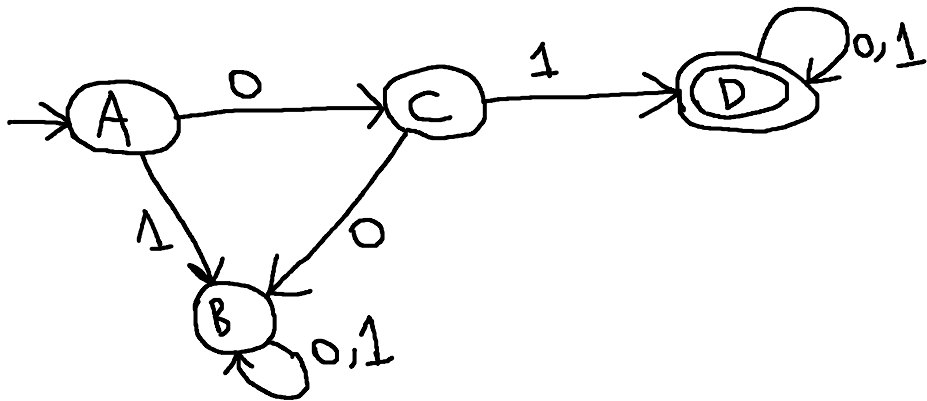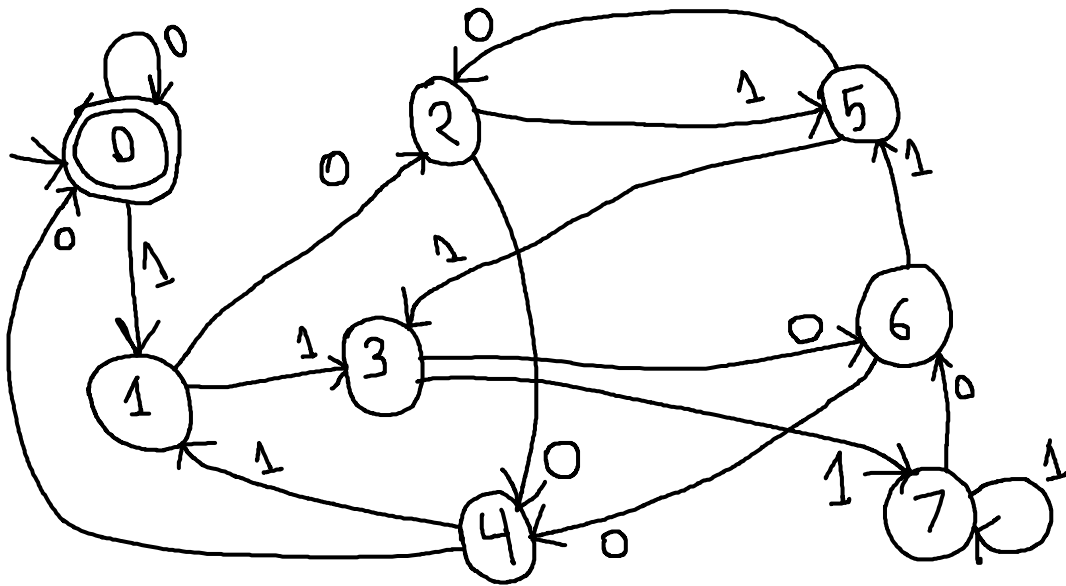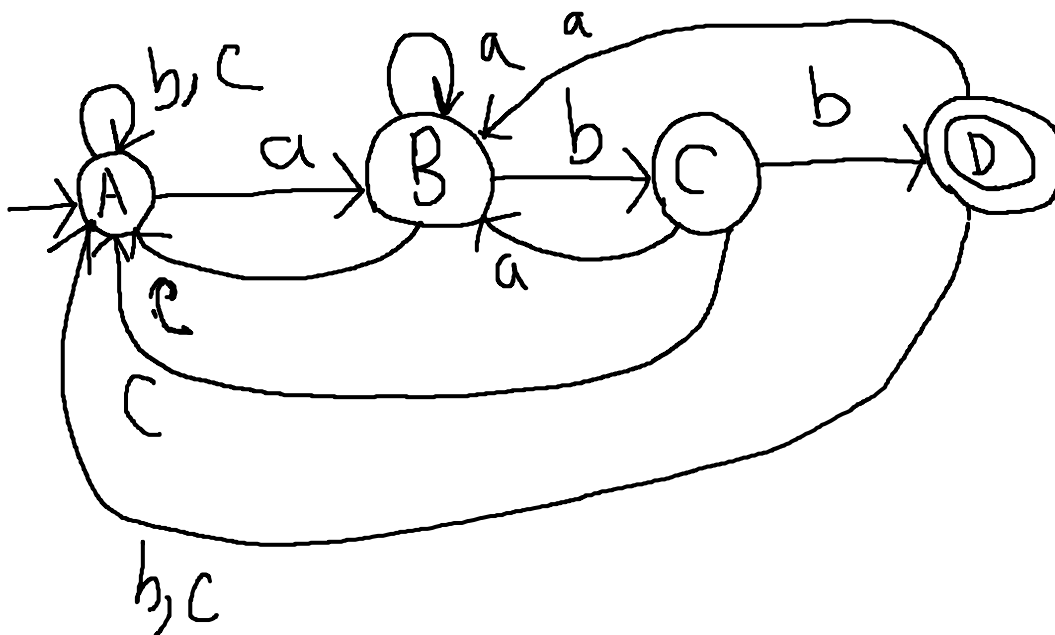1. Draw