

## CS 3342 – Homework #2 (100 points)

Due Date: February 27, 2022 (Sunday) - 11:59pm

### Converting Regular Expressions to NFA/DFA

#### Part one: (50 points)

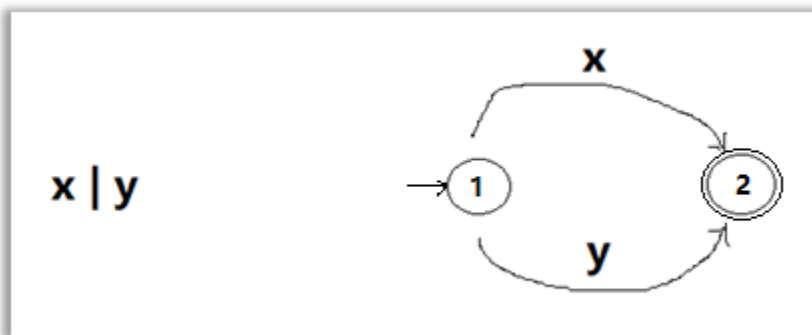
Convert the following regular expressions to NFA/DFA. Draw the new NFA/DFA and place them in a Word Doc.

1.  $(a|b)cd^*$
2.  $a(bc)^*d$
3.  $(a|b)^*(abb|a+b)$

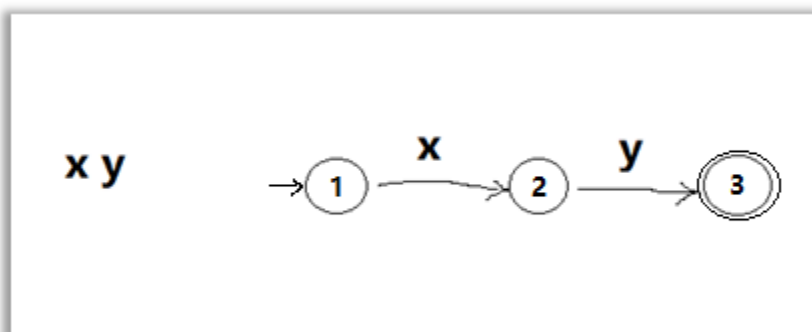
The following are simple examples from the lecture slides.

Regular Expression to NFA/DFA:

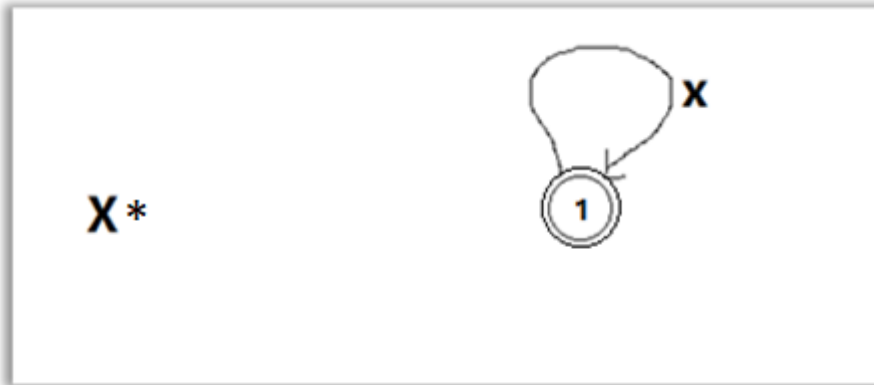
1.



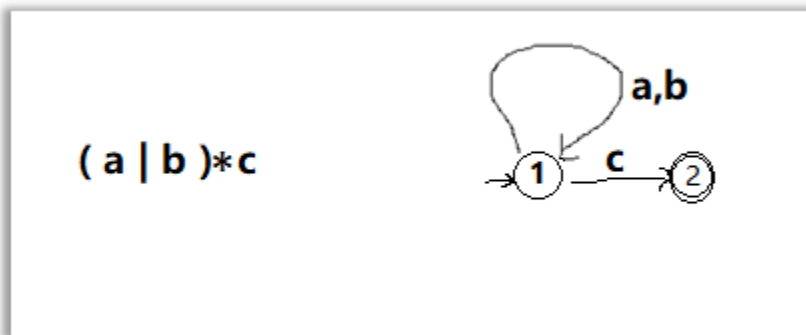
2.



