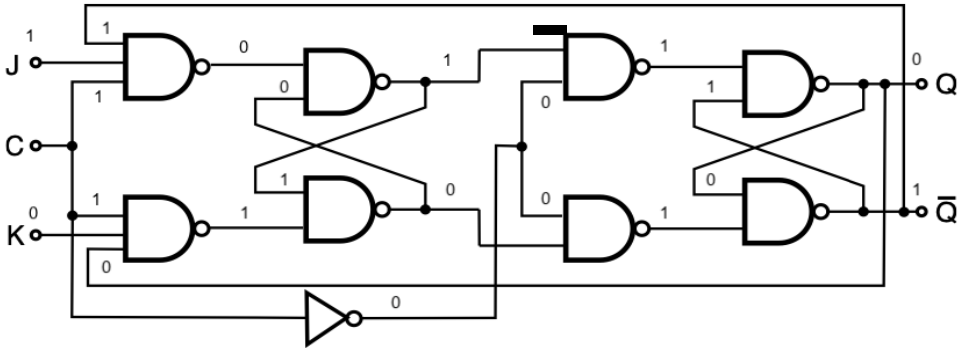
Amine Chahi
CH-232

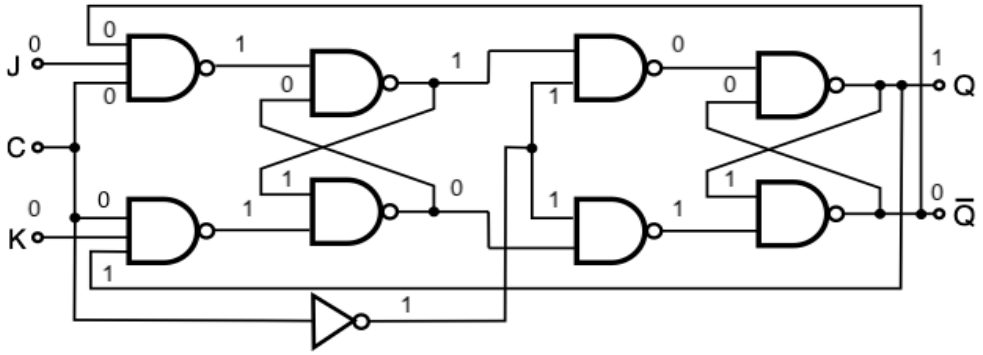
Problem Sheet #10

Problem 10.1:

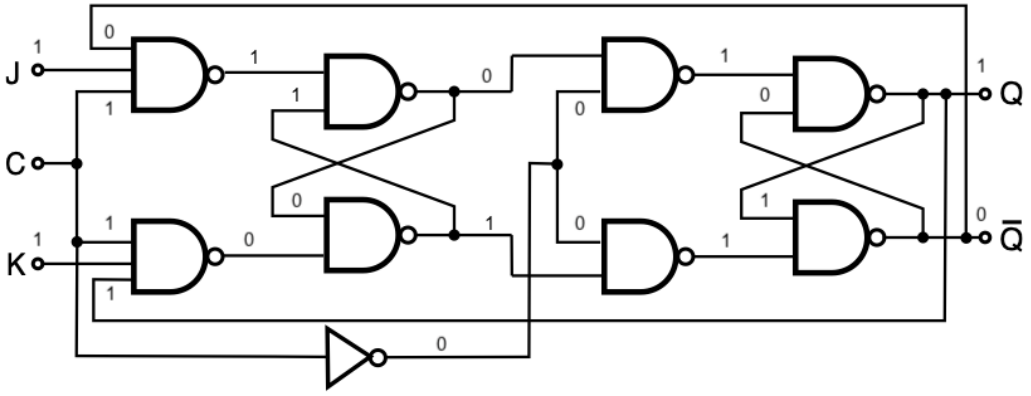
a-) We have J=1, C=1, K=0.



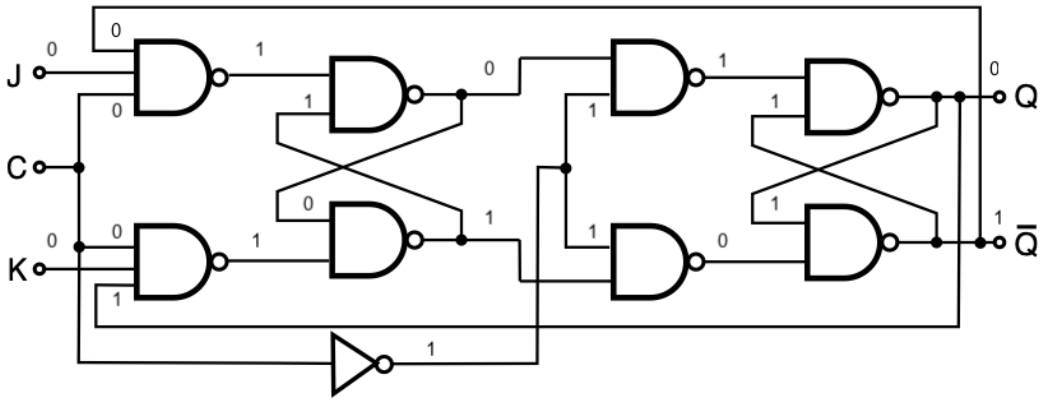
b-) We have J=0, C=0, K=0.



c-) We have J=1, C=1, K=1.



d-) We have J=0, C=0, K=0.



Amine Chahi
CH-232

Problem 10.2:

Cell	Hex	Binary	Assembler	Description
0	2e	001 0 1110	LOAD 14	acc = m[14]
1	b0	101 1 000	EQUAL #0	if acc == 0 skip
2	d4	110 1 0100	JUMP #4	pc= 4
3	e0	111 0 0000	HALT	
4	2f	001 0 1111	LOAD 15	acc = m[15]
5	6f	011 0 1111	ADD 15	acc += m[15]
6	4f	010 0 1111	STORE 15	m[15] = acc
7	2e	001 0 1110	LOAD 14	acc= m[14]
8	91	100 1 0001	SUB #1	acc −= 1
9	4e	010 0 1110	STORE 14	m[14]= acc
10	cb	110 0 1011	JUMP 11	pc= m[11]
11	00	000 0 0000	DATA 0	
12	00	000 0 0000	DATA 0	
13	00	000 0 0000	DATA 0	
14	06	000 0 0110	DATA 6	
15	01	000 0 0001	DATA 1	

a-) see table above.

b-) see table above.

c-) The value left in m[15] is 32 (0x20), the program operates as a loop where the number of iterations is stored in m[14], at each iteration the variable stored in m[15] is incremented by itself, whereas the operand stored in m[14] is decremented by 1. The loop keeps running until the operand stored in m[14] equals 0 then it halts. The program is self modifying and updates at each iteration.

d-) This would cause an additional 4 more iterations in the loop to be runned by the program (10−6 = 4), Hence the value stored in m[15] is incremented by itself four more times, resulting in a new value left in m[15] when the program halts, which is 512 (0x200).