a DFA for the set of binary strings that start with **01**. ∑ = {0,1}
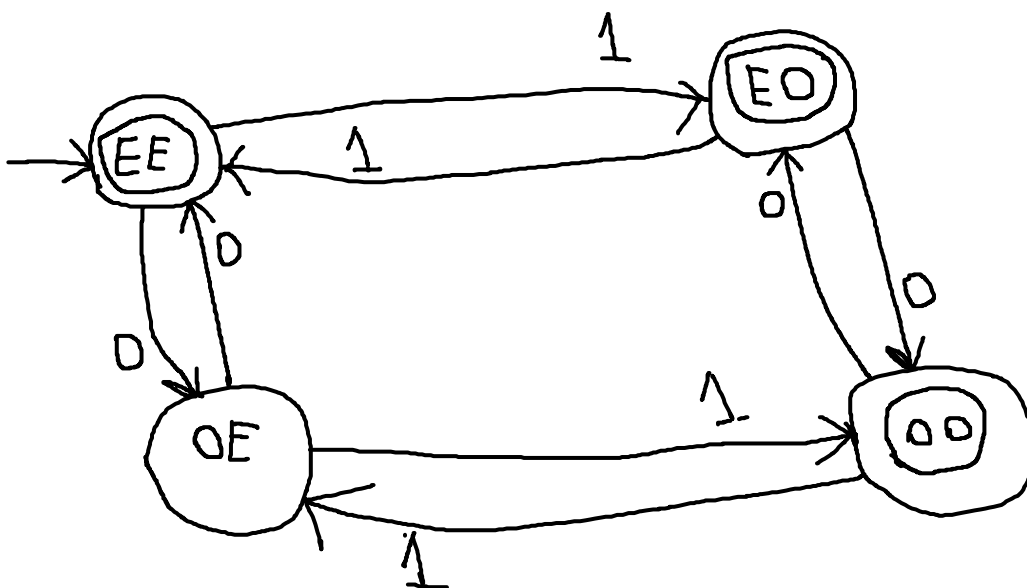

