PROBLEMES SESSIÓ 12

Problema 5.1

a).
Expressió: R = C-(A-B)/(C-D)
Seqüència de codi:

```
                push D
                push C
                sub
                push B
                push A
                sub
                div
                push C
                sub
                pop  R
```
b).
```
                load C
                sub D
                store R
                load A
                sub B
                div R
                store R
                load C
                sub R
                store R
```

Problema 5.2

a). #accessosDades = 10^9ins*0.3mem + $2*10^9$ + 2*0.1 = $5*10^8$ accessos

b). f = N*CPI/Texec = (10^9*2.5c/ins)/2.5s = $1*10^9$Hz = 1Gz

c). #insRISC = 10^9*(1*0.9 + 0.1*2 + 0.2*0.15) + $5*10^8$ * (1+1*0.2 + 0.1*1) = $1.78*10^9$ instruccions

d). freqRISC = $1.78*10^9$*1.2/2.5 = 0.8544 Ghz

e). Econs = Pcons * t
   EConsRISC = 2.5s * ($50*10^{-9}$F * $1V^2$*$1*10^9$Hz + 1V*10A) = 150J
   EConsCISC = 2.5s * ($40*10^{-9}$F * $1V^2$*$0.8544*10^9$Hz + 1V*8A) = 105.44J

f). Guany de bateria del RISC sobre el CISC

   PotRISC/PotCISC = ($50*10^{-9}$F * $1V^2$*$1*10^9$Hz + 1V*10A)/($40*10^{-9}$F * $1V^2$*$0.8544*10^9$Hz + 1V*8A) = x1.4226 Guany

g). fnovaRISC = 1.5*10^9 * 1.3/2.5 = 0.78GHz

h). E = P*t = (40*10^-9F * 1V^2*7.8*10^8Hz + 8W) * 2.5s = 98J

    Guany Nou codi = (150J)/98J = x1.5306

Problema 5.3

a).
```
        movl %ecx<-$0
loop:
        cmpl %ecx, $1000000
        jge Fin
        load %r1<-x
        movl %eax<-%r1
        load %r1<-V(,%ecx,4)
        imul %eax<-%eax*%r1
        load %r2<-suma
        addl %r2<-%r2+%eax
        atore suma<-%r2
        addl %ecx<-%ecx+$1
        jmp loop
Fin:
```

b). #insDin = 1+1000000*7ins = 7000001 ins
    #uopsDin = 1 + 1000000*10 = 10000001 uops

c). CPI = 1c/1.3 uops * 10000001/~7*10^6 uops/ins = 1.0989 c/ins

d). Texec = N*CPI*f = 7*10^6*1.0989*1/3*10^9Hz = 2.564 *10^-3 s = 2.564 ms

e). MidaCodix86 = 66B
    MidaUopsEq = 17B + 38B - 11B = 44B

f). #Bllegits = 17+38*10^6 = 38000017B

    AmpleBandaEfect = #Bllegits/s = 38000017/2.564*10^-3 = 14.8206GB/s

g). #Bllegitts = 6 + 60*10^6+12 = 60000018B

    AmpleBandaEfect = #Bllegits/s = 60000018B/2.564*10^(-3) = 23.4 GB/s

h).

    EConsSUops = 10^-9 * 38000017 + 7*10^6*10*10^-9 + 10*10^(-9)*44 = 0.108J
    EconsUops = 10^-9 * 60000018 + 10*10^(-9)*66 = 0.060000678J

    Guany = 0.108J/0.06J = x1.8 Guany