CSE 340
ASSIGNMENT-3

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Section: 7

Ans. to the ques. No: 1

(a)

Using only stalling to overcome data hazard:

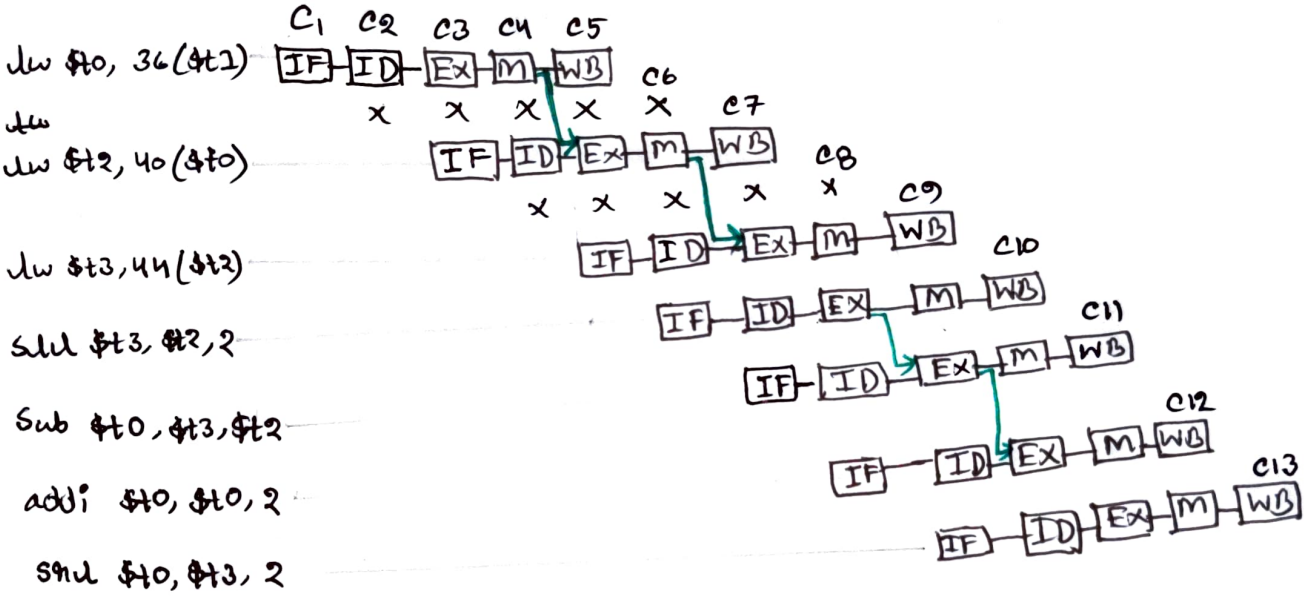
So, Clock cycles needed = 19

$$CPI = \frac{19}{7}$$

(Ans)

(b)

Using stall and forwarding:



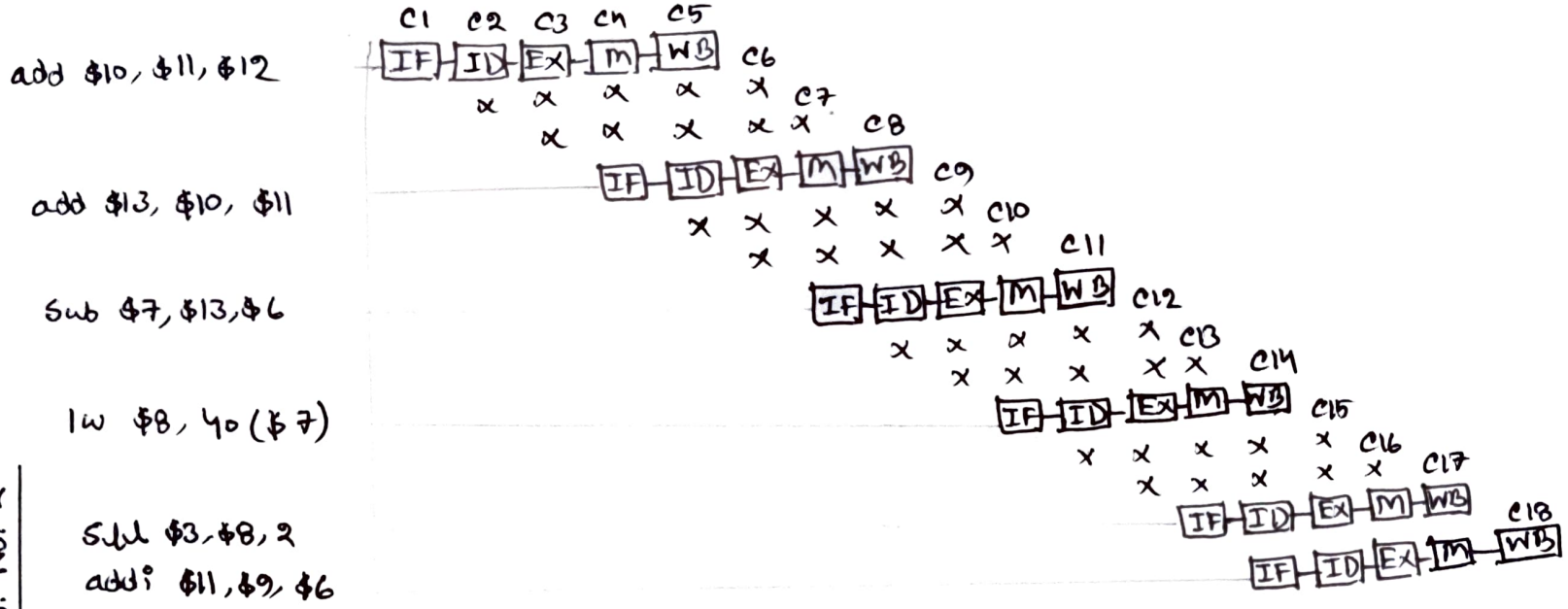
Clock cycle = 13

CPI = $\frac{13}{7}$

(Ans)

Ans. to the qres. No: 2

Using Stalling:

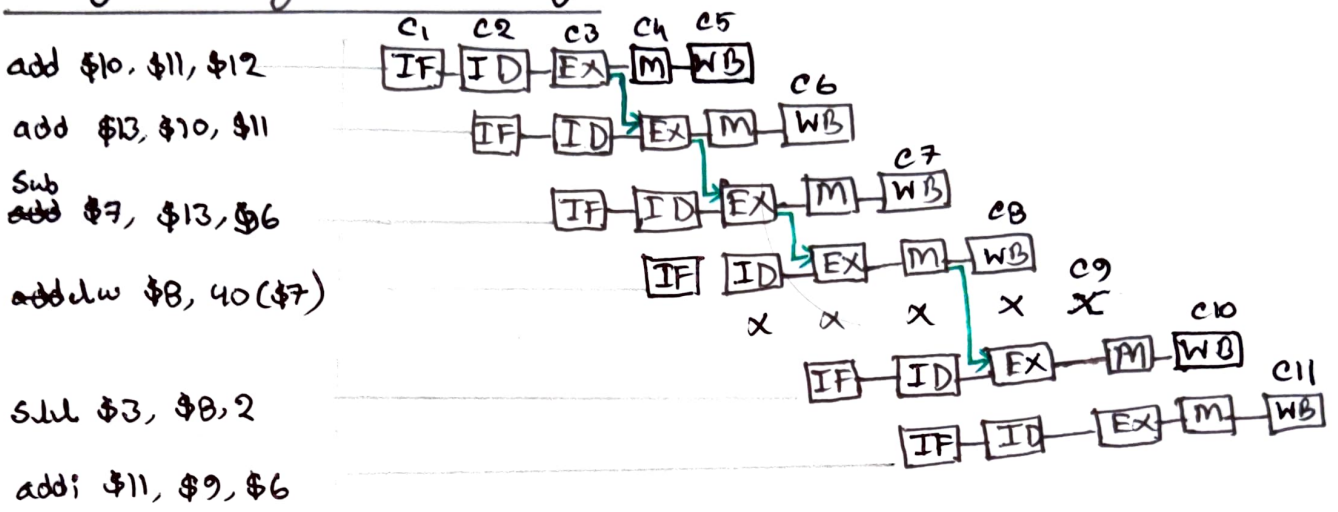


Total cycles: 18

$$CPI = \frac{18}{6} = 3$$

Ans. to the ques. No: 2

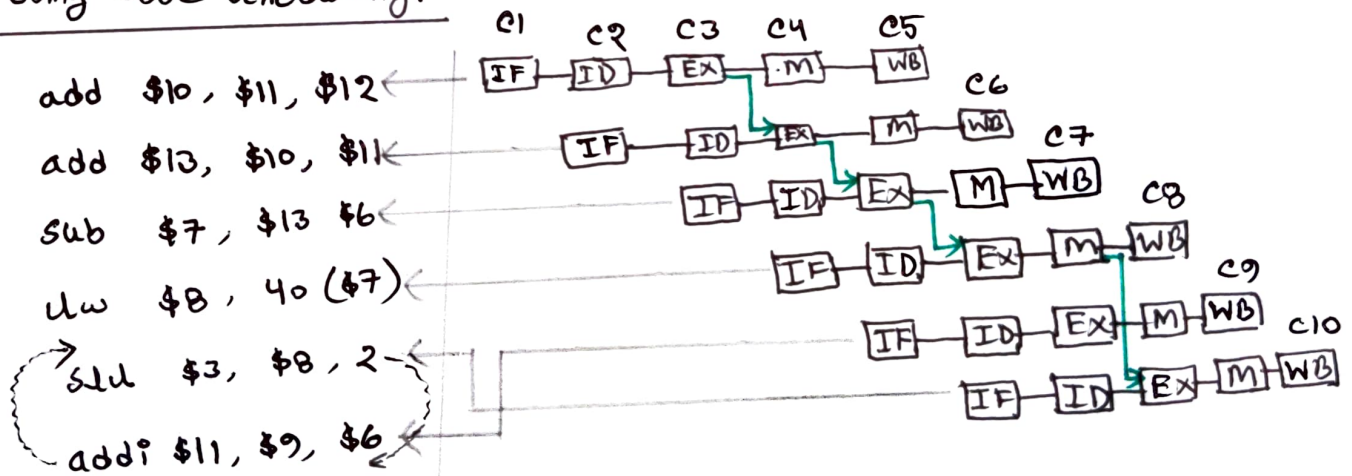
Using stalling + Forwarding:



Clock cycle = 11

CPI = $\frac{11}{6}$

Using Code Scheduling:



Clock cycle = 10

CPI = $\frac{10}{6} = \frac{5}{3}$

(Ans)

Ans. to the ques. No:-3

(a)

Given,

IF = 260ns
ID = 270ns
EX (addition) = 450ns
EX (subtraction) = 350ns
MEM = 200 ns
WB = 290 ns

Here, EX (addition) is taking more time than ~~any~~ any other stages. So, we will calculate clockperiod ~~datapath~~ for single cycle datapath using EX (addition).

~~Datapath for sing~~

Clockperiod for single cycle datapath:

260 + 270 + 450 + ~~350~~ + 200 + 290 = 1470 ns.

Clockperiod for 5 stage pipeline:

450 ns

Difference: (1470 - 450) ns

= 1020 ns

Single cycle datapath is 1020 ns greater than 5 stage pipeline clock period.

(b)

Ex.

Given,

single cycle datapath
clock period: 1470 ns

To execute

6 sub instruction

8 lw "

1 add "

So, Duration: $(6+8+1) \times 1470$ ns

$= (15 \times 1470)$ ns

$= 22050$ ns

(Ans)

Ans. to the ques. No:- 4

(a, b)

Given, lw $9, 16($11)

xxxxxx	01011	01001	0000000000010100
op	rs	rt	offset