**Algorithms & Data Structures**

**Lab1 : Week beginning 25th January, 2021**

**N.B. For all the following problems, write pseudocode, unless the code is very straightforward. You can use pen and paper!**

Q. 1. Write the following methods. **All the methods should be static like those in Math.java**.

Put all methods in a class MyMath.java

Test the methods in a class TestMyMath.java.

* find the smallest of three numbers
* calculate ab where b is a positive integer i.e. write code equivalent to pow() method in Math.java
* find the sum of the numbers 1 to n where n >=1
* calculate n! where n >=0

n! = 1\*2\*3\*4\*…\*n if n>=1

= 1 if n = 0

* test if a number n is a prime number

Q.2 Enter a list of numbers between 1 and 100. A number less than 1 indicates end of input. Count how many of each number entered.

Write the code in main() method.

Q.3. Write and test a method

public static int countWords(String str) that returns a count of all the words in the string str. Words are separated by spaces. E.g countWords(“A Star Is Born”) should return 4. Use whatever methods of String class you wish (but do **not** use not regular expressions).

Q.4 Validate a new password as follows:

It must be at least 8 characters long

It must have at least one uppercase and one lowercase letter

It must have at least one digit

Write a program that asks the user to enter a new password. Ask again until the input conforms to the rules. Use a method with the following header to check if a password is valid:

public static boolean isValid(String password)