

2.18

a)

esp/ebp	
%ebp old	+4
@RET	+8
i	+12
j	

(•: valor actual)

$eax = i$
 $ecx = j$
 • $ecx = 4j$
 $edx = 8i$
 • $edx = 8i - i = 7i$
 • $eax = i + 4i = 5i$

$$mat1[i][j] = @Mat1 + 4(i \cdot N + j)$$

$$mat2[i][j] = @Mat2 + 4(i \cdot M + j)$$

$$\left[\begin{array}{l} mat1 + 4j + 7i \cdot 4 = mat1 + 4(7i + j) \\ mat2 + 4j + 5i \cdot 4 = mat2 + 4(5i + j) \end{array} \right]$$

$$\boxed{N = 7}$$

$$\boxed{M = 5}$$

b) 13 instrucciones estáticas

c) 13 instrucciones dinámicas (no hay saltos)

d)

SumaElemento:

```

pushl %ebp 4
movl %esp, %ebp

movl 8(%ebp), %eax 2
movl 12(%ebp), %ecx 3
sall $2, %ecx
leal (,%eax,8), %edx
subl %eax, %edx
leal (%eax, %eax, 4), %eax
movl mat2(%ecx, %eax, 4), %eax 4
addl mat1(%ecx, %edx, 4), %eax 5

movl %ebp, %esp
popl %ebp 6
ret 7
    
```

7 accesos

e) $ICP_1 = 0'8 \text{ i/c}$
 $ICP_2 = 0'5 \text{ i/c}$

$$\rightarrow \left\lceil \frac{1}{0'8} \cdot 6 + \frac{1}{0'5} \cdot 7 \right\rceil = \lceil 21'5 \rceil = \boxed{22 \text{ ciclos}} \rightarrow CPI = 1'692$$

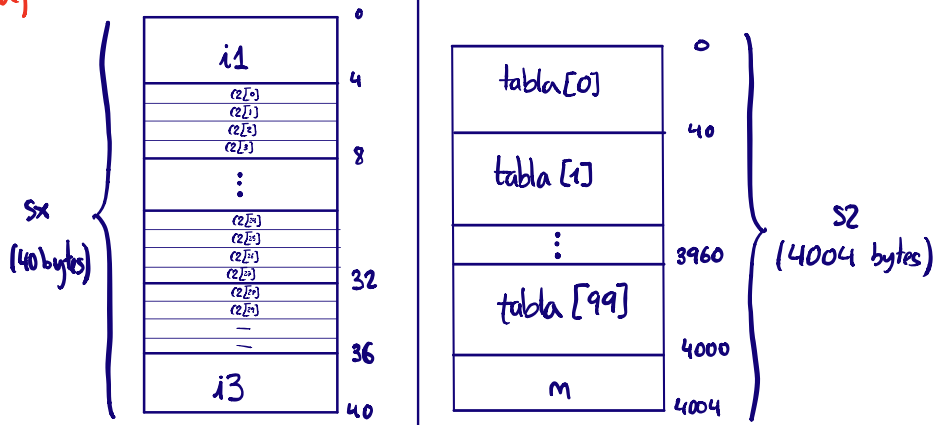
f) $ICP_1 = 0'9 \text{ i/c}$
 $ICP_2 = 0'6 \text{ i/c}$

$$\rightarrow \left\lceil \frac{1}{0'9} \cdot 6 + \frac{1}{0'6} \cdot 7 \right\rceil = \lceil 18'3 \rceil = 19 \text{ ciclos} \rightarrow CPI = 1'462$$

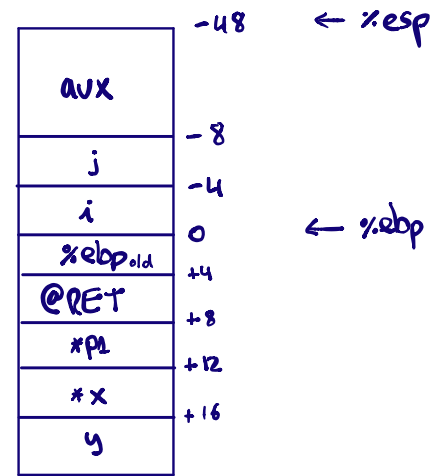
$$Speedup = \frac{1'692}{1'462} = 1'1573 \rightarrow \boxed{+ 15'73 \%}$$

2.19

a)



b)



c)

```

movl 12(%ebp), %eax
movl (%eax), %eax
addl -12(%ebp), %eax
movl %ebp, %esp
popl %ebp
ret

```

d)

```

movl 16(%ebp), %eax
pushl %eax
imull $40, -8(%ebp), %eax
addl 8(%ebp), %eax
pushl %eax
call F
movl %eax, -48(%ebp)

```

e)

```

movl -8(%ebp), %eax
imull 16(%ebp), %eax
movl %eax, -4(%ebp)

```

f)

```

movb -21(%ebp), %al
movl -4(%ebp), %esi # i
movb %al, -44(%ebp, %esi)

```

g)

```

movl $0, %esi # i = 0
movl 8(%ebp), %eax # (&p1)
for:
  cmpl %esi, 16(%ebp)
  jle endfor
  cmpl %esi, 4000(%eax)
  jle endfor
  imull $40, %esi, %ecx
  movl 36(%ecx, %ecx), %edx
  addl %esi, %edx
  movl %edx, (%eax, %ecx)
  addl $5, %esi
  jmp for
endfor: movl %esi, -4(%ebp)

```

h)

```

movl -4(%ebp), %eax # i
movl 16(%ebp), %ecx # j
if: cmpl -48(%ebp), %ecx
    je end
else: movl -8(%ebp), %eax # j
end: movl %eax, -12(%ebp)

```

i)

```

movl $0, %esi
loop: cmpl $'.', -44(%ebp, %esi)
      je end
      movl $' ', -44(%ebp, %esi)
      incl %esi
      jmp loop
end:  movl %esi, -4(%ebp)

```