CS401
Assignment#1 idea_Solution

Question No. 1:

a)

Suppose your computer has a processor with 24-bit address lines. What is maximum amount of memory that can be attached in your system? (Show the step(s) for calculation of maximum addressable memory) **(2.5 marks)**

Solution: -

Accessible memory addresses = $2^{\text{number of address bits}}$
2^{24} = 16777216 bytes
16777216 / 1024 = 16384 KB
16384 / 1024 = **16 MB**

b)

How many address bits are required for accessing 1GB RAM? (Show the step(s) for calculation of required address bits) **(2.5 marks)**

Solution: -

As you know 1GB means 1024MB so we can write it as
1GB = 1024 x 1MB
As you know that 1MB is $\mathbf{2^{20}}$
So we can write the expression as
$\mathbf{1024 \times 2^{20}}$
This can be further simplified as
$\mathbf{2^{10} \times 2^{20}}$
$\mathbf{=2^{30}}$
Hence, **30 address lines** are required to access 1GB RAM.

Question No. 2:

What are the contents of memory locations 0151, 0152, 0153, …….,0158 if 0151 is starting address for Label1. **(1 mark for each location)**

```
Label1:   dw   8494
          db   42
          dw   54
```

```
        dw   7500
        db   01
```

Solution: -

Memory location	Contents
0151	**94**
0152	**84**
0153	**42**
0154	**54**
0155	**00**
0156	**00**
0157	**75**
0158	**01**

Question No. 3:

a)
Calculate physical address using the following segment offset pairs. **(1 mark each)**

1. 00EA:02A4
2. 0100:AA23
3. D3B8:F222
4. 00A0:1234
5. 8FEf:0FFF

Solution: -

1)
00EA**0**
002A4 +
_____
01144 **= physical address**

2)
01000
0AA23 +
_____
0BA23 **= physical address**

3)
D3B8**0**
0F222 +

_____
E2DA2 = physical address

4)
00A0**0**
01234 +

_____
01C34 = physical address

5)
8FEF**0**
00FFF +

_____
90EEF = physical address

b)
What is effective address generated by the following instructions? Every instruction is independent of others. Initially bx = 0x0101, bp=0x0222, si=0x1234, var1=0x1771
(1 mark each)

1. *mov ax, [bx+si]*
2. *mov ax, [bx+100] (100 is in decimal)*
3. *mov ax, [bp+si]*
4. *mov ax, [var1+bp]*
5. *mov ax, [si+var1]*

Solution: -

1)
Effectice address = [bx+si]
= [0101 + 1234]
= [1335]

2)
Effectice address = [bx + 100]
After converting 100 into hexadecimal
Effectice address = [bx + 64]
= [0101 + 64]
= [0165]

3)

Effective address = [bp+si]
= [0222 + 1234]
= [1456]

4)
Effective address = [var1+bp]
= [1771 + 0222]
= [1993]

5)
Effective address = [si + var1]
= [1234 + 1771]
= [29A5]

JUST IDEA..