

CS101- Algorithms and Programming I

Lab 05

Lab Objectives: `for`, `do-while` loops

- For all labs in CS 101, your solutions must conform to the CS101 style guidelines (rules!)
 - **For all questions below you should use only `for` and `do-while` loops.**
1. Create a Java program, Lab05Q1.java that inputs a string and sums all digits in the string. **Hint:** Use Character methods.

Sample Runs:

```
Enter a sentence: hello5there4how327are0you?
The sum of the digits is: 21
```

```
Enter a sentence: hello0000world
The sum of the digits is: 0
```

```
Enter a sentence: hello world!
No numeric characters exist in the input string
```

2. Create a Java program, Lab05Q2.java that displays each *three-digit* narcissistic number and their sum. A narcissistic number is a number that is equal to the sum of its digits each raised to the power of the number of digits.

The number 153 is a narcissistic number ($153 = 1^3 + 5^3 + 3^3$)

Sample Run:

```
153 is a narcissistic number
370 is a narcissistic number
371 is a narcissistic number
407 is a narcissistic number
Sum of three-digit narcissistic numbers: 1301
```

3. Create a Java program, Lab05Q3.java that inputs a nucleic acid sequence and displays its encoded form.

A nucleic acid sequence is a string of characters consisting of only 'A', 'C', 'G' and 'T'. The encoding is done such that each character in the sequence is followed by the number of times that character is repeated consecutively. For example, the encoded version of the sequence "AAA" is "A3" and the encoded version of the sequence "AATCCCCGGG" is "A2T1C4G3".

You may assume that the input sequence will contain only uppercase letters and no spaces or other special characters.

Sample Runs:

```
Enter a nucleic acid sequence: ACCCTTG
Encoded Sequence: A1C3T2G1
```

```
Enter a nucleic acid sequence: AATCCCCGGG
Encoded Sequence: A2T1C4G3
```

4. Create a Java program, Lab05Q4.java. The program will generate a random 3-digit integer number. The user will guess the number, and after each incorrect guess, the program will report the number of correct digits in the input number that also appear in the secret number and how many of them are in the correct position. The game will continue until the user guesses the number correctly. If the user inputs a number that is not 3 digits, a message should be displayed . Once the user guesses correctly, the program should display the number of guesses (not including invalid inputs).

Sample Run:

```
Your guess : 371
Correct digits:    2 Correct Place:    1
Your guess : 204
Correct digits:    1 Correct Place:    1
Your guess : 240
Correct digits:    1 Correct Place:    0
Your guess : 307
Correctly guessed in 4 tries
```