6.823 Computer Architecture DUE: 4/29/2002

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Problem Set 5 *Instructors: Krste Asanovic, Srinivas Devadas*

Problem 4

(a) This sequence takes 18 cycles to execute:

1	F											
2	D				F							
3	R				D				F			
4	X1	R										
5	X2	X1	R									
6	W	X2	X1	R								
7		W	X2	X1								
8			W	X2								
9				W	R				D			
10					X1	R						
11					X2	X1	R					
12					W	X2	X1	R				
13						W	X2	X1				
14							W	X2				
15								W				
16									R			
17									X1	R		
18									X2	X1	R	
19									X3	X2	X1	R
20									W	X3	X2	X1
21										W	X3	X2
22											W	X3
23												W

(b) This sequence takes 13 cycles to execute:

1	F											
2	D				F							
3	R				D				F			
4	X1	R										
5	X2	X1	R									
6	W	X2	X1	R								
7		W	X2	X1	R				D			
8			W	X2	X1	R						
9				W	X2	X1	R					
10					W	X2	X1	R				
11						W	X2	X1	R			
12							W	X2	X1	R		
13								W	X2	X1	R	
14									X3	X2	X1	R
15									W	X3	X2	X1
16										W	X3	X2
17											W	X3
18												W

(c) This sequence takes 7 cycles to execute:

1	F					
2	D		F			
3	R		D		F	
4	X1	R				
5	X2	X1	R		D	
6	W	X2	X1	R		
7		W	X2	X1	R	
8			W	X2	X1	R
9				W	X2	X1
10					X3	X2
11					W	X3
12						W