**Name:**

**Advanced Programming in Java**

**Lab Exercise 10/2/2023**

**Working with Strings**

1. Write an application that allows the user to enter a sentence and then displays the number of vowels as well as a count of the number of each vowel. For example, “Mary had a little lamb whose fleece is white as snow” would have 5 A’s, 6 E’s, 3 I’s, 2 O’s, and 0 U’s.
2. Write an application that will allow the user to enter a sentence and prints out the sentence with case reversed (i.e. uppercase changed to lowercase and lowercase changed to uppercase).
3. Write an application that will read in a sentence and print out the sentence backwards.
4. Write a GUI application that reads in a character and displays the character’s ASCII value. The getText method of the JTextField returns a String object so you need to extract the char value as such:

String inputString = inputField.getText();

char character = inputString.charAt(0);

1. When a vehicle is manufactured, the manufacturer assigns it a unique identifying number called the Vehicle Identification Number (VIN). The number encodes a large amount of information about the vehicle in a 17-character string. The first three characters represent the World Manufacturer Identifier. The next five characters represent the Vehicle Description Section. The next digit is the checksum digit used to detect if there is an error in the VIN. The next eight characters represent the Vehicle Identification Section. The World Manufacturer Identifier consists of the country, manufacturer, and make. The Vehicle Description Section specifies the model year, plant, and 6 digit sequential production number.

Example: JHMCB7658LC056658 is a valid VIN with the following

World Manufacturer Identifier: JHM

Vehicle Description: CB765

Check Digit: 8

Vehicle Identification: LC056658

Computing the check digit for the VIN is a three step process.

a. Assign a numerical value to each character in the VIN (other than the check digit.

Letter A B C D E F G H J K L M N P R S T U V W X Y Z

Number 1 2 3 4 5 6 7 8 1 2 3 4 5 7 9 2 3 4 5 6 7 8 9

1. Multiply the value of each character by it’s weight value

Position: 0 1 2 3 4 5 6 7 9 10 11 12 13 14 15 16

Weight: 8 7 6 5 4 3 2 10 9 8 7 6 5 4 3 2

1. Add the products to get the total. The remainder when the total is divided by 11 gives the check digit. If the remainder is 10, the check digit will be X. Note that there is no I, O or Q in the VIN.

Write an application that has a method testVIN which returns a boolean value whether the VIN is valid or not. You application should allow the user to enter a VIN and then print out the World Manufacturer Identifier, Vehicle Description, Check Digit, Vehicle Identification as shown above. Test your application with the VIN example above and also with the same VIN with two values transposed.

**When you have completed all of these assignments, submit your documented source code.**