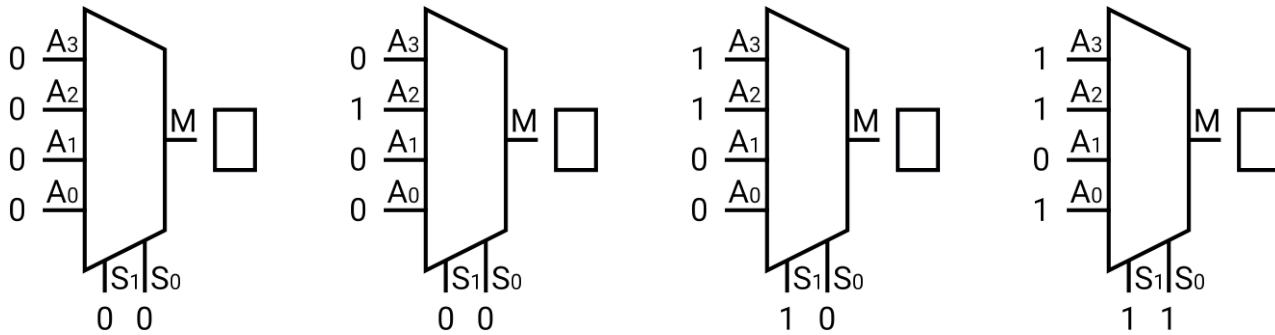a) Determine the requested output(s) of each device (the empty boxes), given the specified inputs.
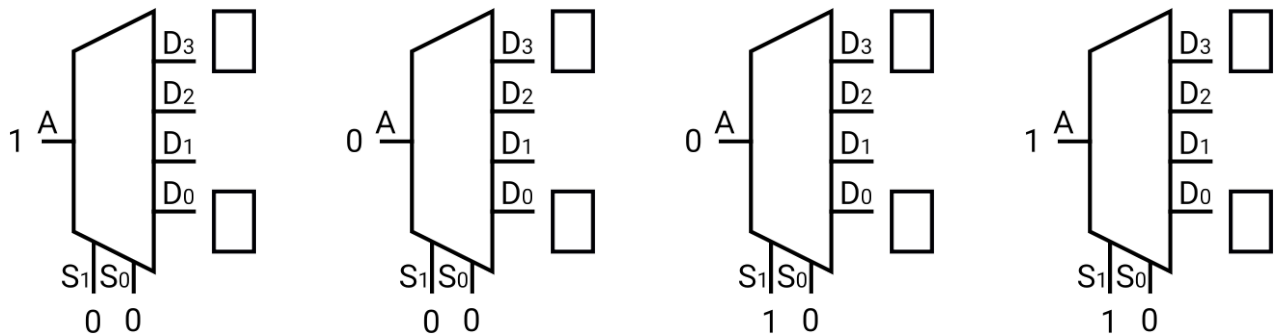
Each of these should take you no more than about 15 seconds. If it's taking longer, you should stop and think about how you (the human) should think about the behavior of these devices.
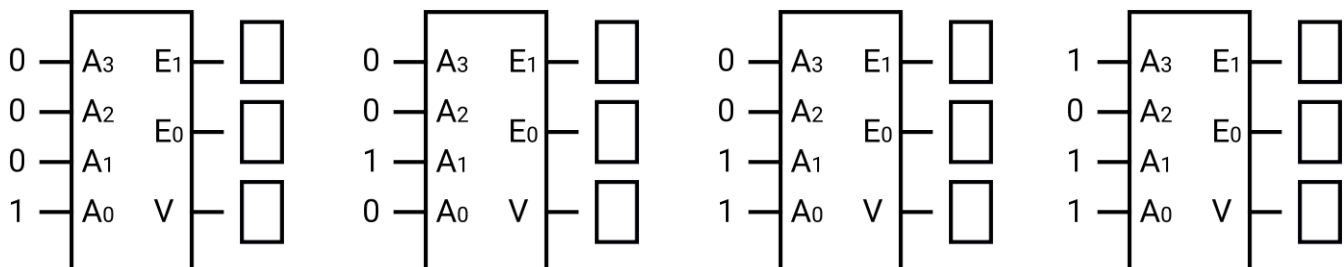
a-1)

0 A_3	0 A_3	1 A_3	1 A_3
0 A_2	1 A_2	1 A_2	1 A_2
0 A_1 M	0 A_1 M	1 A_1 M	1 A_1 M
0 A_0	0 A_0	0 A_0	0 A_0
		0	1
S_1 S_0	S_1 S_0	S_1 S_0	S_1 S_0
0 0	0 0	1 0	1 1

a-2)
The following are digital demuxes (i.e. no pass gates involved). Fill in outputs D_3 and D_0 for each.

D_3	D_3	D_3	D_3
D_2	D_2	D_2	D_2
1 A D_1	0 A D_1	0 A D_1	1 A D_1
D_0	D_0	D_0	D_0
S_1 S_0	S_1 S_0	S_1 S_0	S_1 S_0
0 0	0 0	1 0	1 0

a-3)
The following are priority encoders (with 'valid' outputs) with priority A_3 highest and A_0 lowest.

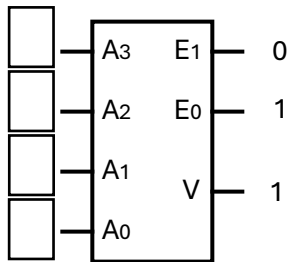|			
0 — A_3 E_1	0 — A_3 E_1	0 — A_3 E_1	1 — A_3 E_1
0 — A_2 E_0	0 — A_2 E_0	0 — A_2 E_0	0 — A_2 E_0
0 — A_1	1 — A_1	1 — A_1	1 — A_1
1 — A_0 V	0 — A_0 V	1 — A_0 V	1 — A_0 V

b) Fill in the missing values that will produce the given output. If there are multiple values that would work, list them all.

b-1)

Left MUX:
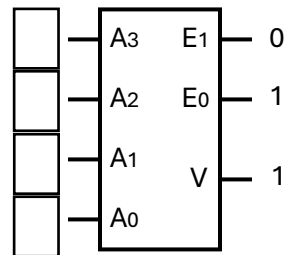1 — A3
1 — A2
0 — A1 M — 0
1 — A0
S1 S0
[ ] [ ]

Right MUX:
0 — A3
1 — A2
0 — A1 M — 0
1 — A0
S1 S0
[ ] [ ]
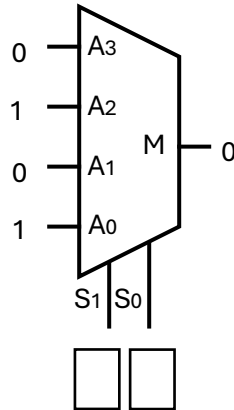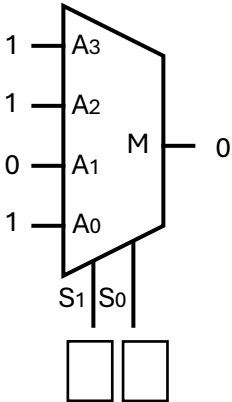
b-2)

(encoder with priority $A_3 \rightarrow A_0$)

[ ] — A3   E1 — 0
[ ] — A2   E0 — 1
[ ] — A1
[ ] — A0   V — 1

(encoder with **unknown** priority)

[ ] — A3   E1 — 0
[ ] — A2   E0 — 1
[ ] — A1
[ ] — A0   V — 1

b-3)

[ ] — D
A3 — 0
A2 — 1
A1 — 0
A0 — 0
S1 S0
[ ] [ ]