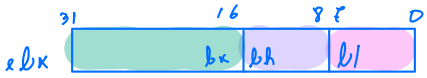
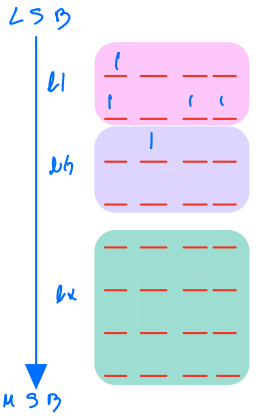
4.1

movl %ebx, $721

→ instrução move a constante 721 para o registo ebx



Nota ebx - 32
ebh - 16
ebl - 8



ebl = $2^7 + 2^6 + 2^4 + 2^0 = 209$

ebh = $2^1 = 2$

4.2

a)

address	value	address	value	register	value
110	FF	118	13	eax	110
111	0	119	0	ebx	A
112	0	11A	0	ecx	1
113	0	11B	0	edx	3
114	AB	11C	55		
115	0	11D	0		
116	0	11E	0		
117	0	11F	0		

I) %eax = 110_{16}

II) 0x114 = AB_{16}

III) $0x118 = 118_{16}

IV) (%eax) = FF_{16}

V) 4(%eax) = (110 + 4 = 114) (%114) = AB_{16}

VI) 9(%eax,%edx) = (110 + 3 = 113 + 9 = 121 = 11C) %11C = 55_{16}

VII) 280(%ecx,%edx) = 55_{16}

280 → $2^8 + 2^4 + 2^3$ → 0001|0001|1000

1 1 8

1 + 3 = 4

117 + 4 = 122 → %11C → 55_{16}

VIII) 0xFC(,%edx,8) = AB_{16}

8 × 8 = 24

0xFC = 16×16 + 12×1 = 268 = 272 → $2^8 + 2^4$ → 0001|0001|0000

1 1 0

%110 = AB_{16}

IX) 2(%eax,%ebx) = 55

110 + A = 120

120 + 2 = 122 → 11C

%11C → 55_{16}

b)

```
1 addl %eax, %ebx
2 addl (%eax), %ecx
3 subl 4(%eax), %edx
4 andl $43, (%eax,%edx,4)
5 decl %edx
6 incl 8(%eax)
7 imull %eax, %ebx
8 sall 2, %ebx
```

1 → ebx : $11A_{16}$

2 → ecx : 1 + FF$_{16}$ → 1615 415 11 = 255 + 1 = 256 → 1 0000 0000 → ECX = 100_{16}

3 →

subl 4(%eax), %edx

%edx = %edx − M[%eax + 4]

= 3 − A3

= 3 − 1F1

= −1 6 8

4 → andl $43, (%eax, %edx, 4)

(110 + 3 × 4)

$43, M[11C] = 55_{16}

```
  00101011
& 01010101
  ---------
  00000001
```

5 → decl %edx

%edx = %edx − 1

3 − 1 = 2

%edx = 2

6) incl 8(%eax)

%eax = 110 + 8 = M[110$_{16}$] = 33 + 1

= 34

7) imull %eax, %ebx

d a o s

%ebx = 110 × A = AA0

8) sall 2, ebx

ebx = ebx << 2

A << 2 = 10 10 00 = 28_{16}

4.3

40F780:75 03

jne XX → jump not equal
↳ destination

Destination = next memory position +1 (byte 03) +03 = 40F781+4 = 40F785

8318A1: 0F 85 F1 FE FF FF jne ??

4.4

: FF 20 jne 300834

300834 = (x+1) + 1(byte 2c) +20

⇒ x = 300834 - 22 = 30812

: EB E8 jmp 854FA2

854FA2 = (x+1) + 1(byte E8) + E8

⇒ x = 854E58

4.3

```c
#include <stdio.h>
int a, b, c;

int main (){
    scanf("%d", &a);
    b = a*2;
    c = b-a;
    printf("%d %d\n",b, c);
}
```