CMSC330 Spring 2016 Quiz #3

Name _____

Discussion Time (circle one) 10am   11am   12noon   1pm   2pm   3pm

Discussion TA (circle one)   Adam   Anshul   Austin   Ayman   Damien
                                  Daniel   Jason   Michael   Patrick   William

Instructions

- Do not start this quiz until you are told to do so.

- You have 15 minutes for this quiz.

- This is a closed book quiz. No notes or other aids are allowed.

- For partial credit, show all of your work and clearly indicate your answers.

1. (4 points) Write a context-free grammar for the following language. Example strings in this language include bbb, abc, and aaabbccc.

$$\mathrm{a}^n \mathrm{b}^m \mathrm{c}^n, \quad n, m \geq 0$$

Answer

$\mathrm{S} \rightarrow \mathrm{aSc} \mid \mathrm{B}$
$\mathrm{B} \rightarrow \mathrm{bB} \mid \epsilon$

2 points for $\mathrm{a}^n \mathrm{c}^n$.

2 points for b^m.

2. (6 points) Construct an NFA for the following regular expression: (ab | b)∗

Answer
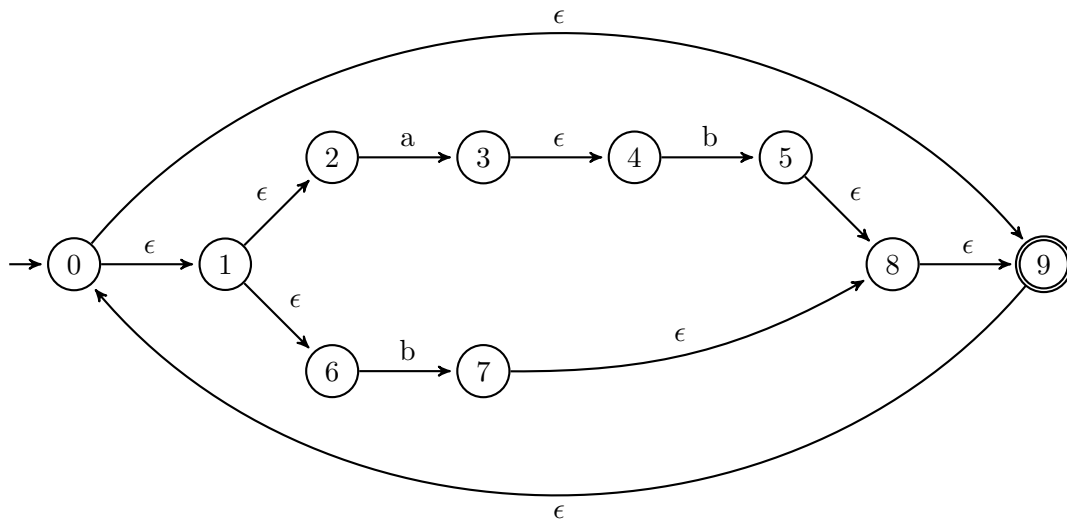
2 **points** for ab.
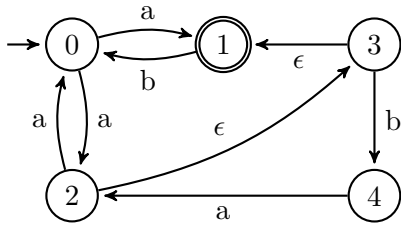
1 **point** for b.
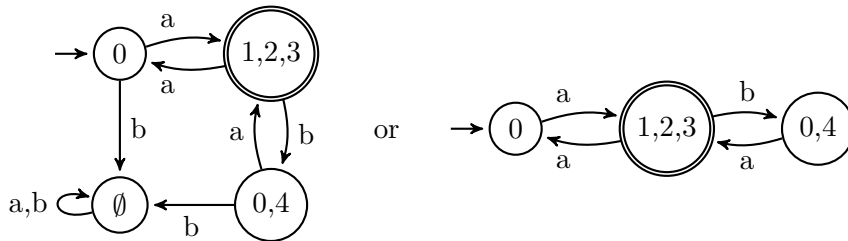
1 **point** for union.

1 **point** for kleene star.

1 **point** for correct start and end states.

Full marks if the NFA accepts the same set of strings as (ab | b)∗.

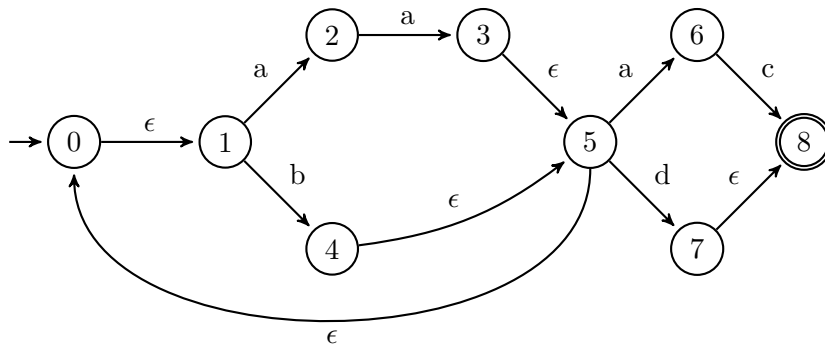3. (6 points) Convert the following NFA to an equivalent DFA.

Answer

1 point for each numbered state.

1 point for having one start and at least one accepting state.

2 points for correct edges.

Full marks if the DFA accepts the same set of strings as the one above.

4. (4 points) Circle "Accept" if the NFA accepts the given string. Circle "Reject" otherwise.

aaaaac	Accept	Reject
ac	Accept	Reject
bbbd	Accept	Reject
aaaac	Accept	Reject

Answer

aaaaac	Accept	Reject
ac	Accept	Reject
bbbd	Accept	Reject
aaaac	Accept	Reject

1 point for each correct answer.