

Module 1
Java Programming - MADP 201

Class Activity

Due: N/A

Requirements

- Try to be consistent throughout your responses. (Use similar symbols and terminologies everywhere)
- Try to reuse your solutions as much as possible.
- It is an open book exam.
 - o You can use your lecture notes.
 - o You can get help from other classmates (Not anybody outside the class)-List below the name of the people you will get help from.
 - o You CANNOT copy each other solution (will be considered plagiarism and failure in the course).
 - o You CANNOT copy a solution from internet (will be considered plagiarism and failure in the course)
 - o Your instructor CANNOT verify the correctness or completeness of your solutions before the end of the exam.
 - o You can ask from the your teacher, whether the assumption you make is valid or not.

If you get help from anybody write his/her name here:

Problem1

For the following problems

- Write a java program and test it.
- Define a class for each problem.

Problem 1.1

Read a number from input (like 123). You make the assumption that the user does not enter a decimal number (like 123.4). The number entered by the user should not be divisible by 10 and if the user enters a number that is divisible by 10 (like 560), it is considered invalid and the application should keep asking until the user enters a valid input. Once the user enters a valid input, the program calculate the reverse of the number (for 153, the reverse is 351) and prints the

result.

Problem 1.2

Read two numbers from input (like A and B) and

- First prints all numbers between A and B (A and B not included), which are divisible to both 3 and 5.
- Then prints all numbers between A and B (A included by B not included), which are divisible by either 6 or 7.
- Finally prints all numbers between A and B (A and B both included), which are not divisible by 3.

Problem 1.3

Read a number in base 10 (any positive, real number, like 452), and convert it to binary and prints the results. (Please research yourself on how to convert a number in base 10 to a binary number).

Problem 1.4

The program keeps asking the user to enter numbers (positive or negative) until the user enters an invalid input. (An invalid input is an input which includes at least one alphabet, like 123d4). The program should print the Max and Min of the numbers the user had entered as well as the distance between the Max and Min. (Remember to calculate the absolute distance).

Problem 1.5

Consider two following mathematical functions:

- $F_1(x) = 2^x$
- $F_2(x) = x^5$

The program should find the positive number (and greater than 2), (let's call it T) which has the following characteristic:

- For all numbers which are less than T we have $F_1(x) < F_2(x)$
- For all numbers which are greater than or equal T we have $F_1(x) > F_2(x)$

Problem2

Write a Java program to print the multiplication table for 1 to 10.

- Note: Do not need to draw the horizontal and vertical lines.

Multiplication Table

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Problem3

Write a Java program which receives a string from input and does the following:

- Reverse the string and print it
- Check whether the input string and the its reverse is the same (like BaBa). It considers case-sensitivity which means (Baba and BaBa are not the same)

Problem5 (Bonus)

The Java program receives a statement which contains only alphabet variables and binary operations including +, -, *, / and % and check whether the statement is a valid arithmetic statement or not.

- The statement might contain parenthesis as well. For instance:
 - $a+b*a+c/c\%y$



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- $(a+b)*(a/d-(a/b))$
- You can make this assumption that the variable names contain only one alphabet (like a, b, c) and cannot have more than one alphabets (like ab, temp, sum, ...)
- Remember from the lecture that 2 conditions should be satisfied in order an arithmetic operation is considered valid. Search in your lecture notes for it if you don't remember it.