.   What is wrong in the following statements?

a. System.out.printf("%5d %d", 1, 2, 3);

b. System.out.printf("%5d %f", 1);

c. System.out.printf("%5d %f", 1, 2);   (3mks)

v.   What are the differences between:

a. While loop and a do-while loop?   (2 mks)

b. Constructors and methods?   (2 mks)

c. Abstract methods and interfaces   (2 mks)

vi.   Describe three visibility modifiers   (6 mks)

vii.   Give two reasons for using packages.   (2 mks)

Section B (30 Marks)

Question One (15 Marks)

i. Design a class named Person and its two subclasses named Student and Employee. Make Faculty and Staff subclasses of Employee. A person has a name, address, phone number, and email address. A student has a class status (freshman, sophomore, junior, or senior). Define the status as a constant. An employee has an office, salary, and date-hired. Define a class named MyDate that contains the fields year, month, and day. A faculty member has office hours and a rank. A staff member has a title. Override the toString method in each class to display the class name and the person's name.

Implement the classes. Write a test program that creates a Person, Student, Employee, Faculty, and Staff, and invokes their toString() methods.   (10 mks)

ii. What data types are required for a switch variable? If the keyword break is not used after a case is processed, what is the next statement to be executed? Can you convert a switch statement to an equivalent if statement, or vice versa? What are the advantages of using a switch statement?

(5 mks)

Question Two (15 Marks)

i. Design a class named Rectangle to represent a rectangle. The class contains:

- Two double data fields named width and height that specify the width and height of the rectangle. The default values are 1 for both width and height.
- A string data field named color that specifies the color of a rectangle. Hypothetically, assume that all rectangles have the same color. The default color is white.
- A no-arg constructor that creates a default rectangle.
- A constructor that creates a rectangle with the specified width and height.
- A method named getArea() that returns the area of this rectangle.
- A method named getPerimeter() that returns the perimeter.

Implement the class. Write a test program that creates two Rectangle objects. Assign width 4 and height 40 to the first object and width 3.5 and height 35.9 to the second object. Assign color red to all Rectangle objects. Display the properties of both objects and find their areas and perimeters.

(10 mks)

ii. What is the purpose of declaring exceptions? How do you declare an exception, and where? What does the JVM do when an exception occurs?   (5 mks)

Question Three (15 Marks)

i. Write a Java program that uses nested loops and print the following four patterns:

Pattern I	Pattern II	Pattern III	Pattern IV
1	1 2 3 4 5 6	1	1 2 3 4 5 6
1 2	1 2 3 4 5	2 1	1 2 3 4 5
1 2 3	1 2 3 4	3 2 1	1 2 3 4
1 2 3 4	1 2 3	4 3 2 1	1 2 3
1 2 3 4 5	1 2	5 4 3 2 1	1 2
1 2 3 4 5 6	1	6 5 4 3 2 1	1

(9 mks)

ii. Describe three categories of programming errors.   (6 mks)