CSE1007 – Cyclesheet Questions

For the worksheet, create a table with a single column. In each row, copy one question, its code and the screenshot of the output (output should be clearly visible) and save. Write interactive input/output statements.

1. Write a Java program to read the number of students, '*n*' as input from the user. For the 'n' students, the user may input either his registration number (an integer), name (String) or CGPA (float), randomly. The names may have multiple parts. Read those inputs and display the following.
   i)   Count of the registration numbers, count of the CGPA and count of the names
   ii)   Average of all the cgpa values entered
   iii)   The least and the greatest registration number entered so far
   iv)   a single string that concatenates all the names with a comma between them.

   Sample Input:

   11 (n value)

   6.8
   14
   25
   8.3
   7.9
   Peter George
   9.2
   Dwarakesh
   17
   6
   Ram Desai

   Output:
   4 (Count of reg.no)
   4 (Count of CGPA)
   3 (Count of names)
   8.05 (Average of CGPA)
   6 (Least reg.no)
   25 (Greatest reg. no)
   Peter George, Dwarakesh, Ram Desai

2. The details of a list of transactions carried out on a single day for a particular bank are given as command line inputs in the order of customer name, total amount, transacted amount. Read these inputs. If the transacted amount is negative, it can be considered as withdrawal. If it is positive, it can be considered as deposit. For withdrawal, either if the total amount is less than the |transacted amount| or if the withdrawal amount exceeds the maximum limit of 25000, display the message, "Failed Transaction". Withdrawal charges are as follows.
   If the withdrawal amount <=500, charge=5
   If the withdrawal amount <=1000, charge=8

If the withdrawal amount >1000 and <=5000, charge=10

If the withdrawal amount >5000 and <=15000, charge =12

If the withdrawal amount >15000 and <=25000, charge=15

For every customer, print the name and his balance amount after the transaction.

Sample Input:

java MainClass Vinay 7000 1500 Andrea 46000 -28000 Venba 18500 -11800 Mithil 78000 3000 Kavin 8600 -10000

Output:

Vinay

8500

Andrea

Failed Transaction

46000

Venba

6688

Mithil

81000

Kavin

Failed Transaction

8600

3)

i)   Write a Java program to print the sum of the series

1-22+333-4444+ … upto n terms (without using string functions)

Sample Input I:

4 (number of terms)

Sample Output I:

-4132

Sample Input II:

3 (number of terms)

Sample Output II:

312

ii)   Given the number of rows, n, as input, write a program to print the following pattern.

Example:

4 (number of rows for the pattern)

```
  1
   1   2
 1       3
1         4
 1       3
   1   2
    1
```

Sample Input II:
3

```
   1
   1   2
  1      3
   1   2
     1
```

4) Given a list of 'n' integers, build a 2-D ragged array with n-2 rows. Store the following in each row.
Row 0: sum of the individual 2-element subarrays formed by taking 2 contiguous elements each time
Row 1: sum of the individual 3-element subarrays formed by taking 3 contiguous elements each time
and so on
…….
Row n-3: sum of the individual n-element subarrays formed by taking all the 'n' elements of the given list. Print the ragged array.
For each element x, in the 2-D array, perform OR and Ex-OR operations with every other element in the same row and print the pair of elements along with their results. If for any pair of values, the OR and Ex-OR results are found to be the same, stop further calculations for that row and move to the next row.
Sample Input: [2,-1,4,3,-1,0,5]
Sample Output:
(1,3) OR=3 XOR=2
(1,7) OR=7 XOR=6
(1,2) OR=3 XOR=3
Row 0 is abruptly terminated
(5,6) OR=7 XOR=3
(5,6) OR=7 XOR=3
(5,2) OR=7 XOR=7
Row 1 is abruptly terminated
(8,5) OR=13 XOR=13
Row 2 is abruptly terminated
(7,5) OR=7 XOR=2
(7,11) OR=15 XOR=12
(5,11) OR=15 XOR=14
Row 3 is processed entirely
(7,10) OR=15 XOR=13
Row 4 is processed entirely

5. Write a program to read the size and the elements of a square matrix. Rotate the ith row elements 'i' times towards the left and then rotate the jth column elements 'j' times upwards. Print the resulting matrix.

Example:

4

Input matix:

A B C D
E F G H
I J K L
M N O P

Output:

A G I O
F L N D
K M C E
P B H J

Sample Input 2:
3
X Y Z
A B C
P Q R
Sample Output 2:
X C Q
B P Z
R Y A

5) Write a Java program to read a list of 'n' words. Mark each letter in the word as a vowel or consonant. Replace a sequence of consecutive consonants by a single 'C' and a sequence of consecutive vowels by a single 'V'. For each word, print the resulting "CV" sequence and the count of the number of occurrences of the pattern "VC".

Eg., if the word is "CARROT"

C	A	R	R	O	T
↓	↓	↓	↓	↓	↓
C	V	C	C	V	C

=CVCVC   Therefore, count of the pattern "VC" is 2

 Sample Input:

5 (the value of n)

CLASS

GLUE

COMPATIBILITY

ASSESSMENT

PROGRAM

Sample Output:

CVC

1

CV

0

CVCVCVCVCVC

5

VCVCVC

3

CVCVC

2

6. Given a Python dictionary definition statement as an input string like the one shown below, write a Java program to create two arrays – one with keys as its elements and the other with the sum of the tuple elements.

