BCSE 2nd Year 2nd Semester Examination, 2023

Advanced Object Oriented Programming

Full marks: 100   **Time: 3 hours**

Use separate answer script for each part

Part A (answer w.r.t. JAVA) -- 50 Marks

CO1   Conceptualize the object oriented features [20 Marks]

1. a) What happens when a java source code is compiled?   2
   b) What will be the steps to create the packages named stakeholders.student and stakeholders.employer and to have relevant classes there? How will you use the classes defined in those packages somewhere else?   4
   c) Explain, how will you do deep and shallow copy of an object?   3
   d) Consider a class X has a public method f(int). Class Y extends X and contains a public method f(float). Now consider the following code snippet:

   int i; float fl;

   Y c=new Y(); c.f(i); X b=c; b.f(fl);

   Explain, what will happen for the code snippet?   3
   e) Mention the advantages of @override?   2
   f) Suppose in a try-catch block of a method an exception has occurred. Now what will be the flow of execution?   3
   g) What is the utility of an inner class?   3

CO2   Understand and Develop concurrent programming   [10 Marks]-[Answer either Q.2 or 3]

2. a) Explain, how to specify the code for a thread and what will be the data for the thread?   3
   b) Explain with a scenario where notifyAll() may be preferred over notify().   4
   c) Suppose there is a predesigned class Data with a method modify() to change the value of the attributes. Now, in a multithreaded environment number of threads working with same Data object may call modify(). What measures will you take to prevent simultaneous attempt of modification of Data object. Describe with skeleton code.   3
3. A collection of accounts has to be maintained. Each account has account number and balance. Each account must maintain a minimum balance. Users

[Turn over

may select an account (user will provide the account number) to deposit or withdraw money. Each such activity will be thread based. Multiple threads may work simultaneously. Design and develop the system (code required). 10

CO3   Understand and Develop event driven programming [10 Marks] [Answer either Q.4 or 5]

4. Develop (code required) a GUI based application through which one can enter scores in an examination. User will enter the roll number of the student and then for each of the attempted questions (assume maximum three questions) marks will be entered. First of all user will denote whether question has been attempted or not. If attempted then only corresponding marks entry will be allowed. If not attempted then corresponding marks (if any) has to be cleared. Once user denotes that entry of marks for the student is over then show the total score.   10

5. a) Write down the code snippet for the following:

    i) In a panel make a set of options mutually exclusive

    ii) A list in a panel will display at most 5 elements at a time and will allow scrolling   5

    b) Describe the process of event handling in a GUI based application with a skeleton code as an example.   5

CO4   Design and implement object oriented solution for problems [10 Marks] [Answer either Q.6 or 7]

6. a) Write down the code snippet to accept a filename and to display whether it's a directory or not.   3

    b) Design a Student class with roll, name and score as attributes. Take the necessary measures so that instances can be used as the elements of the List interface instances, methods of the List interface classes and algorithms of the collection framework (as applicable with the collection) can be supported and objects can be stored into the file. Provide the skeleton code for the class with brief explanation of your design.   7

7. a) How will you create a random access file?   2

    b) How will you iterate over a collection in reverse direction?   2

    c) I need to store the roll number (it is unique) and phone number of the students. Frequently I need to find out the phone number for the students. Explain, how will you fulfill the requirement? How can you display the complete list of roll and phone number? Provide the skeleton code.   6

Part B (answer w.r.t. Python) -- 50 Marks

Answer any 5 questions. 5 X10 = 50

1. Discuss advantages of Python over Java as an Object Oriented Programming Language. 10 [CO1]

2. Why Python is called as dynamic language? Discuss the chr(), int(), oct(), complex() and float() type conversion functions with examples. 5+5=10 [CO1]

3. Write a program to create three dictionaries and concatenate them to create fourth dictionary. Check whether a dictionary is empty or not. 5+5=10 [CO1]

4. What is multithreading? How to create a multi-threading program in Python? 5+5=10 [CO2]

5. Create a GUI application in Python that provides an Entry field where the user can provide the name of a text file. Open the file and read it, displaying its contents in a Label. You can also replace the Entry widget with menu that has a File Open option that pops up a window to allow the user to specify the file to read. Also add an Exit or Quit option to the menu rather than having a QUIT button. 10 [CO3]

6. Discuss the following list functions - a) len() b) sum() c) any() d) all() e) sorted().Write a program that receives a string containing a sequence of white space separated words and returns a string after removing all duplicate words and sorting them alphanumerically. 5+5=10 [CO4]

7. How does Generalization differ from Encapsulation. Explain with examples in Python. What is monkey patching in Python? 5+5=10 [CO1]

8. Explain different Functional programming features in Python. Write a program that implements a stack data structure of specific size. If the stack is full and we are trying to push an item, then an IndexError exception should be raised. Similarly, if the stack is empty, then an IndexError exception should be raised. 5+5=10 [CO4]