1)

Memory Device	Performance (Disk space)	Cost (USD)	Performance/Cost (GB/USD)
Samsung 860 EVO SSD	1 TB / 1000 GB	149.99	6.67
SanDisk Cruzer CZ36 Flash	64 GB	10.67	5.99
SONY 100CDQ80SP CD-R 100 Pack	70000 MB (700 MB each) / 70 GB	17.71	3.95
CORSAIR Vengeance DDR4 b3200MHz RAM	16 GB	114.99	0.139
WD Blue	1 TB / 1000 GB	49.99	20
Maxwell 3.5 HD 10-Pack Floppy Disk	14.4 MB (1.44 MB each) / 0.0144 GB	21.04	0.000684
Seagate FireCuda SSHD	2 TB / 2000 GB	95.99	20.84
Toshiba External Hard Drive USB 3.0	2 TB / 2000 GB	61.99	32.26
SanDisk Ultra MicroSDXC U1	256 GB	37.99	6.74
Samsung MicroSD EVO U3	128 GB	20.99	6.09

When strictly talking about storage per dollar, RAM and floppy disks performed the worst. However, this does not consider information like write or read speed.

2)

1.

Qy/SR	00	01	10	11
00	11	01	10	11
01	11	01	10	01
10	11	01	10	10
11	11	01	10	00
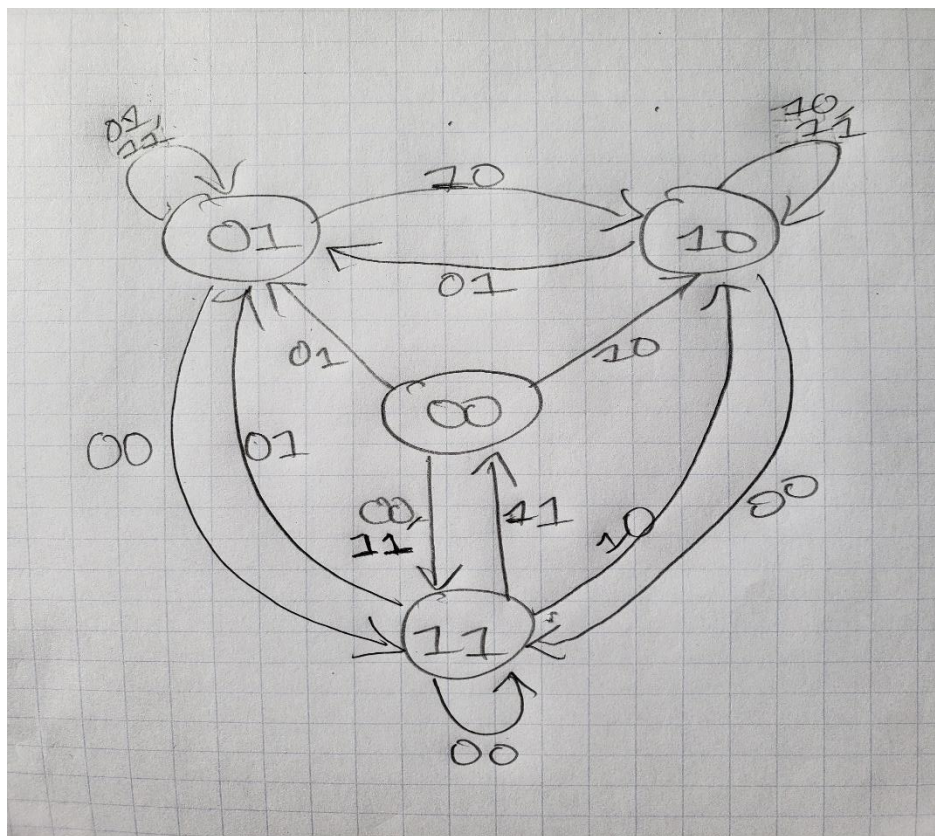
Characteristic expression:

SR = 00: (Q, y) = (1, 1)

SR = 01: (Q, y) = (0, 1)

SR = 10: (Q, y) = (1, 0)

SR = 11: (Q, y) = (0, 0), (1, 1)

State table

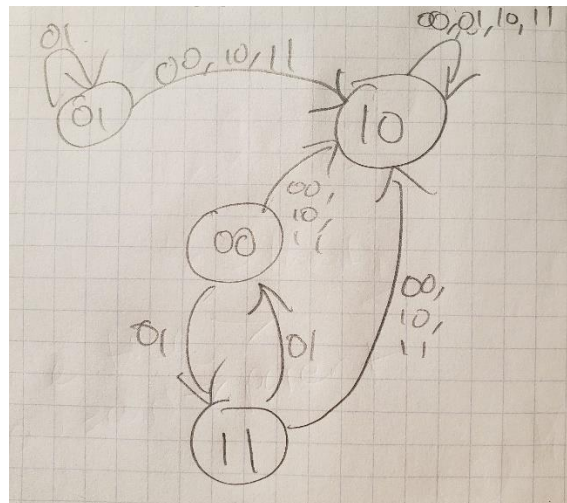| PS Q(t) \Inputs SR	00	01	10	11
0	x	0	1	0
1	x	0	1	1