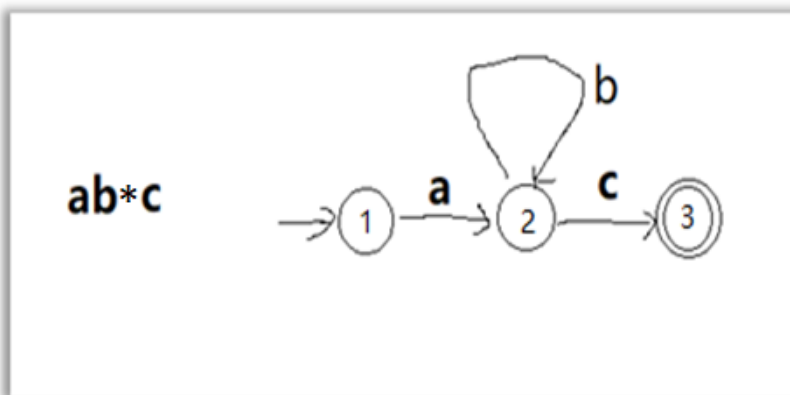
3.



4.



5.



Sample code:  
string function1()

```

{
    string str = "";
    c = NextChar();
    if (c == 'a')
    {
        str = str + c;
        c = NextChar();
        while (c == 'b')
        {
            str = str + c;
            c = NextChar();
        }
        if (c == 'c')
        {
            str = str + c;
            return str;
        }
    }
    return error;
}

```

## Part Two: (50 points)

Write the corresponding code in Java without using 'java.util.regex' to recognize the following regular expressions.

1. (a|b)cd\*
2. a(bc)\*d

The Java program should read an input file and try to find the lexemes/tokens that match the REs. The content in the input file looks like this:

```

abc acdd abcbcd ac bcddd ad
abbbbbbc acddddddd abcbcbcbcd

```

A sample program and a sample input file will be given to you on Canvas. The output of the program should be like the following. The sample program is written for RE: ab\*c.

```

This is line 1 : abc acdd abcbcd ac bcddd ad
***** This is for RE - ab*c
Input string is : abc
    From main : Pattern found - abc
Input string is : acdd
    From main : Reject - acdd
Input string is : abcbcd

```

```

    From main : Reject - abcbcd
Input string is : ac
    From main : Pattern found - ac
Input string is : bcddd
    From main : Reject - bcddd
Input string is : ad
    From main : Reject - ad
This is line 2 : abbbbbb bcaccccccccc abcbcbcbcd
***** This is for RE - ab*c
Input string is : abbbbbb bc
    From main : Pattern found - abbbbbb bc
Input string is : accccccccc
    From main : Reject - accccccccc
Input string is : abcbcbcbcd
    From main : Reject - abcbcbcbcd

```

You need to modify the program or write your own program to accept or reject the input strings with the two REs below:

1.  $(a|b)cd^*$
2.  $a(bc)^*d$

Your output should look like the following:

```

This is line 1 : abc acdd abcbcd ac bcddd ad
***** This is for the first RE - (a|b)cd*
RE is : (a|b)cd* & input string is : abc
    From main : Reject - abc
RE is : (a|b)cd* & input string is : acdd
    From main : Accept - acdd
RE is : (a|b)cd* & input string is : abcbcd
    From main : Reject - abcbcd
RE is : (a|b)cd* & input string is : ac
    From main : Accept - ac
RE is : (a|b)cd* & input string is : bcddd
    From main : Accept - bcddd
RE is : (a|b)cd* & input string is : ad
    From main : Reject - ad
***** This is for the second RE - a(bc)*d
RE is : a(bc)*d & input string is : abc
    From main : Reject - abc
RE is : a(bc)*d & input string is : acdd
    From main : Reject - acdd
RE is : a(bc)*d & input string is : abcbcd

```

From main : Accept - abcbcd  
RE is : a(bc)\*d & input string is : ac  
From main : Reject - ac  
RE is : a(bc)\*d & input string is : bcddd  
From main : Reject - bcddd  
RE is : a(bc)\*d & input string is : ad  
From main : Accept - ad  
This is line 2 : abbbbbb acdddddd abcbcbcbcd  
\*\*\*\*\* This is for the first RE - (a|b)cd\*  
RE is : (a|b)cd\* & input string is : abbbbbb  
From main : Reject - abbbbbb  
RE is : (a|b)cd\* & input string is : acdddddd  
From main : Accept - acdddddd  
RE is : (a|b)cd\* & input string is : abcbcbcbcd  
From main : Reject - abcbcbcbcd  
\*\*\*\*\* This is for the second RE - a(bc)\*d  
RE is : a(bc)\*d & input string is : abbbbbb  
From main : Reject - abbbbbb  
RE is : a(bc)\*d & input string is : acdddddd  
From main : Reject - acdddddd  
RE is : a(bc)\*d & input string is : abcbcbcbcd  
From main : Accept - abcbcbcbcd

Take a screen shot of your output and put it in a Word doc. **Please do not zip the Word Doc.** Zip the source file. Submit the word document and the source file separately to Canvas.

You can put the answers for part A and the output for part B in the same word document.