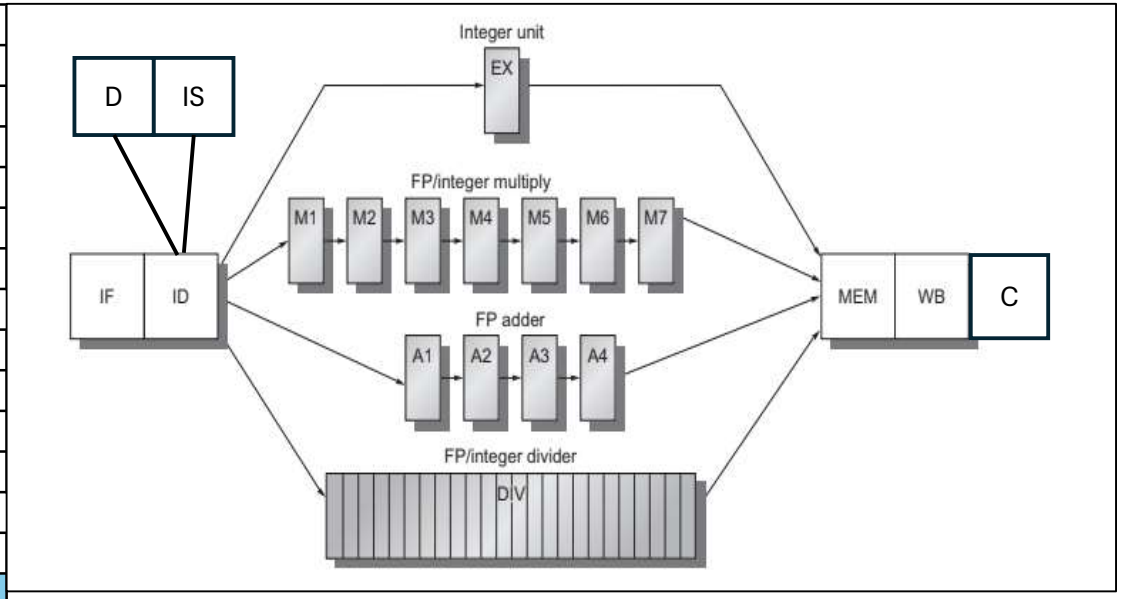
CS613 Homework 8	Instructions	1	2	3	4	5	6	7	8	9	10	11
1	add x1, x0, x0	IF	D	IS	EX | R1	MEM | R1	WB | R1	C | R1				
2	addi x5, x0, 2000	IF	D	IS/s	s/IS	EX | R2	MEM | R2	WB | R2	C | R2			
3	fld f1, -8(x5)		IF	D	IS/s	s/IS	EX | R6	MEM | R6	WB | R6	C | R6		
4	addi x2, x2, 10		IF	D	IS/s	IS/s	IS/s	s/IS	EX | R1	MEM | R1	WB | R1	C | R1
Strt: 5	fld f1, -8(x5)			IF	D/s	s/D	IS/s	IS/s	IS/s	s/IS	EX | R6	MEM | R6
6	addi x5, x5, 8			IF	D/s	s/D	IS/s	IS/s	IS/s	EX | R2	MEM | R2	WB | R2
7	fadd.d f7, f7, f1				IF/s	s/IF	D/s	D/s	D/s	s/D	IS	EX1 | R3
7A	fmul.d f7, f10, f1				IF	D/s	D/s	D/s	s/D	IS	EX1 | R5	EX2| R5
8	fsd f7, -8(x5)						IF	D	IS/s	IS/s	IS/s	IS/s
9	subi x2, x1, 1					IF/s	IF/s	IF/s	s/IF	D	IS/s	s/IS
10	bne x2, x2, Strt							IF	D/s	D/s	D/s	D/s
End 11	xor x4, x1									IF	D/s	s/D
12	fld f1, -8(x5)								IF/s	IF/s	IF/s	IF/s
13	addi x5, x5, 8										IF/s	s/IF
14	fadd.d f7, f7, f1											

