

SUBJECT: CS3005 OBJECT ORIENTED PROGRAMMING USING JAVA

TIME: 1.5 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

- Q1 (a) What do you understand by architecture neutral and portable. [2]  
(b) Write a program in JAVA that test whether a number entered from the console is an even number or not. You are not allowed to use the % operator. [3]
- Q2 (a) What is the interpretation of the command: [2]  
`java -classpath c:\classdir;.c:\test\test.jar MyProg`  
(b) Write a program in JAVA that enters a string from the user. Convert the string to uppercase. Your program should then append a random character between A and Z to the end of the string. This is to be repeated twenty times or till the new character to be appended is the same as the last character appended, in which case the loop terminates. Your program should display the altered string at the end.  
[Hint you can generate a random integer between 0 and ub using java.util.Random i.e. `Random random = new Random(); int r = random.nextInt(ub+1);`] [3]
- Q3 (a) Which of the following code samples is not an example of the autoboxing/unboxing feature of JAVA and why? [2]  
i) `Integer x = new Integer(27); int i = x;`  
ii) `Integer x = new Integer(27); int i = x.intValue();`  
iii) `Float y = new Float((float) x);`  
(b) Write a program in Java that allows a user to enter numbers into an array containing different number of elements in each row. Your program should start of by inputting the number of rows in the array. Then for each row the user is asked to input the number of elements in the row before finally inputting the elements. [3]
- Q4 (a) Differentiate between a final class and an abstract class. [2]  
(b) Write a program in JAVA that accepts two strings as command line arguments and prints 1 if the first string is longer than the second string, zero if they are of equal length and -1 if the second string is longer than the first string. Your program should not use the built-in function to find the length of a string. [3]
- Q5 (a) What is an interface? What is a pre-requisite for a class to allow cloning of its objects in JAVA. [2]  
(b) Assume the existence of a class Employee and a class Manager which inherits from Employee. Which of the following lines of code (if any) will flag an error and why? [3]  
i) `Manager[] managers = new Manager[10];`  
ii) `Employee[] staff = managers;`  
iii) `staff[0] = new Employee("XYZ");`
- Q6 (a) How is shallow copy different from deep copy in the context of JAVA objects. [2]  
(b) A company runs its payroll software in JAVA. The software requires the operator to input the name, basic salary, HRA and DA for a user and then calculates the total salary as the sum of basic, HRA and DA minus 18% of the basic. However, the company specifies that if the deduction amount is more than Rs. 2000/-, an exception is to be generated. Write a custom exception class which suitably overrides the toString() method to print the appropriate message. The software should throw an object of this custom exception class when the deduction crosses Rs. 2000/- for an employee. [3]