2. Draw a DFA for the set of binary strings that are divisible by 8 while considered as binary numbers. ∑ = {0,1}

3. Draw a DFA for the set of strings that end with **abb**. $\Sigma = \{a, b, c\}$

States: A (start), B, C, D (accepting)

- A: b, c → A (self loop); a → B
- B: a → B (self loop); b → C; c → A
- C: a → B; b → D; c → A
- D: a → B; b, c → A

4. Draw a DFA for the set of binary strings that have an even number of **0**'s or an odd number of **1**'s. $\Sigma = \{0,1\}$

States: EE (start, accepting), EO (accepting), OE (accepting), OO (accepting)

- EE: 1 → EO; 0 → OE
- EO: 1 → EE; 0 → OO
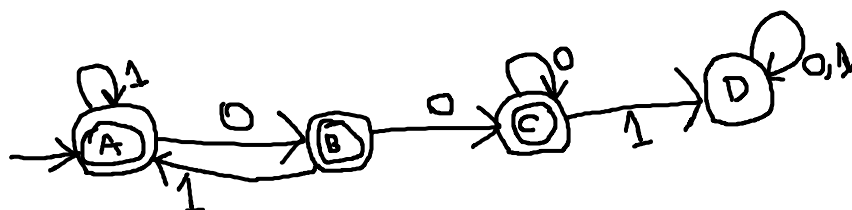- OE: 0 → EE; 1 → OO
- OO: 0 → EO; 1 → OE

5. Draw a DFA for the set of strings that have **011** as a substring and **001** as not a substring.
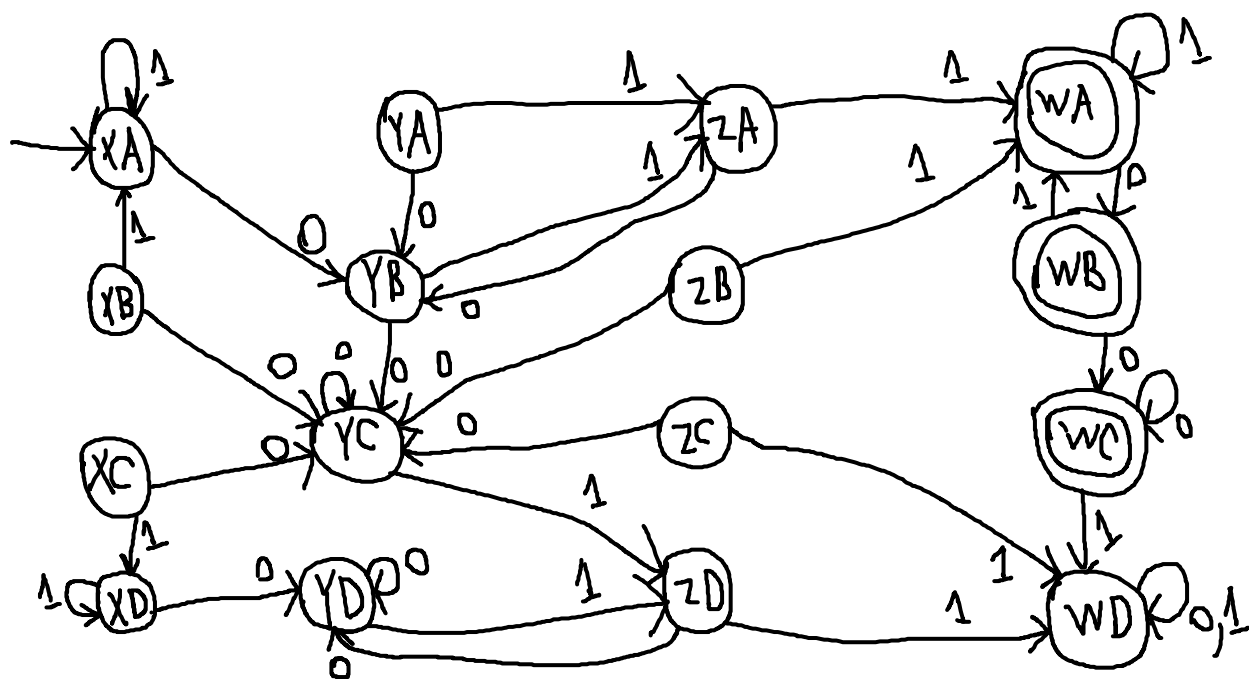 $\Sigma = \{0,1\}$

