## Computer Science 240 Assignment No.4

**1. An interrupt** is a signal sent by device to CPU to indicate need for service. When an interrupt occurred, the AX register will hold the following information

1 1 1 1 1 1 1 1 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1

Bit 1 : blank

Bit 2 : 1 if math coprocessor installed, 0 otherwise

Bits 3,4 : 00=16GB RAM, 01=32GB RAM, 10=48GB RAM and 11 =64GB RAM

Bits 5,6 :00

Bits 7,8 : number of floppy drives plus one(00 = one derive)

Bit 9 :0

Bits 10, 11,12: number of ports installed

Bit 13 : 1 if game adaptor is installed, 0 otherwise

Bit 14 : 0

Bit 15,16: number of printers installed(00= 0 printer, 01= 1 printer, ....)

Suppose the content of AX register is 1100 1110 1001 1100 (i.e mov ax, 1100 1110 1001 1100b). Write an assembly program to determine:

- a. The number of printers connected to the computer
- b. The number of floppy drives
- c. The size of the RAM
- There are 16 sprinklers in the Masson Park. Each bit of AX register represents a sprinkler ("1" indicates the sprinkler is on, and "0" otherwise). Suppose the content of AX register at this moment is ox6A2F. write a program to answer the follow:
  - i. Display the AX register at base two
  - ii. How many sprinklers are on?
  - iii. Which sprinkler are defective (off)?

AX=0110 1010 0010 1111

9 sprinklers are ON

Defective sprinklers: 16 13 11 9 8 7 5

3 The Sheraton Hotel in Irvine is a 16 floor building. Suppose each bits of AX register represent one floor (the right most bit is representing the first floor). Ten people got into the elevator on the first floor and each pressed a random floor number between 2 and 16 (some random numbers may be the same which indicates more than one person will get off at the same floor). Write a program to (i) display the content of AX at base 2 (ii) use AX register to determine at what floors the elevator will stop

AX= 1001 0001 0000 1100 Elevator will stop at floors no. 16 13 9 4 3

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This function displays the content of: short a; at base 2
void Base2 ( )
     short x = 1 << 15, t; n=a;
    for (int i=1; i<=16; ++i)
              t=n & x;
              if(t == 0)
              { cout<<0; }
              else
              { cout<<1; }
              if( I % 4==0 )
              { cout<<" ""; }
              n = n << 1;
     }
     a=n; //save the original value of a
     cout<< endl;
 }
```