

II B. TECH I SEMESTER REGULAR EXAMINATIONS, MARCH - 2022
JAVA PROGRAMMING
(Common to CSE, INF, CSM, CIC, CSO and AID)

Time: 3 Hours

Max. Marks: 70

Note: Answer **ONE** question from each unit ($5 \times 14 = 70$ Marks)

~~~~~

## UNIT-I

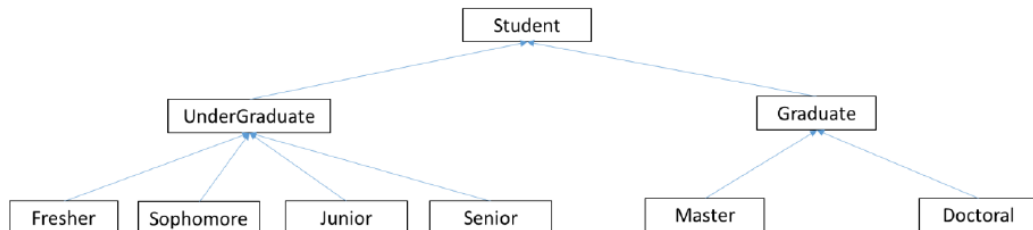
1. a) Explain the use of static keyword with suitable example. [7M]
- b) Develop an application to illustrate hiding of data members from outside world. [7M]

(OR)

2. a) Compare and contrast String and StringBuffer classes. [7M]
- b) Apply Bubble sort algorithm to sort collection of strings supplied as command line arguments. [7M]

## UNIT-II

3. Develop the following class hierarchy: [14M]



Each student has following attributes id, name, and list of courses taken. Each course is identified by a class "Course" and it is referred by attributes: course id, course name, credits. Number of available courses is 10 and populate them with relevant information. Create a TestStudent class to create a mix of all kind objects and print all objects. While printing each object it should display following information as table.

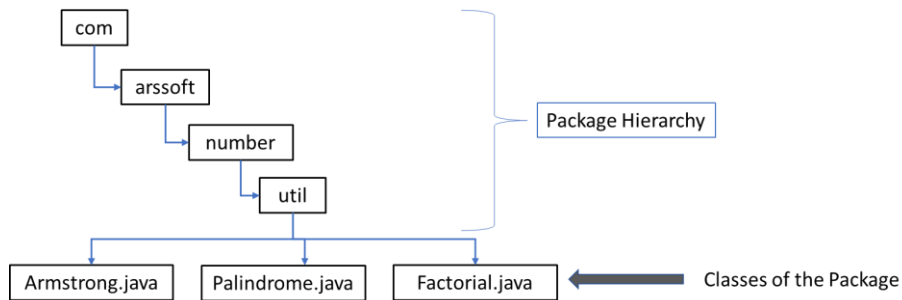
| Student Id | Student Name | Course Id | Course Name | Course Credits |
|------------|--------------|-----------|-------------|----------------|
|------------|--------------|-----------|-------------|----------------|

**Note:**

- \* Each student should take at least 2 courses from available course list.
- \*\* Provide randomness in creating mix of objects, selecting no of courses for each student, and for selecting the courses.

(OR)

4. Develop an user defined *Number Utilities* package and provide following classes [14M] with supported functionalities:



The above diagram shows the path of the package. Develop a *NumberUtilTest* class to test the *Number Utilities* package and write the sequence of steps to create and use the packages.

| Class           | Method                           | Description                                   |
|-----------------|----------------------------------|-----------------------------------------------|
| Armstrong.java  | static boolean armstrong(int n)  | returns true if the number 'n' is Armstrong   |
| Palindrome.java | static boolean palindrome(int n) | returns true if the number 'n' is palindrome  |
| Factorial.java  | static int factorial(int n)      | returns the factorial of the given number 'n' |

### UNIT-III

5. a) Develop a class *DeviationFromMean* that allows a user to enter up to 10-15 double values in to an array and then displays each entered value and its deviation from the mean. Array size and elements of the array should be taken from the user in String format and then convert them into integer and double values, respectively. Handle the following exceptions: [7M]

| S. No | Input      | Exceptions to be handled                                                                                                                                                                                                         |
