ICS Hw3

3200102555

Yunfan Li

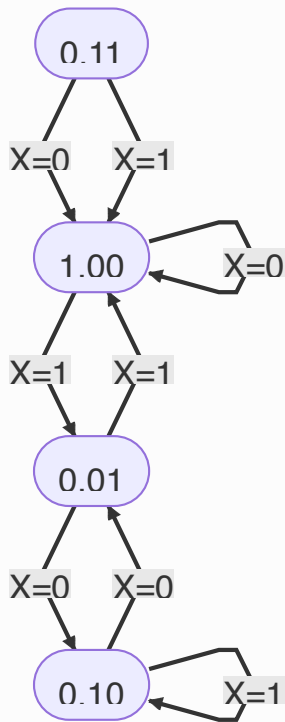## 3.53

	cycle0	cycle1	cycle2	cycle3	Cycle4	cycle5	cycle6	Cycle7
D2	0	1	1	1	1	0	0	0
D1	0	1	1	0	0	1	1	0
D0	0	1	0	1	0	1	0	1

As a decrementing counter.

3.61

1.

S1	S0	X	Z	S1'	S0'
0	0	0	1	0	0
0	0	1	1	0	1
0	1	0	0	1	0
0	1	1	0	0	0
1	0	0	0	0	1
1	0	1	0	1	0
1	1	0	0	0	0
1	1	1	0	0	0

0.11

X=0   X=1

1.00   X=0

X=1   X=1

0.01

X=0   X=0

0.10   X=1

4.1

- Memory: storing information for processing

- Processing Unit: processing information such as computing

- Input and Output: input and output information

- Control Unit: controling the processing

4.3

It literally means the counter of the program, which hints that it is the manager of the programs. But in fact, the program counter contains the address of the next instruction of the program(it is like the PC points the instruction), so the instruction pointer may be more insightful.

4.8

1. $\log_2 256 = 8$ bits

2. $\log_2 128 = 7$ bits

3. 32-7-8=17 bits

   For the unsigned number, it would be 2^{17}

   For the 2's complement number, it would be 2^{16}

4.10

	Fetch Instruction	Decode	Evaluate Address	Fetch Data	Execute	Store Result
PC	0001,0110,1100				1100	
IR	0001,0110,1100					
MAR	0001,0110,1100			0110		
MDR	0001,0110,1100			0110		