

## Problemas

### 6.1.

- a)  $CPI = \frac{1}{4} = 0.25 \text{ c/i}$
- b)  $20c \times 4 = 80instr$
- c)  $CPI = 0.25 + 20 \times 0.2 = 4.25 \text{ c/i}$
- d)  $4.25 / 0.25 = 17$
- e)  $CPI = 0.25 + 20 \times 0.2 \times 0.05 = 0.45 \text{ c/i}$
- f)  $speedup = 4.25 / 0.45 = 9.44$

### 6.2

- a)  $IPC = 10^9 i / 10^9 c = 1 \text{ i/c}$   
 $OPC = 4 \times 10^9 op / 10^9 c = 4 o/c$
- b)  $4 \times 10^9 i / 10^9 c = 4 \text{ i/c}$
- c)  $0.6 \times 10^9 + 0.4 \times 10^9 \times 2 = 1.4 \times 10^9 \text{ ciclos}$
- d)  $IPC = 10^9 i / 1.4 \times 10^9 c = 0.714 \text{ i/c}$   
 $OPC = 4 \times 10^9 o / 1.4 \times 10^9 c = 2.857 \text{ o/c}$
- e)  $4 / 16 = 0.25$
- f)  $0.6 \times 10^9 + 0.25 \times 0.4 \times 10^9 \times 2 + 0.75 \times 0.4 \times 10^9 = 1.1 \times 10^9 \text{ ciclos}$
- g)  $IPC = 10^9 i / 1.1 \times 10^9 c = 0.909 \text{ i/c}$   
 $OPC = 4 \times 10^9 / 1.1 \times 10^9 c = 3.63 \text{ o/c}$

### 6.3

- a)  $Ganancia\ maxima = 200 / (0.05 \times 200 + 0.1 \times 200) = 6.67$
- b)  $t(N) = 30 + 170/N + N$
- c)  $0 = 30 + 170/N + N \rightarrow N = 170^{(-1/2)} = 13 \text{ procesadores}$
- d)  $Ganancia = 200 / (30 + 26) = 3.57$
- e)  $Ganancia = 200 / (180 + 20/10) = 1.1$
- f) 5 horas
- g)  $Ganancia = 200 / (10 + 26 + 5) = 4.88$
- h)  $MIPS = 648 \times 10^{13} / (10^6 \times 200 \times 3600) = 9000$   
 $MFLOPS = 72 \times 10^{13} / (10^6 \times 200 \times 3600) = 1000$
- i)  $MIPS = (648 \times 10^{13} + 13 \times 10^{13}) / (10^6 \times (10 + 26 + 5) \times 3600) = 44783$   
 $MFLOPS = 72 \times 10^{13} / (10^6 \times (10 + 26 + 5) \times 3600) = 4878$
- j) PC:  $1000 \text{ MFLOPS} / 120 \text{ w} = 8.33 \text{ mflops/w}$   
Supercompu:  $4878 / (30 \times 10 + 13 \times 90) = 3.32 \text{ MFLOPS/W}$
- k)  $4878 \text{ MFLOPS} / (90 \times 13 \times 26/41 + 90 \times 1 \times 15/41 + 30 \times 10 \times 5/41) = 6 \text{ MFLOPS/W}$   
 $Ganancia\ 6/3.32 = 1.81$