

Sessió 4

ex. 18, 19 ← Tema 2

18 SumaElements:

pushl %ebp

movl %esp, %ebp

movl 8(%ebp), %eax # %eax = i

movl 12(%ebp), %ecx # %ecx = j

call \$2, %ecx # %ecx = 4 * j (j * 4 < 2 (arithmetic))

leal (, %eax, 8), %edx # %edx = 8 * (i * 8)

subl %eax, %edx # %edx = i * 8 - i

leal (%eax, %eax, 5), %eax # %eax = i + i * 4 @mat2 + 20i + 4 * j

movl mat2(%eax, %eax, 4), %eax # %eax = @mat2 + 4 * (i + i * 4) + 4 * j = mat2[i][j]

addl mat1(%ecx, %ecx, 4), %eax # mat2[i][j] += @mat1 + 4 * j + 4 * (i * 8 - i)

movl %ebp, %esp

popl %ebp

ret

$$a) @mat1 + 28i + 4j = @mat1 + 4(7i + j) // @mat2 + 20i + 4j = @mat2 + 4(5i + j)$$

$$N=7; M=5$$

b) 13 instruccions
estàtiques

c) 13 instruccions
dinàmiques

d) 9 accessos a
memòria

e) 0.8 instruccions/cicle → no accés mem. // 0.5 instruccions/cicle → Accés mem.

9 accessos memòria (inst.)

13 - 4 = 9 inst. no accessos a mem.

$$\frac{1}{0.8} = 1.25 \text{ cicles/instruccions}$$

$$\frac{1}{0.5} = 2 \text{ cicles/instruccions}$$

$$\text{Cicles totals} = 4 \cdot 1.25 \text{ c/i} + 9 \cdot 2 \text{ c/i} = 23 \text{ cicles}$$

f) No accés a mem. → $\frac{1}{0.8} = 1.25 \text{ c/i}$

$$\text{Accés a mem.} \rightarrow \frac{1}{0.5+0.1} = \frac{1}{0.6} = 1.67 \text{ c/i}$$

$$\text{Guany} = \frac{20}{23} = 0.87$$

$$\text{Cicles totals} = 4 \cdot 1.25 \text{ c/i} + 9 \cdot 1.67 \text{ c/i} = 20 \text{ cicles}$$

19 typedef struct {

int i1;

char c2[30];

int i3;

} x;

typedef struct {

x tabla[100];

int m;

} z;

int F(x * p1, int y);

int examen(x * p1, int * x, int y)

{ int i, j;

x aux;

...

d) aux.i1 = F(&(*p1).tabla[j], y);

pushl 16(%ebp) # 4

movl 8(%ebp), %eax # %eax = p1

movl -44(%ebp), %edx # %edx = j

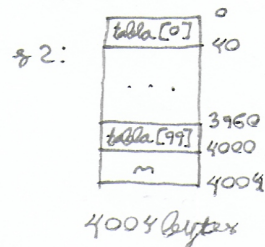
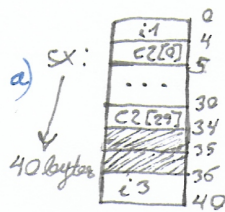
imul \$40, %edx # %edx = j * 40

addl %edx, %eax # p1 + tabla[j]

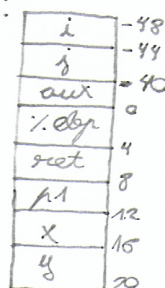
pushl %eax # &(*p1).tabla[j]

(movl %eax, -40(%ebp) # aux.i1 = F(&(*p1).tabla[j], y);

addl \$8, %esp



examen:



c) return (*x + aux.i3);

movl 12(%ebp), %eax # %eax = &x

movl (%eax), %eax # *x

addl -4(%ebp), %eax # aux.i3

$$-40 + 36 = -4$$

e) i = j * y;

movl 16(%ebp), %eax # %eax = y

movl -44(%ebp), %ecx # %ecx = j

imul %ecx, %eax # %eax = j * y

movl %eax, -48(%ebp) # i = j * y

f) $\text{aux.C2}[i] = \text{aux.C2}[23];$

$-40 + 4 + 23 = -13$

$\text{movl } -13(\%ebp), \%al \quad \# \%al = \text{aux.C2}[23]$

$\text{leal } -40(\%ebp), \%ecx \quad \# \%ecx = \&\text{aux}$

$\text{addl } \$4, \%ecx \quad \# \%ecx = \&\text{aux} + 4$

$\text{addl } -48(\%ebp), \%ecx \quad \# \%ecx = \&\text{aux} + 4 + i$

$\text{movl } \%al, (\%ecx) \quad \# \text{aux.C2}[i] = \text{aux.C2}[23]$

g) $\text{for}(i=0; (i < 4) \&\& (i < (*p1).m); i=i+5)$

$(*p1).\text{tabla}[i].i1 = (*p1).\text{tabla}[i].i3 + i;$

$\text{movl } \$0, \%eax \quad \# i = 0$

$\text{movl } 8(\%ebp), \%ecx \quad \# \%ecx = p1$

$\text{for: cmpl } 16(\%ebp), \%eax \quad \# \text{Salta si } i \geq 4$

jge endfor

$\text{cmpl } 4000(\%ecx), \%eax \quad \# \text{Salta si } i \geq (*p1).m$

jge endfor

$\text{imul } \$40, \%eax, \%edx \quad \# \%edx = i * 40$

$\text{addl } \%ecx, \%edx \quad \# \%edx = p1 + i * 40$

$\text{movl } \%edx, \%esi \quad \# \%esi = p1 + i * 40 = p1.\text{tabla}[i]$

$\text{movl } 36(\%esi), \%eax \quad \# \%eax = p1.\text{tabla}[i].i3$

$\text{addl } \%eax, \%esi \quad \# \%esi = p1.\text{tabla}[i].i3 + i$

$\text{movl } \%esi, (\%edx) \quad \# p1.\text{tabla}[i].i1 = p1.\text{tabla}[i].i3 + i$

$\text{addl } \$5, \%eax \quad \# i += 5$

jmp for

endfor:

h) $\text{if}(\text{aux.i1} \neq y)$

$\text{aux.i3} = i;$

else

$\text{aux.i3} = j;$

$\text{movl } -40(\%ebp), \%eax \quad \# \%eax = \text{aux.i1}$

$\text{if: cmpl } 16(\%ebp), \%eax \quad \# \text{Salta si } \text{aux.i1} == y$

je else

$\text{movl } -4(\%ebp), \%ecx \quad \# \%ecx = \text{aux.i3}$

$\text{movl } -48(\%ebp), \%ecx \quad \# \text{aux.i3} = i$

jmp end

$\text{else: movl } -44(\%ebp), \%ecx \quad \# \text{aux.i3} = j$

end:

i) $i = 0;$

$\text{while}(\text{aux.C2}[i] \neq ' ')\{$

$\text{aux.C2}[i] = '#';$

$i++;$

$\}$

$\text{movl } \$0, \%eax \quad \# i = 0$

$\text{leal } -40(\%ebp), \%ecx \quad \# \%ecx = \&\text{aux}$

$\text{movl } 4(\%ecx, \%eax), \%ecx \quad \# \%ecx = \text{aux.C2}[i]$

$\text{while: cmpl } \$', \%ecx \quad \# \text{Salta si } \text{aux.C2}[i] == ' '$

je endwhile

$\text{movl } '#', \%ecx$

$\# \text{aux.C2}[i] = '#'$

$\text{incl } \%eax$

$\# i++$

endwhile: