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CPSC 240

// Gregory Pierot
// Project 4

//Question 1

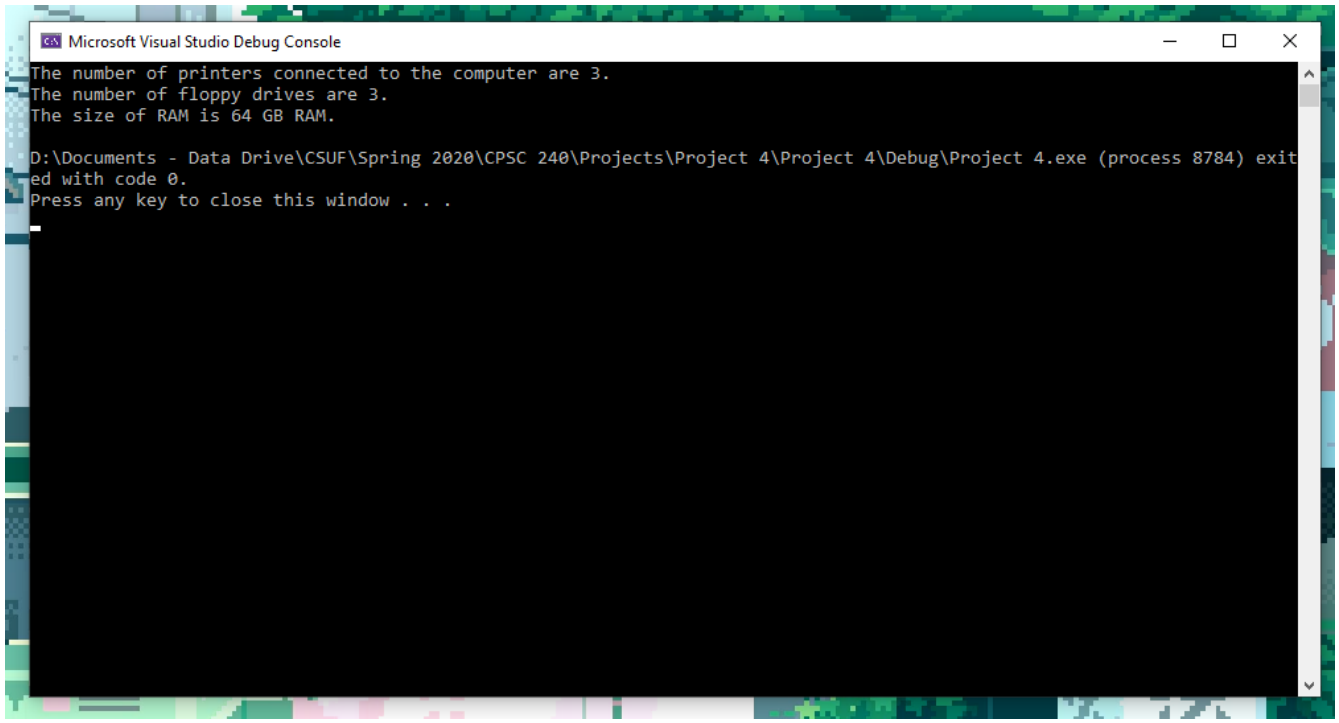
```
#include <iostream>
using namespace std;

int main()
{

        _asm
        {
   printer:
   mov eax,4
   mov ebx,1
   mov ecx,outputMsg1
   mov edx,lenoutputMsg1
   int 80h


   mov ax,[num]
   mov bx,1100000000000000b
   and bx,ax
   shr bx,0ch

   cmp bx,00h
   je printer0

   cmp bx,01h
   je printer1

   cmp bx,02h
   je printer2

   jmp printer3


   printer0:
   mov eax,4
   mov ebx,1
   mov ecx,pt0
   mov edx,lenpt0
   int 80h
   jmp floppy


   printer1:
   mov eax,4
   mov ebx,1
   mov ecx,pt1
   mov edx,lenpt1
```

```
int 80h
jmp floppy


printer2:
mov eax,4
mov ebx,1
mov ecx,pt2
mov edx,lenpt2
int 80h
jmp floppy


printer3:
mov eax,4
mov ebx,1
mov ecx,pt3
mov edx,lenpt3
int 80h


floppy:

mov eax,4
mov ebx,1
mov ecx,outputMsg2
mov edx,lenoutputMsg2
int 80h


mov ax,[num]
mov bx,0000000011000000b
and bx,ax
shr bx,05h

cmp bx,00h
je floppy0

cmp bx,01h
je floppy1

cmp bx,02h
je floppy2

jmp floppy3


floppy0:
mov eax,4
mov ebx,1
mov ecx,fp0
mov edx,lenfp0
int 80h
jmp ram


 floppy1:
```

```
mov eax,4
mov ebx,1
mov ecx,fp1
mov edx,lenfp1
int 80h
jmp ram


floppy2:
mov eax,4
mov ebx,1
mov ecx,fp2
mov edx,lenfp2
int 80h
jmp ram


floppy3:
mov eax,4
mov ebx,1
mov ecx,fp3
mov edx,lenfp3
int 80h

ram:

mov eax,4
mov ebx,1
mov ecx,outputMsg3
mov edx,lenoutputMsg3
int 80h

mov ax,[num]
mov bx,0000000000001100b
and bx,ax
shr bx,02h

cmp bx,00h
je ram1

cmp bx,01h
je ram2

cmp bx,02h
je ram3

jmp ram4

ram1:
mov eax,4
mov ebx,1
mov ecx,ram1m
mov edx,lenram1m
int 80h
jmp _exit

ram2:
```

```
mov eax,4
mov ebx,1
mov ecx,ram2m
mov edx,lenram2m
int 80h
jmp _exit

ram3:
mov eax,4
mov ebx,1
mov ecx,ram3m
mov edx,lenram3m
int 80h
jmp _exit

ram4:
mov eax,4
mov ebx,1
mov ecx,ram4m
mov edx,lenram4m
int 80h

_exit:
mov eax,1
mov ebx,0
int 80h

 num dw 110011101001100b

outputMsg1 db 'The number of printers connected to the computer are :'
lenoutputMsg1 equ $-outputMsg1
outputMsg2 db 'The number of floppy drives are :'
lenoutputMsg2 equ $-outputMsg2
outputMsg3 db 'The size of RAM is :'
lenoutputMsg3 equ $-outputMsg3

ram1m db '16GB RAM'
lenram1m equ $-ram1m
ram2m db '32GB RAM'
lenram2m equ $-ram2m
ram3m db '48GB RAM'
lenram3m equ $-ram3m
ram4m db '64GB RAM'
lenram4m equ $-ram4m

pt0 db '0 printer'
lenpt0 equ $-pt0
pt1 db '1 printer'
lenpt1 equ $-pt1
pt2 db '2 printer'
lenpt2 equ $-pt2
pt3 db '3 printer'
lenpt3 equ $-pt3

fp0 db '1 floppy'
lenfp0 equ $-fp0
fp1 db '2 floppy'
lenfp1 equ $-fp1
fp2 db '3 floppy'
```

