

CS101- Algorithms and Programming I

Lab 04

Lab Objectives: `while` loops, nested `while` loops.

For all labs in CS 101, your solutions must conform to the CS101 style guidelines (rules!)

For the following questions, you should only use `while` loops in your solutions.

1. Write a program, `Lab04_Q1.java` that inputs words from the user, until the user enters 'exit'. When the user enters 'exit' the program should display the word that comes *second* alphabetically. Your program should not be case sensitive.

Sample Runs:

```
Enter strings (exit to stop):
zebra
cat
dog
ant
bunny
exit
String that comes second alphabetically: bunny
```

```
Enter strings (exit to stop):
house
exit
Not enough input data...
```

```
Enter strings (exit to stop):
house
house
house
exit
Not enough input data...
```

```
Enter strings (exit to stop):
house
car
house
exit
String that comes second alphabetically: house
```

2. Write a program, `Lab04_Q2.java` that inputs a string from the user and displays the length of the longest block of *letters* with the same case. I.e., the longest block of uppercase *letters* or lowercase *letters*.

Input string: HELLO therehow AREYOU TODAY -> longest block is 8

Input string: hi how is your day? -> longest block is 4

Input string: 52343 3424 -> longest block is zero

3. Write a program, `Lab04_Q3.java` that inputs a long binary number and displays its decimal and hexadecimal values.

Notes:

- You should not use `String` methods in your solution.
- 4 binary digits is called a *nibble*, each nibble (or partial nibble) corresponds to a hex digit. To convert to hex you should process the binary number in nibbles.
- [Binary-Decimal-Hex Conversion Information](#).
- **Hint:** the characters A – F are represented in ascii by the decimal values 65 – 70. You can cast an `int` value as a `char`: `char ch = (char) 65 // 'A'`

Sample Run:

```
Enter binary number (exit to quit): 1011010000110000
      Binary          Decimal      Hexadecimal
1011010000110000      46128      #B430

Enter binary number (exit to quit): 0110100
      Binary          Decimal      Hexadecimal
0110100              52          #34

Enter binary number (exit to quit): 0000
      Binary          Decimal      Hexadecimal
0              0          #0

Enter binary number (exit to quit): 1111
      Binary          Decimal      Hexadecimal
1111              15          #F

Enter binary number (exit to quit): exit
```