CSE222 Computer Architecture
Homework Set 03

(**Review**)

1. Computer Architecture, Microarchitecture
2. Little-endian, big-endian
3. MIPS Instructions and Programming
   a. Registers set: 32 registers + PC, hi, lo
   b. R-, I-, J-type instructions and their format
   c. Logic instructions: and, or, nor; addi, ori, xori
   d. Shift instructions: sllv, srlv, srav; sll, slr, sra;
   e. Arithmetic instructions: add, sub, mult, div, mfhi, mflo
   f. Conditional instructions: beq, bne, slt,
   g. Jump instructions: j
   h. Array
   i. MIPS syscalls: code 1-4, 5-8, 10, 42
4. MARS MIPS Simulator (IDE): edit, assemble, run and debug

(**Exercise**)

1. Display the following menus, ask user to select one item. If 1-3 is selected, display message "item x is selected", (x is the number of a menu item), display menus again; if 0 is selected, quit from the program.

   1. Menu item 1
   2. Menu item 2
   3. Menu item 3
   0. Quit

   Please select from above menu (1-3) to execute one function. Select 0 to quit

2. Input an integer number n, calculate and display the sum, where

$$sum = (2^1 + 2^2 + \ldots + 2^n)$$

3. Write MIPS code which is equivalent to the follow java program:

```
int day = (int)(Math.random() * 7);
switch (day) {
case 1: System.out.println("Monday"); break
case 2: System.out.println("Tuesday"); break
case 3: System.out.println("Wednesday"); break
case 4: System.out.println("Thursday"); break
case 5: System.out.println("Friday"); break
case 6: System.out.println("Saturday"); break
case 0: System.out.println("Sunday"); break
}
```

4. Define an integer array of size 12:
    1. Initialize this array with random numbers in range [0, 100].
    2. Display this array; display 5 elements per line.
    3. Find the maximum and minimum numbers in array, display these 2 numbers
    4. Calculate the average value (integer) of this array, display this number