|-------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Array size | <p><b><i>NumberFormatException</i></b> – If the user is not entered valid integer</p> <p><b><i>NegativeArraySizeException</i></b> – If the user is entered negative number as array size and initialize the array size as 5.</p> |

- b) Develop a *ScoreTest* class to display a series of five Student ID numbers and asks the user to enter a numeric test scores of three subjects and to display the average. Develop a *ScoreException* class and throw it when the user enters an invalid score (greater than 100 and less than 0). [7M]

(OR)

6. a) Illustrate the use of object serialization with an example. [7M]  
b) Exemplify Random access file operations. [7M]

## UNIT-IV

7. a) Explain the uses of multithreading. [4M]  
b) Develop a multithreaded program to find whether given numbers are prime or not. [10M]

Thread 1: Take the input from the user.

Thread 2: Determine whether input is prime or not.

\*\* Thread 1 and Thread 2 is repeated at least 10 cycles.

Main Thread: Print each number and its status of prime as either PRIME or NOT PRIME.

Make ensure that Thread 2 should execute after Thread 1 in each cycle and Main Thread should be terminated only after completion of all cycles.

(OR)

8. a) What is the necessity of thread synchronization. [4M]  
b) Explain the importance of it using the following use case: [10M]

A Father and son went to a hotel and observed that it was very crowded. Since they are very hungry they ordered two lunch packs. They waited for half an hour and finally they took their lunch order. But hotel management placed only one spoon and forget to put two spoons. Now father and son not interested to go back and they want to adjust and share the available spoon. They want to eat alternatively with one spoon.

Sample Output:

Father holding the spoon and son is waiting.

Son holding the spoon and father is waiting.

Father holding the spoon and son is waiting.

Son holding the spoon and father is waiting.

.....

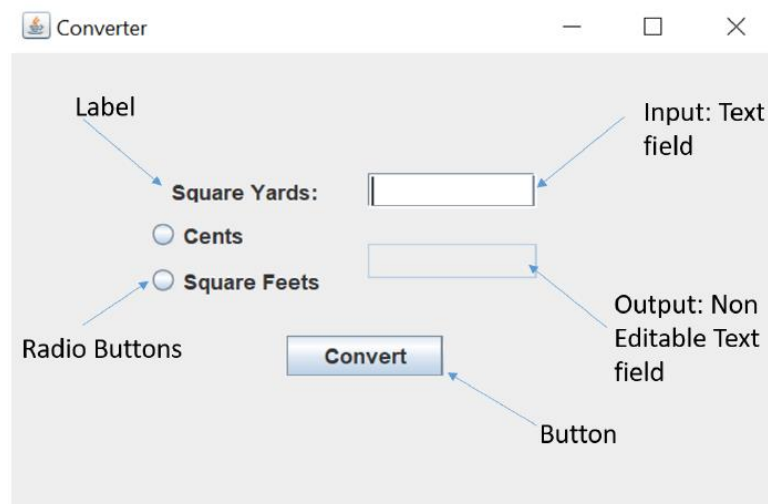
## UNIT-V

9. a) Describe delegation event model. [4M]
- b) Develop a Menu Bar using Swings with the following items: [10M]
- Operations (Menu) has following Sub Menus:
    - Arithmetic (Sub Menu) has following Menu Items
      - ADD (Menu Item)
      - SUB
      - MUL
      - DIV
    - Logical (Sub Menu) has following Menu Items
      - AND
      - OR
      - NOT

Whenever a user clicks any menu item display description about the operation in the application window.

(OR)

10. Develop the following Swing based GUI to convert Square Yards into either Cents or Square Feet. The conversion takes place when user clicks Convert button and choice of conversion based on the selection of radio button. If the user is entered other than numeric data generate an exception, then terminate the application and report the appropriate message to the user. [14M]
- (1 Cent = 48.4 Square Yards, 1 Square Yard = 9 Square Foot).



\* \* \* \* \*