DFA for 011 as a Substring
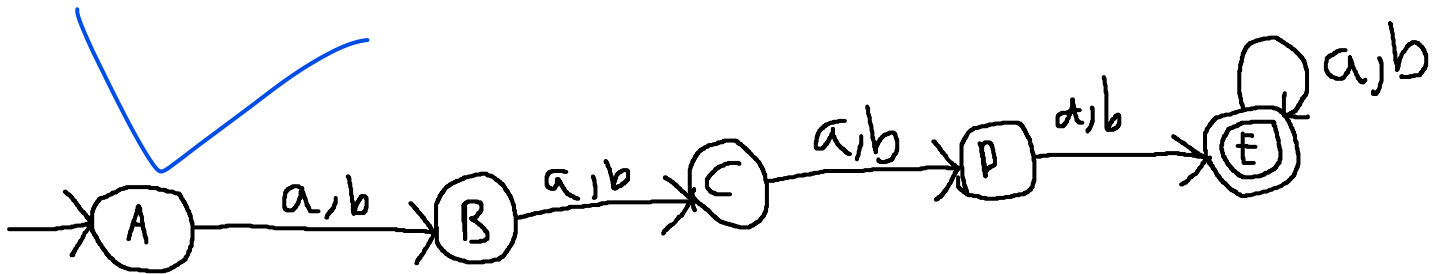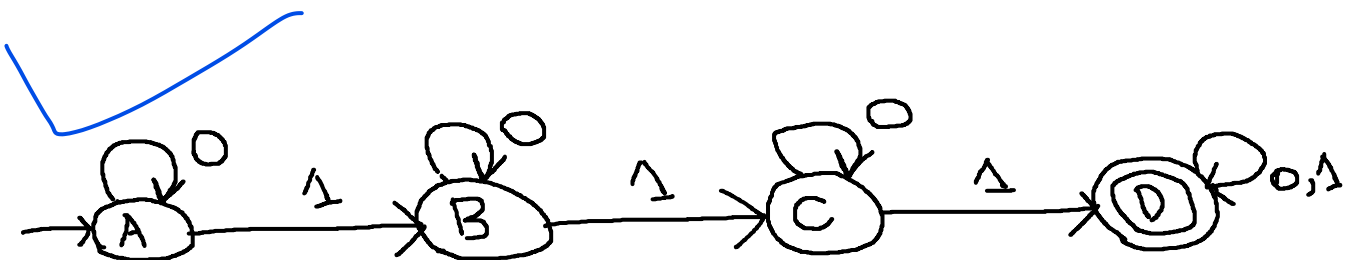

