CSE 3064

FORMAL LANGUAGES AND AUTOMATA THEORY

HW #1

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HW-1

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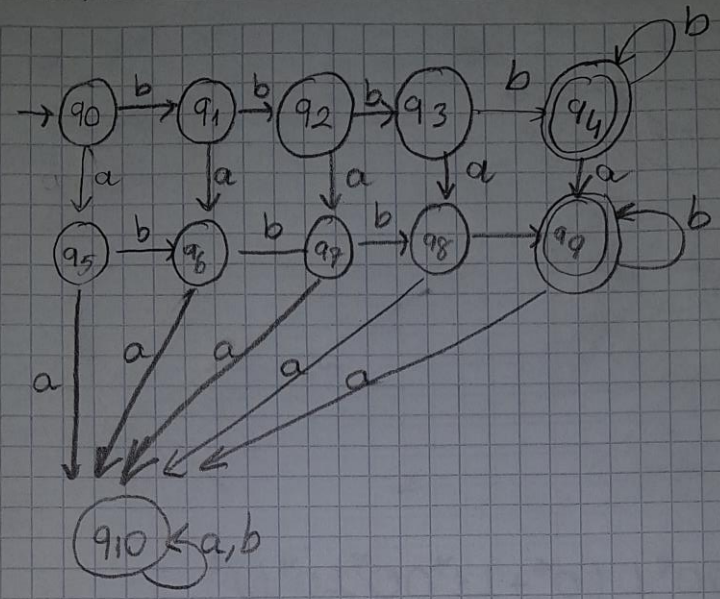
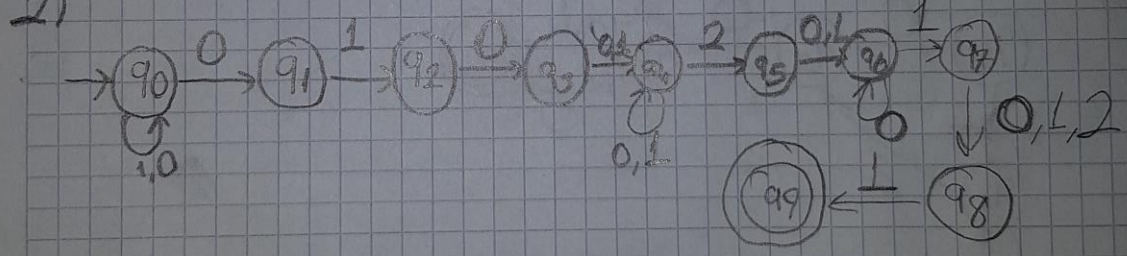
1)



2)



3) a) $L_1 - L_2 = L_1 \cap \overline{L_2}$

$\overline{L_2}$ → regular

$L_1 \cap \overline{L_2}$ → regular

So, the language is regular

b) $\underbrace{(L_2 - L_1)}_{\text{only } L_2} \cup \underbrace{(L_1 - L_2)}_{\text{only } L_1}$

only L_2 → regular

only L_1 → regular

so, the language is regular

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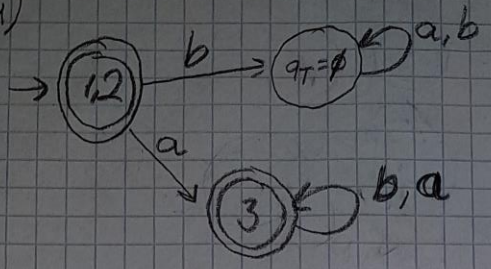
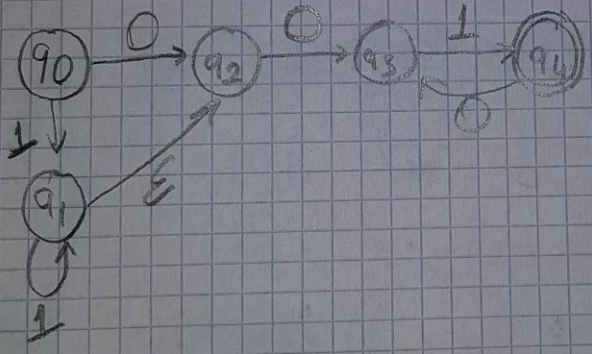
4)



5)

Solution = $1^*00^*1(0^*+11^*00^*10^*1)^*$

6)



7) If we want to compare the count of ab and ba we have to know the counts. However, count of ab or ba can not saved to anywhere. So, the language is not a regular language.

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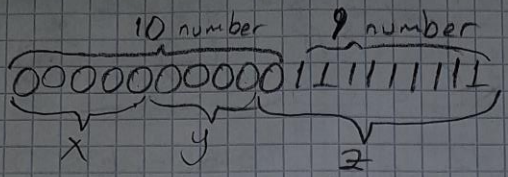
8)

Let → $0^{p+1}1^p$ → $p=9$



$xy^2z =$ 000 00000000 01111111111

- $xy^2z \notin L$
- $|y| > 0$
- $|xy| \leq p \Rightarrow 13 \leq 9 \Rightarrow$ contradiction

So, L is not regular.

9)

a.

$S \Rightarrow b, aSa, aSb, bSa, bSb$

$L = \{b, aba, abb, bba, bbb, aabaa \dots\}$

b.

$S \Rightarrow \varepsilon, 0S2, 02, 0A2$

$A \Rightarrow \varepsilon, 1A22, 122$

$L = \{\varepsilon, 02, 01222, 0012222, 0112222 \dots\}$