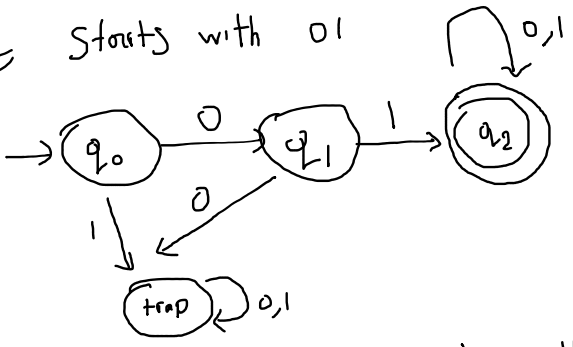
DFA Practice Sheet Solution Sec09

Tuesday, November 19, 2024 11:58 PM

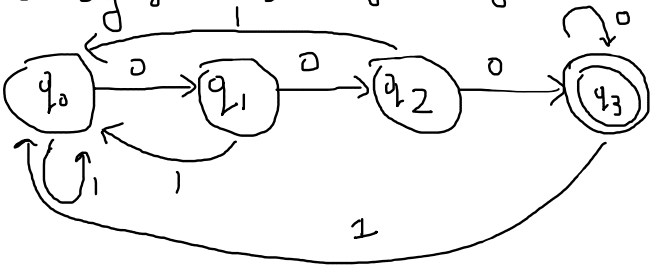
Practice Sheet - DFA

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**. ∑= {a, b, c}
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. ∑ = {0,1}
5. Draw a DFA for the set of strings that have **011** as a substring and **001** as not a substring. ∑ = {0,1}
6. Draw a DFA for the set of strings that have a length of at least **4**. ∑ = {a, b}
7. Draw a DFA for the set of binary strings that contain at least three **1**'s. ∑ = {0,1}
8. Draw a DFA for the set of strings that have exactly three **a**'s. ∑= {a, b, c}
9. Draw a DFA for the set of strings that have lengths of not more than **6**. ∑= {0,1}
10. Draw a DFA for the set of strings that have exactly three **1**'s and four **0**'s. ∑= {0,1,2}
11. Draw a DFA for the set of strings that have **three** consecutive **1**'s. ∑= {0,1}

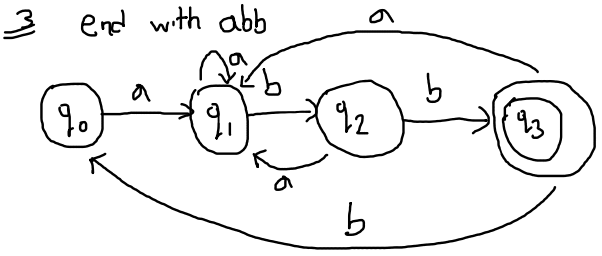
1) Starts with 01



2) div by 8 means strings ending with 000.



3) end with abb



4) even 0's or odd 1's

↳ explained in class

5) 011 as a substring & 001 as not a substring

Idea: Draw DFA for

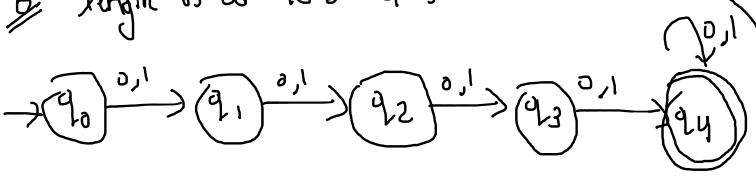
- 011 as a substring [DFA_1]
- 001 as a substring [DFA_2]

Finally draw a DFA for

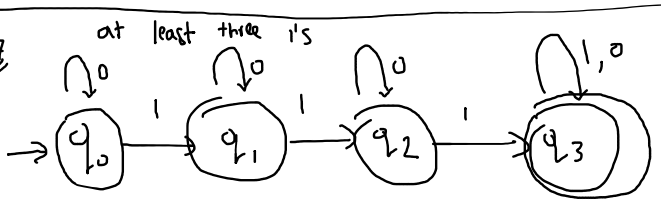
$DFA_1 - DFA_2$

i.e $DFA_1 \cap \overline{(DFA_2)}$ [use Cross Product]

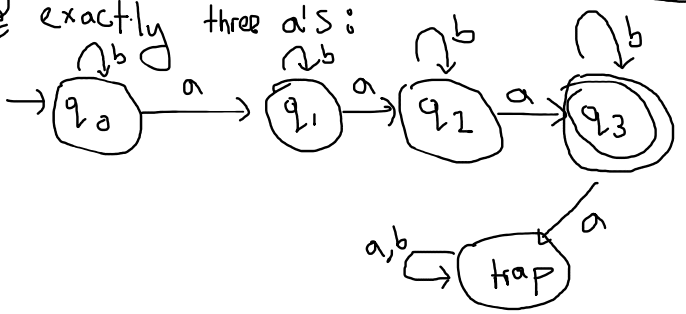
6) length of at least 4 :



7) at least three 1's

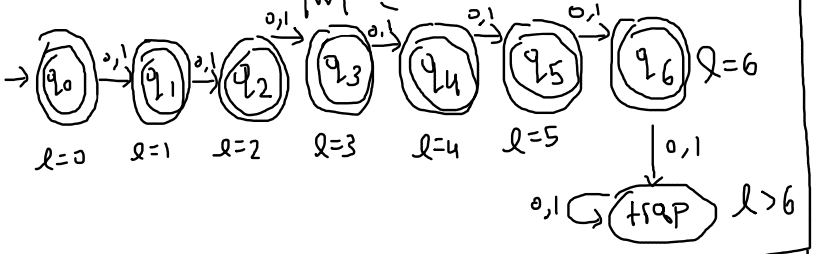


8) exactly three a's :



9) Strings of length not more than 6.

i.e $|w| \leq 6$



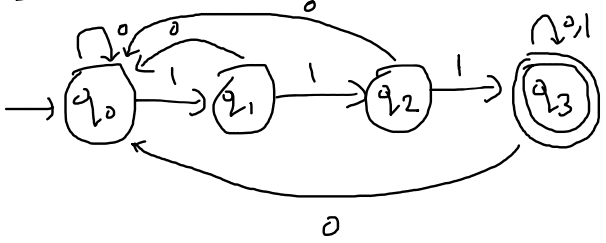
10) Strings exactly three 1's & four 0's

Idea: Draw DFA for strings :

- exactly three 1's [DFA_1]
- exactly four 0's [DFA_2]

0,1 ↺ trap $l > 6$

II three consecutive 1's



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- exactly three 1's [DFA_1]
- exactly four 0's [DFA_2]

Then draw $DFA_1 \cap DFA_2$
[Cross Product]