



MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2012/2013

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE (MAIN CAMPUS)

CCS 218: OBJECT ORIENTED PROGRAMMING II WITH JAVA

Date: 19th July, 2013

Time: 2.30 – 4.30 p.m.

INSTRUCTIONS:

- ◆ Attempt Question ONE (COMPULSORY) and any other TWO questions.
- ◆ MOBILE PHONES are STRICTLY FORBIDDEN in this exam.

Question one(Compulsory 30 marks)

1. What is a java interface? Give the basic structure of an interface. (2 marks)
2. Can an abstract class implement an interface? Justify your answer (2 marks)
3. Listed below is the skeleton for a class named InventoryItem. Each inventory item has a name, a unique ID number and price per item: (4 marks)

```
class InventoryItem
{
    private String name;
    private int uniqueItemID;
    private double pricePerItem
}
```

Flesh out the class with appropriate getters, constructors, and setters.

4. Create a java program that opens a file and reads the contents line by line, displaying each line on the console. (5 marks)
5. Write a temperature conversion application that converts from Fahrenheit to Celsius. The Fahrenheit temperature should be entered from the keyboard (via aJTextField). A JLabel should be used to display the converted temperature. Use the following formula for the conversion: (5 marks)

$$Celsius = \frac{5}{9} \times (Fahrenheit - 32)$$

6. Find the error(s) in each of the following statements, and explain how to correct it (them) (6 marks)
 - a. `buttonName = JButton("Caption");`
 - b. `JLabel aLabel, JLabel; // create references`
 - c. `txtField =new JTextField(50,"Default Text");`
 - d. `JPanel panel = new JPanel();`
`setLayout(new BorderLayout());`
`button1 =new JButton("North Star");//add to North border`
`button2 =new JButton("South Pole");//add to South border`
`panel.add(button1);`
`panel.add(button2);`
7. Explain the below entity manager API operations (6 marks)
 - a. `persist()`
 - b. `remove()`
 - c. `refresh()`
 - d. `find()`

- e. createQuery()
- f. createNamedQuery()

Question two (20 marks)

1. Explain the following terms as used in Java persistence (6 marks)
 - a. Entity
 - b. persistent identifier
 - c. persistence context
2. A database has a table called Employees that holds the names, ages, and Ids of each employee in a company. The ID is the primary key. Create an entity class for the described table (6 marks)
3. Perform the following tasks for an array called fractions (8 marks)
 - a. Declare a constant ARRAY_SIZE that is initialized to 10.
 - b. Declare an array with ARRAY_SIZE elements of type double, and initialize the elements to 0.
 - c. Refer to array element 4.
 - d. Assign the value 1.667 to array element 9.
 - e. Assign the value 3.333 to array element 6.
 - f. Sum all the elements of the array, using a for statement.

Question three (20 marks)

1. What is the key reason for using the finally block? (2 marks)
2. A Box has length, width and height and can either be closed or open, wooden or metallic. For example, it can be an open wooden box. Write a java program that asks the user to enter the length, width, height , type (if open or not), and material of box, then calculates the volume of box. Use try-catch block to make sure the user enters the valid input types. (8 marks)
3. In a bank, account holder details are stored in a HashMap. Create a HashMap to hold the keys as strings and the values as doubles. The keys represent the first name concatenated with the account number of an individual, while the values represent the account balance. Put 3 elements into the HashMap representing different account holders. Get the sum of the total amount of money that is being held in the bank. (5 marks)
4. Write an applet that automatically generates Employee ID's for a company in the form FIRSTNAME INITIAL SECONDNAME INITIAL/DEPT INITIAL-RANDOMNUMBER/EMPLOYMENTYEAR e.g, the applet should allow user to enter their names, select dept from a list and enter their year of employment. E,g if my name is John Smith, in department of finance and employed in the year 2000, then my employee ID is js/f-5643/2000. (5 marks)

Question four (20 marks)

1. Create class SavingsAccount. Use a static variable annualInterestRate to store the annual interest rate for all account holders. Each object of the class contains a private instance variable savingsBalance indicating the amount the saver currently has on deposit. Provide method calculateMonthlyInterest to calculate the monthly interest by multiplying the savingsBalance by annualInterestRate divided by 12—this interest should be added to savings-Balance. Provide a static method modifyInterestRate that sets the annualInterestRate to a new value. Write a program to test class SavingsAccount. Instantiate two savings Account objects, saver1 and saver2, with balances of \$2000.00 and \$3000.00, respectively. Set annualInterestRate to 4%, then calculate the monthly interest and print the new balances for both savers. Then set the annualInterestRate to 5%, calculate the next month's interest and print the new balances for both savers. (15 marks)
2. Create an ArrayList of integers and add 5 integers in it. Sort and print the contents of the ArrayList. Get the sum of its elements and print the sum to the console (5 marks)

Question five (20 marks)

- A. In a golf club, one becomes a member only after registration. To register, one needs to provide his/her name, age, ID number, location and marital status. The ID number is used to uniquely identify each member.
- a. Create an entity class for the above description. (10 marks)
 - b. Create the following queries in Java Persistence query language
 - i. a named query called "ShowMembers" that shows the list of all registered members from table "MEMBERS" (2 marks)
 - ii. a query called that lists all members who are 40 year and above (2 marks)
 - c. Show how you would implement the named query in question A.b.i above so as to print on the console the ID numbers, name and age of all registered members. The table is called "KisumuGolfClub" (6 marks)