Sample Input:

Eg., Input string = " mydict={'A': (1,-2,3), 'B': (4,8), 'C': (3,6,-4,5), 'D': (1,7,8,-2,-6), 'E': (9,10)}"

Sample Output:

  Array 1 =["A","B","C","D","E"]

 Array 2= [2,12,10,8,19]

7. Define a class 'Encoding' with the instance variables – *inputtext* (a string), SA (a String array to store the individual words of the inputtext)and IA (an integer array to store the encoded values). [Note: Each object of this class will have a copy of inputtext, SA and IA]. Define a constructor, to split the inputtext into words and store them in the String array, SA. In the main class, read 'n' such input texts and store their details in an array of 'n' objects. Define a method, *sort()* in the 'Encoding' class to sort the individual words of all the 'n' input texts, in alphabetical order. Define another method, *encodeText()* to encode the individual words of each text based on the index of the word in the sorted list and store them in the integer array. Overload this method to make the integer array of each inputtext to have equal number of elements by padding with the value, -1.

Invoke all these methods from the main class.

Sample Input:

3

this is an example for classes

students attend their classes online

online classes are also equally effective

Output:

Sorted List of Words:

also an are attend classes effective equally example for is online students their this

Encoded List from the first encodeText()

[13 9 1 7 8 4]

[11 3 12 4 10]

[10 4 2 0 6 5]

Encoded List from the second encodeText()

[13 9 1 7 8 4]

[11 3 12 4 10 -1]

[10 4 2 0 6 5]

8. There is a class 'Faculty' with two methods - *findClassAverage()* to calculate the internal marks average of the entire class and *findMaxScore(),* a private method to print the highest internal marks score. In the main class, read *n*, the number of students and instantiate the 'Faculty' class by passing *n* and invoke its two methods. The 'Faculty' class alone knows the existence of another class 'Student' and it should create an array of *n* 'Student' objects. The 'Student' class should have two instance variables – *sum* and *marks[]* (an integer array of size 5 to store CAT-1,CAT-2,DA-1,DA-2 and DA-3 marks). Define a method *getIndividualTotal()* in 'Student' class that calculates and returns the total marks. Use the individual total returned by this method in *findClassAverage()*.

Sample Input:

3 (n, the number of students)
1 (marks of student 1)
2 (marks of student 1)
3 (marks of student 1)
4 (marks of student 1)
5 (marks of student 1)
6 (marks of student 2)
7 (marks of student 2)
8 (marks of student 2)
9 (marks of student 2)
10 (marks of student 2)
11 (marks of student 3)
12 (marks of student 3)
13 (marks of student 3)
14 (marks of student 3)
15 (marks of student 3)
Sample Output:
40 (class average)
65 (highest internal marks)

9. An interface stores an array of 84-2-1 codes of the decimal digits from 0 to 9 stored in random order.

0101	0100	0000	1111	1000	1011	1001	0111	1010	0110

Define a nested class inside the interface with a method to create the following 2-D array. The decimal equivalent should be found by adding the weights of all the 1's in the corresponding 84-2-1code. Eg., For the code 1011, decimal equivalent = 1*8 + 0*4 + 1*(-2) + 1*(-1) = 5

84-2-1 Code	Decimal Digit
0101	
0100	
0000	
1111	
1000	
1011	
1001	
0111	
1010	
0110	

Derive a class "Class8421" from the nested class that uses the above table to generate the 84-2-1 code of a given number, n.

Eg., If the number is 395, its 84-2-1 code is 0101 1111 1011

Define another class "Complement9" that inherits "Class8421" with two methods.

i)   First method to find the 9's complement of the number by changing 1's to 0's and 0's to 1's.
           Eg., 0101 1111 1011 should change to 1010 0000 0100
ii)   Second method to find the decimal equivalent of the complemented 84-2-1 code using the table.
           Eg., Decimal equivalent of 1010 0000 0100 is 604

10. Define an interface BinaryTree that includes two methods to perform insertion and level order traversal (ie., breadth-first traversal). Define a class ArrayBinaryTree that implements the interface so as to perform the binary tree operations in an array. Define another class LinkedBinaryTree that implements the above interface so as to perform the binary tree operations with dynamically created nodes. Invoke these methods from the main class.

The main class should be defined in the package "mainpackage" in a directory and the interface should be defined in the package "parentpackage" in a different directory and the two classes should be defined in the subpackage "childpackage" created inside "parentpackage".

11. Define a class Line with 4 instance variables x1, y1 (cartesian coordinates of point 1), x2 and y2 (cartesian coordinates of point2). The constructor of the class should throw NumberFormatException if the two points are same. Derive the class Triangle from Line with two Line objects as its instance variables. Trigger TriangleNotPossibleException if the end point of one line is not the starting point of the other. In either case, the user should be prompted again to enter the input. At last, print the number of additional attempts made until a valid triangle is formed.

12. A faculty evaluates quiz and stores the count of students who have scored 1 mark, 2marks and so on, as follows.

Marks (x_i)	1	2	3	4	5	6	7	8	9	10
Student count (f_i)	3	4	17	8	23	10	4	6	5	2

She/He wants to calculate the mean of the distribution given by

$$mean = \frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}$$

Assist him/her in completing this task by spawning four threads out of which two share the task of calculating $\sum_{i=1}^{n} f_i x_i$ and the other two share the task of calculating $\sum_{i=1}^{n} f_i$. The main thread should calculate mean of the marks.

13. Three queues are maintained at a college canteen – one for faculty, another for male students and the last queue for female students. Assume there are only 4 different dishes prepared in the canteen costing Rs. 50, Rs. 75, Rs. 100 and Rs. 150 respectively. Bill processing should be done in order as follows - 3 faculty first, followed by one male student and then one female student and this pattern should continue until all the customer requests are processed. For each customer, read the number of items in each dish and calculate the bill and print. Print the total number of faculty and students (including both boys and girls) who visited the canteen on that day.

1. Question1 Code Screenshot of output
2. Q C Screen