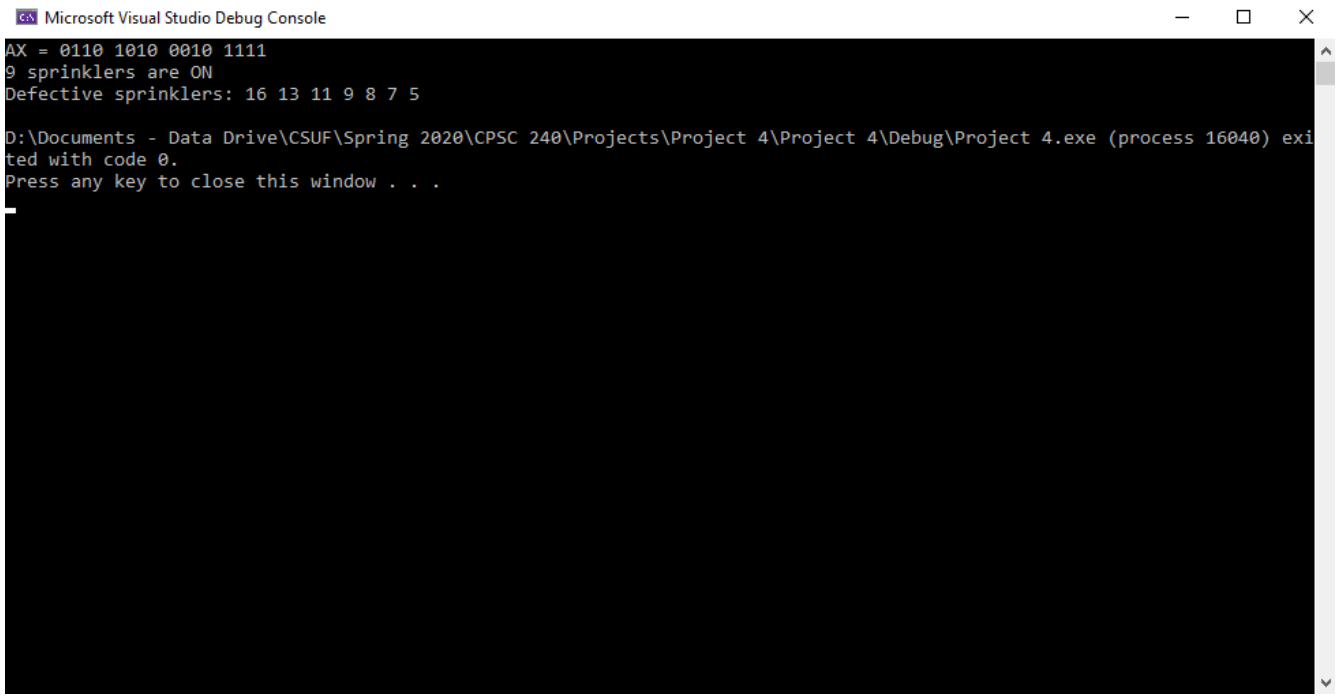
```
   lenfp2 equ $-fp2
   fp3 db '4 floppy'
   lenfp3 equ $-fp3
       }

       return 0;
}
```




```
// Question 2


_asm
       {


; i) Print "Ax="

       mov edx, OFFSET msg1

              call WriteString

              ; Display register AX

              mov ax, 0x6a2f

              mov ebx, TYPE 2

              call WriteBinB; if ebx is set to 2 then WriteBinB will output contents of eax as
16 bit binary format(for WORD ebx is set to 1)
```

```
        ; Print msg2 string

        mov edx, OFFSET msg2

        call WriteString

        ; Now check individual bits of the register AX.To check status of individual bits
in each iteration AND registers bxand cx.Since only first bit of cx is set so if the first bit
of bx is also set then AND will result into 1 otherwise 0.

        mov edx, 1; counter to iterate over 16 bits

        mov bx, ax; copy the number in bx

        mov cx, 0x0001; 0000 0000 0000 0001

        CHECK:

    cmp edx, 17

        je END; If counter reaches 17 then end the loop

        and cx, bx; AND of cxand bx

        jz ZERO; If this results in 0 then bit is not set, jump to ZERO

        jmp ONE; jump to ONE

        ZERO :

    ; iii) If 0 then sprinkler is OFF, display sprinkler number

    mov eax, edx

        call WriteInt; Display the sprinkler number

        shr bx; Right shift bx to check next bit

        inc edx; increment the counter

        jmp CHECK

        ONE :

    ; If 1 then sprinkler is ON, increment the counter

        mov eax, defSpr

        inc eax

        mov defSpr, eax

        shr bx; Right shift bx to check next bit

        inc edx; increment the counter

        jmp CHECK

        END :

    ; ii) Display how many sprinklers are ON
```

```
        ; Print msg3
                mov edx, OFFSET msg3
                call WriteString
                ; print count
                mov eax, defSpr
                call WriteInt
                _exit
}
```