DFA for 001 as not a substring
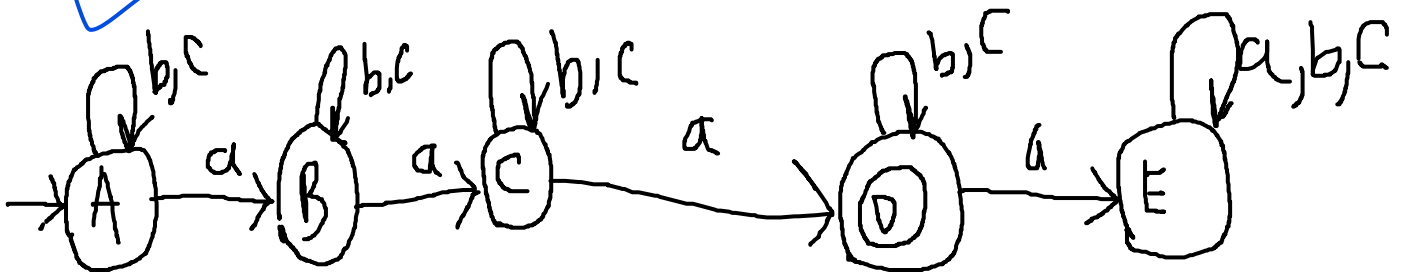

Cross Product of the two DFA

6. Draw a DFA for the set of strings that have a length of at least **4**. Σ = {a, b}
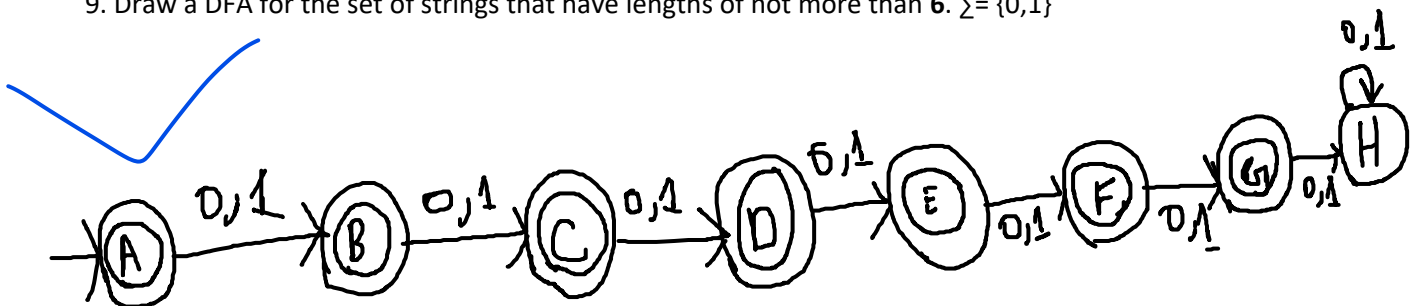
A --a,b--> B --a,b--> C --a,b--> D --a,b--> E (E has self-loop a,b)

7. Draw a DFA for the set of binary strings that contain at least three **1**'s. Σ = {0,1}

A (self-loop 0) --1--> B (self-loop 0) --1--> C (self-loop 0) --1--> D (self-loop 0,1)

8. Draw a DFA for the set of strings that have exactly three **a**'s. Σ= {a, b, c}

A (self-loop b,c) --a--> B (self-loop b,c) --a--> C (self-loop b,c) --a--> D (self-loop b,c) --a--> E (self-loop a,b,c)

9. Draw a DFA for the set of strings that have lengths of not more than **6**. Σ= {0,1}

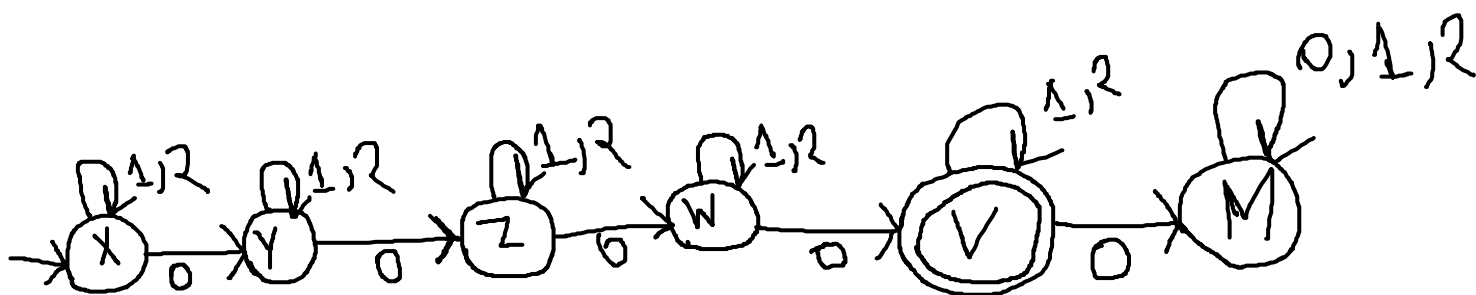A --0,1--> B --0,1--> C --0,1--> D --0,1--> E --0,1--> F --0,1--> G --0,1--> H (self-loop 0,1)

