Lab 3 – Introduction to Programming

**Instruction:**

1. Take a screenshot of the final output of each question.
2. All screenshots must be labelled according to the question.
3. Submit a single PDF file – All screenshots must be combined into a single file/document.

**Lab from Unit 6**

1. Write a code in Java to calculate the factorial of a given number using a **While loop**. The factorial of a non-negative integer n is denoted as n! and calculated using the formula:

n!=n×(n−1)×(n−2)×…×2×1

**Sample Input:**

Enter the non-negative number to process its factorial: **5**

**Expected output:**

The Factorial of 5! = 5×4×3×2×1=120

***Hint: Scanner.nextInt(), loop,***

1. Repeat question 1 using For loop.
2. Write a Java program that prints the English alphabet (both uppercase and lowercase) in their natural order, followed by printing them in reverse order.

***Hint: Use ASCII, char,***

**Expected output:**

Uppercase Alphabets: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z   
Lowercase Alphabets: a b c d e f g h i j k l m n o p q r s t u v w x y z   
Uppercase Alphabets in Reverse: Z Y X W V U T S R Q P O N M L K J I H G F E D C B A   
Lowercase Alphabets in Reverse: z y x w v u t s r q p o n m l k j i h g f e d c b a

1. Write a program in Java that converts any positive integer of base 10 to its binary representation (base 2) using any **loop** method.

***Hint: Use ASCII, char***

**Sample Input 1:**

Enter the non-negative number for binary conversion: **10**

**Expected output 1:**

The binary conversion of 10 is = 1010

**Sample Input 2:**

Enter the non-negative number for binary conversion: **27**

**Expected output 2:**

The binary conversion of 27 is = 11011

**Lab from Unit 7**

1. Write a program in Java that would

* accept a string line input,
* calculates the number of uppercase letters,
* Number of lowercase letters,
* Number of digits, and
* number of whitespace characters in the string.
* And analyze it to produce the report below:

***Hint: loop, if.., length, isUpperCase(), isLowerCase(), isDigit(), isWhitespace() and counters***

**Sample Input**

|  |  |
| --- | --- |
| Enter a string: | Hello World 123 |

**Sample Output**

|  |  |  |
| --- | --- | --- |
| *Expected Result* | | *This part is just for explanation.* |
| Uppercase letters: | 2 | *(H and W)* |
| Lowercase letters: | 8 | *(e, l, l, o, o, r, l, d)* |
| Digits: | 3 | *(1, 2, 3)* |
| Whitespace characters | 1 | *the space between 'World' and '123'* |

1. Write a Java program that prompts the user to enter a password. The program should validate the password based on the following criteria:

* At least 8 characters long
* Contains at least one uppercase letter, one lowercase letter, and one digit
* Does not contain any whitespace characters Utilize the provided character methods to perform the necessary checks. Inform the user whether their password meets the criteria or not.
* If condition is okay Print

**“Congratulations! Your password meets the criteria.”**

* If not Print

**“Sorry, your password must:**

**- Be at least 8 characters long**

**- Contain at least one uppercase letter**

**- Contain at least one lowercase letter**

**- Contain at least one digit**

**- Not contain any whitespace characters**

**Please try again.”**

***Hint: loop, if, length, isUpperCase(), isLowerCase(), isDigit(), isWhitespace()***

1. Write a Java program that will accept two inputs from user using GUI and make a call to the addition and subtraction methods created in Lab2.

***Hint: parseInt(), parseDouble(),***

* Display the result of the addition and subtraction