// Question 3

```
_asm
        {
                ; i) Print "Ax="
                mov edx, OFFSET msg1
                call WriteString
                ; Display register AX
```

```
mov ax, 0x6a2f
mov ebx, TYPE 2
call WriteBinB;
; Print msg2 string
mov edx, OFFSET msg2
call WriteString
mov edx, 1; counter to iterate over 16 bits
mov bx, ax; copy the number in bx
mov cx, 0x0001; 0000 0000 0000 0001
CHECK:
cmp edx, 17
        je END; If counter reaches 17 then end the loop
        and cx, bx; AND of cxand bx
        jz ZERO; If this results in 0 then bit is not set, jump to ZERO
        jmp ONE; jump to ONE
        ZERO :
; iii) If 0 then sprinkler is OFF, display sprinkler number
mov eax, edx
        call WriteInt; Display the sprinkler number
        shr bx; Right shift bx to check next bit
        inc edx; increment the counter
        jmp CHECK
        ONE :
; If 1 then sprinkler is ON, increment the counter
        mov eax, defSpr
        inc eax
        mov defSpr, eax
        shr bx; Right shift bx to check next bit
        inc edx; increment the counter
        jmp CHECK
        END :
```

```
        ; ii) Display how many sprinklers are ON

        ; Print msg3

                mov edx, OFFSET msg3

                call WriteString

                ; print count

                mov eax, defSpr

                call WriteInt

                _exit
}
```