Reservation Stations	Shorthand
ALU-1	R1
ALU-2	R2
FPA-1	R3
FPA-2	R4
Mul	R5
L/S	R6

Reorder Buffer	Shorthand
Buffer 1	B1
Buffer 2	B2
Buffer 3	B3

Pipelines	Shorthand
Pipeline 1	P1
Pipeline 2	P2



CS613 Homework 8	Instructions	12	13	14	15	16	17	18	19	20	21	22
1	add x1, x0, x0											
2	addi x5, x0, 2000											
3	fld f1, -8(x5)											
4	addi x2, x2, 10											
Strt: 5	fld f1, -8(x5)	WB | R6	C | R6									
6	addi x5, x5, 8	C | R2										
7	fadd.d f7, f7, f1	EX2| R3	EX3 | R3	EX4 | R3	MEM | R3	WB | R3	C | R3					
7A	fmul.d f7, f10, f1	EX3 | R5	EX4 | R5	EX5 | R5	EX6 | R5	EX7 | R5	MEM | R5	WB | R5	C | R5			
8	fsd f7, -8(x5)	IS/s	s/IS	EX | R6	B	MEM | R6	WB | R6	B	B	C | R6		
9	subi x2, x1, 1	EX | R1	MEM | R1	WB | R1	C | R1							
10	bne x2, x2, Strt	D/s	s/D	IS	EX | R2	B	B	MEM | R2	WB | R2	C | R2		
End 11	xor x4, x1	IS	EX1 | R2	MEM | R2	WB | R2	C | R2	B	B	NOP			
12	fld f1, -8(x5)	IF/s	s/IF	D	IS/s	IS/s	IS/s	IS/s	IS/s	s/IS	EX | R6	MEM | R6
13	addi x5, x5, 8	D	IS/s	IS/s	s/IS	EX | R1	B	MEM | R1	WB | R1	B	B	C | R1
14	fadd.d f7, f7, f1			IF	D/s	D/s	D/s	D/s	D/s	s/D	IS	EX1 | R3

Reservation Stations	Shorthand
ALU-1	R1
ALU-2	R2
FPA-1	R3
FPA-2	R4
Mul	R5
L/S	R6

Reorder Buffer	Shorthand
Buffer 1	B1
Buffer 2	B2
Buffer 3	B3

Pipelines	Shorthand
Pipeline 1	P1
Pipeline 2	P2

Part 1. C

The fact that there is only 1 ALU Is causing a lot of stalls. Additionally, there are not enough ALU Reservation stations to accommodate all of the instuctions. However, if there were more ALU excecution units it could relieve some of the pressure off of the Reservation stations. There is definately a benefit for another Excecution unit to be added than just another reservation station. having only one EX causes the pipe to have to stall to accomodate the lack of excecution resources.

CS613 Homework 8	Instructions	23	24	25	26	27	28	29
1	add x1, x0, x0							
2	addi x5, x0, 2000							
3	fld f1, -8(x5)							
4	addi x2, x2, 10							
Strt: 5	fld f1, -8(x5)							
6	addi x5, x5, 8							
7	fadd.d f7, f7, f1							
7A	fmul.d f7, f10, f1							
8	fsd f7, -8(x5)							
9	subi x2, x1, 1							
10	bne x2, x2, Strt							
End 11	xor x4, x1							
12	fld f1, -8(x5)	WB | R6	C | R6					
13	addi x5, x5, 8							
14	fadd.d f7, f7, f1	EX2| R3	EX3 | R3	EX4 | R3	MEM | R3	WB | R3		

Reservation Stations	Shorthand
ALU-1	R1
ALU-2	R2
FPA-1	R3
FPA-2	R4
Mul	R5
L/S	R6

Reorder Buffer	Shorthand
Buffer 1	B1
Buffer 2	B2
Buffer 3	B3

Pipelines	Shorthand
Pipeline 1	P1
Pipeline 2	P2