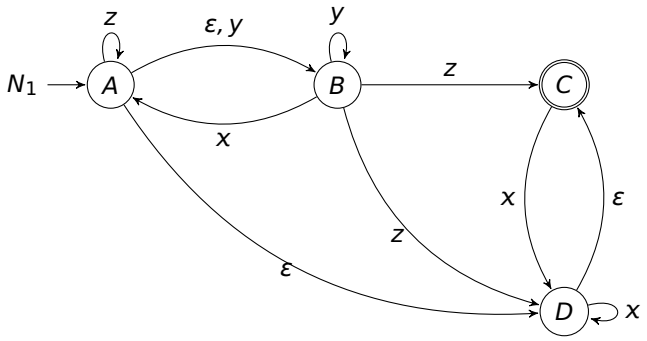
Assignment II (20 pts)

Burak Ekici

Assigned : March the 31st, 23h55
Due : April the 8th, 23h55

Q1. (15 pts) Given an NFA$_\varepsilon$ $N_1 = (\{A, B, C, D\}, \{x, y, z\}, \varepsilon, \Delta_1, \{A\}, \{C\})$ with the below state diagram

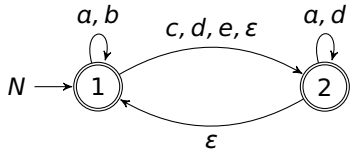


a) **(5 pts)** employ ε-elimination over N_1 to obtain an equivalent NFA $N_2 = (\{A, B, C, D\}, \{x, y, z\}, \Delta_2, \{A\}, F_2)$ with no ε-transitions. Clearly show intermediate steps.

b) **(5 pts)** apply subset construction algorithm to the NFA N_2 so as to get an equivalent DFA $D = (Q, \{x, y, z\}, \delta, s, F)$. Clearly show intermediate steps.

c) **(5 pts)** minimize the DFA D benefiting the marking algorithm. Justify your reasoning.

Q2. (5 pts) Given a NFA$_\varepsilon$ $N = (\{1, 2\}, \{a, b, c, d, e\}, \varepsilon, \Delta, \{1\}, \{1, 2\})$ with below depicted state diagram



compute the regular expression α such that $\mathcal{L}(\alpha) = \mathcal{L}(N)$ employing the algorithm (definition) given in w4.pdf, slide #18.

Important Notice:

- Collaboration is strictly and positively prohibited; lowers your score to 0 if detected.
- Any submission after 23h55 on April the 8th will NOT be accepted. Please beware and respect the deadline!
- All handwritten answers should somehow be scanned into a single pdf file, and only then submitted. Make sure that your handwriting is decent and readable.