

ECE 33: Introduction to Computer Engineering: Fall 2015

Practice Problems for Test 1

1. Read 3 characters from the keyboard, then print them out in reverse order. Sample output of the program:

```
Please type three characters: A4D
Answer: D4A
```

2. Read two characters and print if they are equal or not. Repeat till user hits a <CR> (Carriage Return). Sample output of the program:

```
Please type two characters (To end session, hit Enter)
AB not equal
3y not equal
77 equal
Goodbye!
```

3. Read two single digits and print them out in sorted order (larger number first). Repeat till user hits a <CR> (Carriage Return). Sample output of the program:

```
Please type two numbers (To end session, hit Enter)
34 ordered: 43
72 ordered: 72
77 ordered: 77
Goodbye!
```

4. Read 6 single digits and print the largest and the smallest. Sample output of the program:

```
Please type in six one digit numbers.
169490
Maximum: 9 Minimum: 0
```

5. Read 12 single digits and print the one that occurs most frequently (if more than one number occurs with the same, highest number of of times, then you may print any one of them). Sample output of the program:

```
Please type in twelve one digit numbers.
169490323036
Most frequent digit: 3
```

To check the following subroutines, you will need to write a small main program that loads required registers with some test constants and then calls the subroutines. To check the answers in the simulator, open the *view code* and the *view registers* windows and run the simulation in the *step* mode. Alternately, *run* the program with a breakpoint after the CALL statement. When the program stops at the breakpoint, check the register contents.

1. Write a subroutine to multiply the number in B register by 10 and return with the product in B register. (Assume that the number in B is small enough so that $10 * \langle B \rangle$ fits in 8 bits of B).
2. Write a subroutine to multiply the number in A register by 6 and return with the product in C register. (Assume that the number in A is small enough so that $6 * \langle A \rangle$ fits in 8 bits of C).
3. Write a subroutine to exchange contents of registers B and C.
4. write a subroutine to add a (16 bit) number in B-C register pair with the (8-bit) number in D and return with the result in B-C pair.
5. Write a subroutine to rotate the contents of registers A, B and C amongst themselves, i.e., number in A should go to B, that in B, to C and that in C, to A. For example, if $A=5$, $B=10$ and $C=15$ are passed to the subroutine, they should be changed to $A=15$, $B=5$ and $C=10$.