CS3810 Assignment 07

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Question 1:

cycle time has to be at least 2000 ps

clock speed = $\frac{1}{\text{cycle time}} = \frac{1}{2\times10^{3}\times10^{-12}} = 5\times10^{8}\ Hz = 0.5$ Gigahertz

CPI (cycles per instruction) = 0.5

⇒ Throughput (in billion instructions per sec) = 0.5

Question 2:

cycle ~~speed~~ time has to be at least 250 ps

clock speed = $\frac{1}{250\ ps} = 4\ GHz$

CPI = 0.5 since there are no stalls

Each clock cycle, a new instruction is fetched ⇒ CPI = 0.5

⇒ Throughput (in billion instructions per sec) = 4

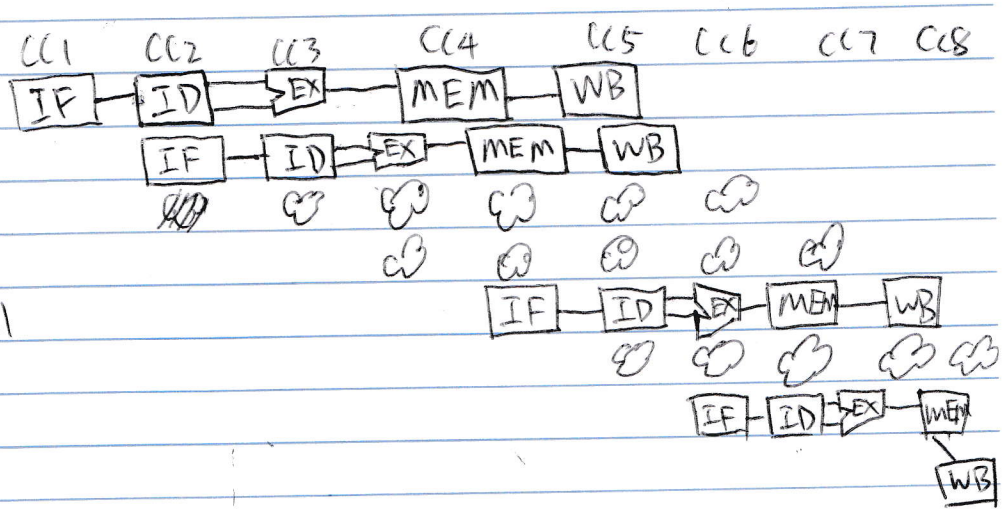
speedup = new clock speed ÷ old clock speed

$= 4\ GHz \div 0.5\ GHz$

$= 8$

It is less than 10 because the cycle time was increased less than 10 as well.

Question 3:



Question 4:

add $s1 $s2 $s3

lw $s4 4($s4)

add $s5 $s4 $s1

sw $s5 8($s2)