

# University of Asia Pacific

## Department of Computer Science & Engineering

### Mid-Semester Examination Spring -2021

#### Program: B. Sc. Engineering (3<sup>rd</sup> Year/1<sup>st</sup> Semester)

Course Title: Theory of Computation

Course No. CSE 307

Credit: 3.00

Time: 1.00 Hour.

Full Mark: 60

There are **Four** Questions. **Answer questions 1, 4 and (2 or 3).** All questions are of equal value/Figures in the right margin indicate marks.

- 1.a) Why NFA is easier to design than DFA? Explain. 6
- b) Let  $\Sigma = \{\text{the letters/symbols of your own name}\}$  14
- Suppose you want to construct the following language:
- “The set of all strings that accept any string of *your last name length* but will not accept your last name as a string.”
- Draw a corresponding NFA.
2. Suppose my name is ‘abdul baten’. I use the first letter from both first name and last name in the below figures. Use **first** letters of your **own name (first name and last name)** in the figure(s), draw it in your script and then: 6
- i) Find out the  $\epsilon$ -closure for each state. (Figure 1) +
- ii) Find the equivalent states and minimized DFA (Using the procedure of Table of state inequivalences). (Figure 2) 14

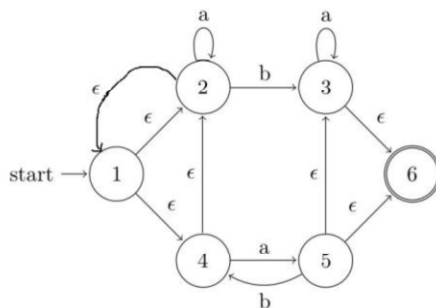


Figure 1

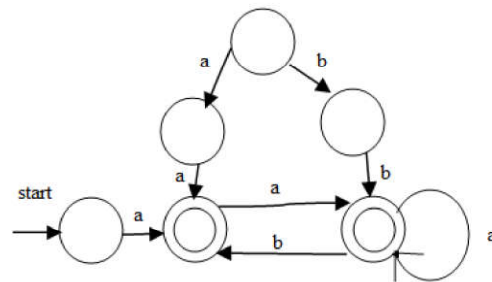


Figure 2

3. Suppose my name is 'abdul baten'. I use the first letter from both first name and last name in the below figures. Use **first** letters of your **own name (first name and last name)** in the figure(s), draw it in your script and then: 6  
+  
14

- Find out the  $\epsilon$ -closure for each state. (Figure 1)
- Find the equivalent states and minimized DFA (Using the procedure of Table of state inequivalences). (Figure 2)

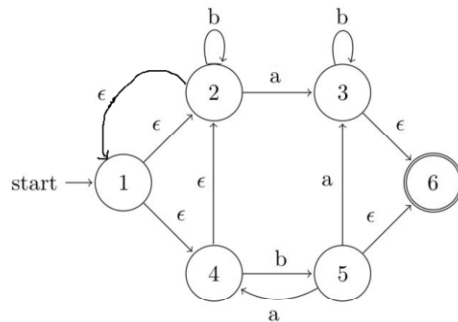


Figure 1

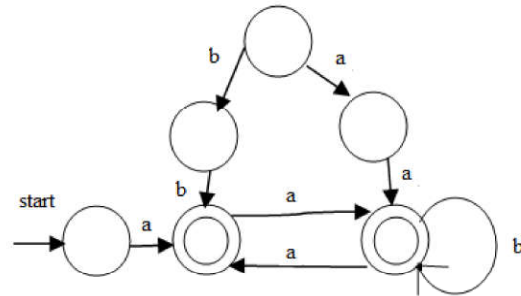


Figure 2

- 4.a) Write a regular expression for a website. Rules are given below: 10

- May start with:(https://www, https://, www) or may not present.
- If prefix is www then there will be dot (.) otherwise not.
- Followed by website name at least (length of your first name) alphanumeric characters and at most (length of your full name) alphanumeric characters.
- Then there will be dot (.).
- Ending domain names are: (com, org, net, int, edu, gov, mil).

- b) Draw the Finite Automata for the following regular expression: 10

- $\Sigma = \{p, q\}$ , RE =  $q(p+q)^*$
- $\Sigma = \{a, b\}$ , RE =  $ab^+(ab+b)$