$Q(t + 1) = S(t)R'(t) + S(t)Q(t)$

2. If we change one NOR gate to a NAND gate, we get the following state table:

(S connects to the NOR gate and R to the NAND gate)

S	R	Qt	yt	Qt	yt	Qt	yt	Qt	yt
0	0	0	0	1	1	1	0	1	0
0	0	0	1	1	1	1	0	1	0
0	0	1	0	1	0	1	0	1	0
0	0	1	1	1	0	1	0	1	0
0	1	0	0	1	1	0	0	1	1
0	1	0	1	0	1	0	1	0	1
0	1	1	0	1	0	1	0	1	0
0	1	1	1	0	0	1	1	0	0
1	0	0	0	1	0	1	0	1	0
1	0	0	1	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	1	1	0	1	0	1	0
1	1	0	0	1	0	1	0	1	0
1	1	0	1	0	0	1	0	1	0
1	1	1	0	1	0	1	0	1	0
1	1	1	1	0	0	1	0	1	0

Qy/SR	00	01	10	11
00	10	11	10	10
01	10	01	10	10
10	10	10	10	10
11	10	00	10	10

All our inputs result in 10 besides 0111, 0101, and 0100.

Characteristic Expression:
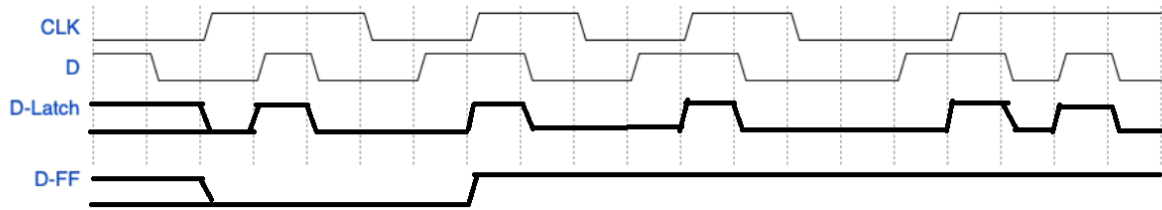
SR = 00: (Q, y) = (1, 0)

SR = 01: (Q, y) = (0, 0), (1, 1)
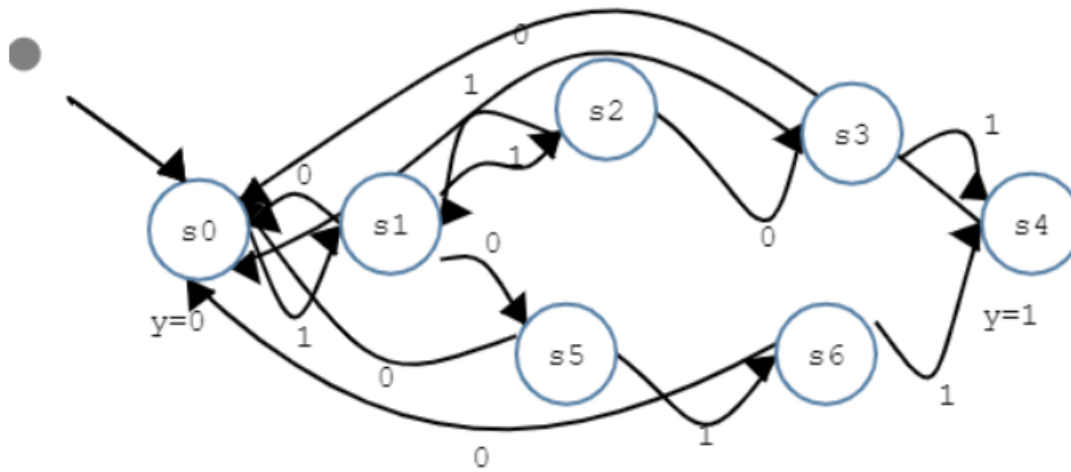
SR = 10: (Q, y) = (1, 0)

SR = 11: (Q, y) = (1, 0)

PS Q(t) \Inputs SR	00	01	10	11
0	1	0	1	X
1	1	1	1	X

$Q(t + 1) = Q(t) + S(t) + S'(t)R'(t)$

3)

4)

S(t)	0	1
S0	S0, 0	S1, 0
S1	S5, 0	S2, 0
S2	S3, 0	S1, 0
S3	S0, 0	S4, 1
S4	S0, 0	S0, 0
S5	S0, 0	S6, 0
S6	S0, 0	S4, 1

5)

State Table:

Id	Q1(t)	Q0(t)	X(t)	Q1(t+1)	Q0(t+1)	D1	D0
0	0	0	0	1	1	1	1
1	0	0	1	1	0	1	0
2	0	1	0	1	1	1	1
3	0	1	1	1	0	1	0
4	1	0	0	0	1	0	1
5	1	0	1	0	1	0	1
6	1	1	0	0	0	0	0
7	1	1	1	1	0	1	0

Derivation:

D1:

X(t)\Q1(t)Q0(t)	00	01	11	10
0	1	1	0	0
1	1	1	1	0

D1 = Q1'(t) + Q0(t)X(t)

D0:

X(t)\Q1(t)Q0(t)	00	01	11	10
0	1	1	0	1
1	0	0	0	1

D0 = Q1'(t)X'(t) + Q1(t)Q0'(t)

Logic Diagram: