Name: Key **CS301 F2**

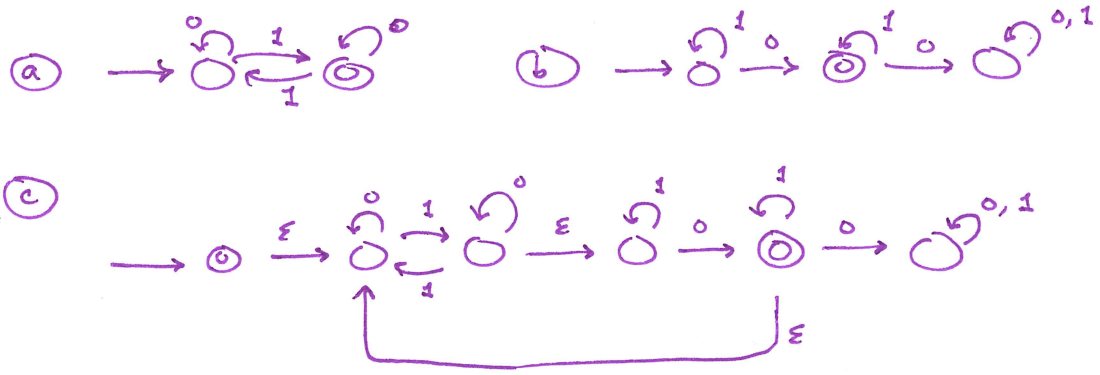
1. Consider the alphabet $\Sigma = \{0, 1\}$ and the languages

$$A_1 = \{w \mid w \text{ contains an odd number of 1s}\},$$
$$A_2 = \{w \mid w \text{ contains exactly one 0}\},$$

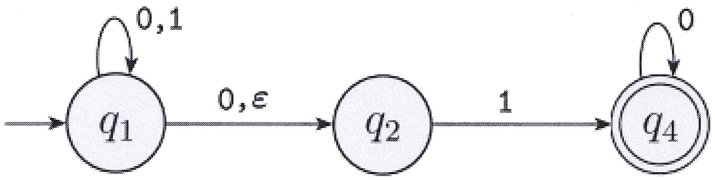
(a) **(__ /1 pt)** Create a DFA recognizing A_1.

(b) **(__ /1 pt)** Create a DFA recognizing A_2.

(c) **(__ /3 pts)** Create a NFA recognizing $(A_1 \circ A_2)^*$.



2. Consider the alphabet $\Sigma = \{0, 1\}$ and the NFA, N, given below.

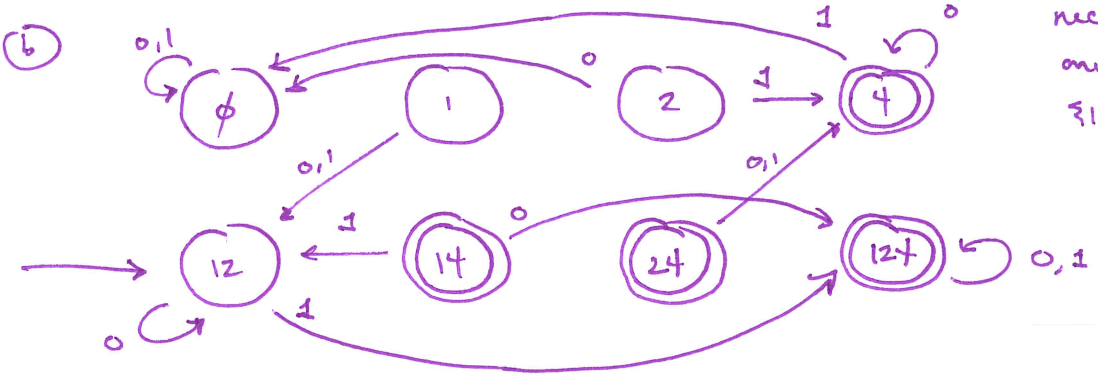


(a) **(__ /1 pt)** Describe the language recognized by N.

(b) **(__ /4 pts)** Convert N into a DFA using the state set $\mathcal{P}(Q)$, where Q is the state set of N.

(a) All binary strings containing at least one 1.

(b)



NOTE: It is not necessary to keep any nodes beyond {1,2} and {1,2,4}.