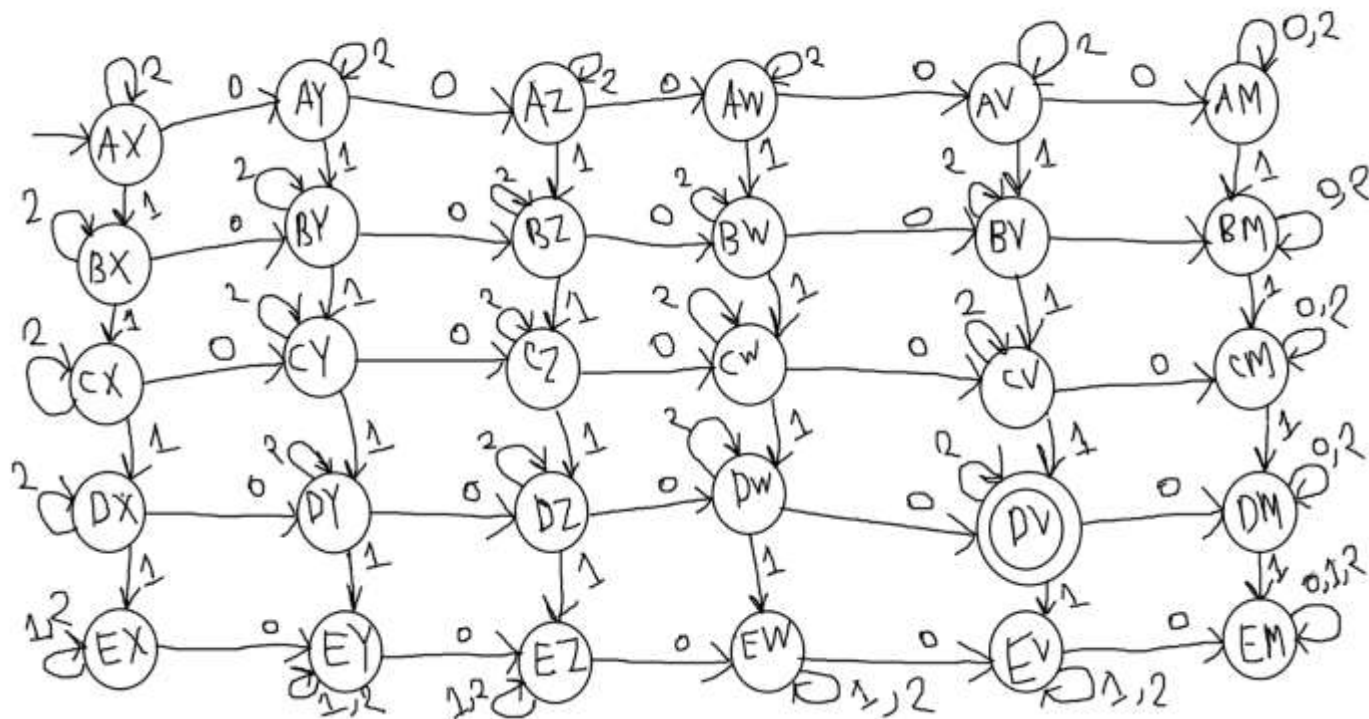10. Draw a DFA for the set of strings that have exactly three **1**'s and four **0**'s. ∑= {0,1,2}

DFA for exactly three 1

DFA for exactly four 0

Cross product of the two DFA

11. Draw a DFA for the set of strings that have **three** consecutive **1**'s. $\Sigma = \{0,1\}$

A DFA diagram:
- State A (start state) with a self-loop labeled 0
- A → B on 1
- B → A on 0
- B → C on 1
- C → A on 0
- C → D on 1
- State D (accepting) with a self-loop labeled 0,1