North South University

Department of Electrical and Computer Engineering

CSE 215L (Programming Language II Lab)

Lab 2: Mathematical, String functions and Conditional Statement

Objective:

- **Mathematical Functions:** Learn to use advanced mathematical functions like square root, exponentiation, and trigonometric functions.
- **String Functions:** Understand and apply basic string functions for manipulation, including concatenation, substring extraction, and length calculation.
- **Number Formatting:** Learn techniques for formatting numerical values, including rounding, precision control, and converting numbers to strings.
- **Character Case Conversion:** Understand functions to convert characters between uppercase and lowercase, facilitating string manipulation.
- **Common Mathematical Constants:** Familiarize yourself with mathematical constants, such as π (pi) and e, and understand their significance in computations.
- **String Trimming and Padding:** Learn functions to remove unnecessary spaces (trimming) or add padding to strings, enhancing output formatting.
- **Understanding Conditional Statements:** Gain a solid understanding of conditional statements (if, else if, else) and their role in controlling program flow based on specified conditions.
- **Nested Conditional Statements:** Explore the concept of nesting conditional statements to create intricate decision structures within a program.
- **Switch Statements:** Understand the use of switch statements for handling multiple conditions efficiently, providing an alternative to lengthy if-else chains.
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Mathematical Functions:

For Java, it is common for us to use various mathematical functions which come from the Math class. This class provides two useful constants, one of which is math.PI (3.142) and Math.E (2.718). In addition, the Math Class provides various functions that you have already been made familiar with during the theory class, some of them are as follows:

Math Functions			
Trigonometric Functions	Exponent Functions	Rounding Functions	Service Functions
toDegrees()	exp()	ceil()	max(a, b)
toRadians()	log()	floor()	min(a, b)
sin()	log10()	rint()	abs(a)
cos()	pow(b, e)	round()	
asin()	sqrt(a)		
acos()			
atan()			

Character and String Functions:

We deal with character and string datatypes regularly, which will be the case till the end of the semester. Therefore, we have already used some
of the methods given below in the theory class.

Character and String Functions	
Character Functions (from Character Class)	**String Functions (from String class)**
isLetter()	length()
isDigit()	charAt(index)
isUpperCase()	concat(s1)
isLowerCase()	toUpperCase()
toUpperCase()	toLowerCase()
toLowerCase()	trim()

Conditional Statements:

Conditional statements are used for checking whether a certain condition is being fulfilled or not and we commonly use if-else and switch statements and they can be nested as well (like as an if-else statement inside ANOTHER if-else statement). How they are used is given below:

if-else	**switch**
```if (condition){` ` // Execute the code in this if block` `} else {` ` // Execute the code in this else block` `}```	```switch (case){` ` case 1:` ` // Execute the given code` ` break;` ` case 2:` ` // Execute the given code` ` break;` ` default:` ` // Execute the given code` ` break;` `}```
if-else (nested)	**switch (nested)**
```if (condition){` ` if (condition2){` ` // Execute the code here` ` } else {` ` // Execute the other code` ` }` `} else {` ` // Execute the code in this else block` `}```	```switch (case){` ` case 1:` ` switch (case2){` ` case 1:` ` // Execute this code` ` break;` ` default:` ` // Execute this code` ` break;` ` }` ` break;` ` default:` ` // Execute the given code` ` break;` `}```

Practice Problem:

1. Take user input for the salary for February, March, and April, then find the maximum salary and round it up to zero decimal figures. Then, add half of the minimum salary to the rounded-up maximum salary.
2. Take user input of first and last names separately. Then, make the first name look like it is written in all uppercase letters and follow it up by concatenating these names.
3. Take a string input from the user and show whether the last character of the string is a letter or a digit.

4. Suppose you have gained a certain amount of points from a user input. You are tasked to find the number of points raised to the power of half and then print the final results.
5. You are tasked to write the name of your living place, but make sure the final product does not contain whitespaces before the beginning and after the end.
6. (Using if-else statement) Take a user input for your name and check whether it starts with a Uppercase Vowel. If the condition is fulfilled, write "My name starts with a vowel"; otherwise, write "My name starts with a consonant."
7. Write a program that takes an integer and determines if it's odd or even. Use switch cases to produce results.
8. Create a program where three integers are taken as user input followed by performing one of the following functions:
   a. Press '1' for addition of numbers
   b. Press '2' for the subtraction of other numbers from the maximum
   c. Press '3' for the multiplication of numbers
   d. Any other input will give a warning for 'Invalid Input.'