Homework 2

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1 Regular Expressions

1.1 Question 1.1

Write a regular expression for a language that describe all strings of lowercase letters that contains the five vowels (a, e, i, o, u) in order, and exactly one time. For example, a valid string is "s a b e g g i o n m b u w v v l".

[^aeiou]* a[^aeiou]* e[^aeiou]* i[^aeiou]* o[^aeiou]* u[^aeiou]*

1.2 Question 1.2

Describe informally the kind of pattern that matches the following extended regular expression: [b-d]a?e+ and rewrite it using only the basic (not extended) features of formal regular expressions.

a? means that we should do (ϵ|a)

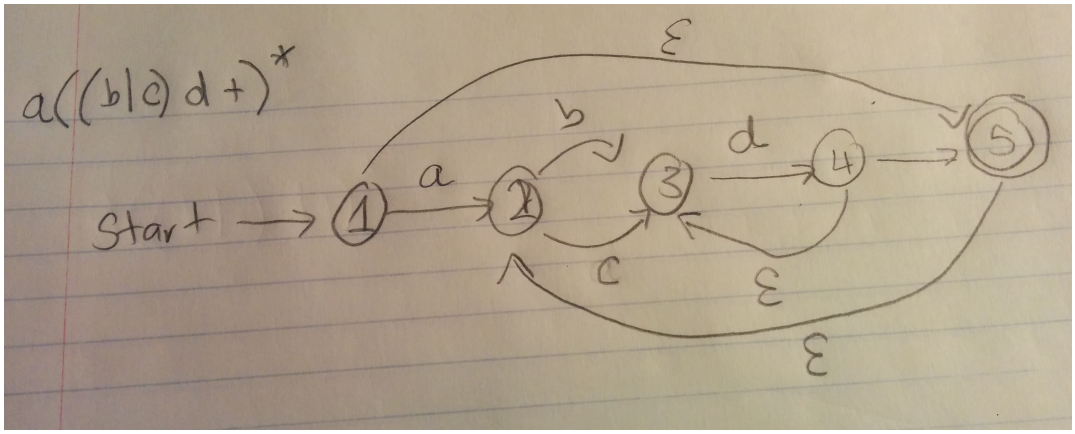
e+ means that we do (e)(e)* where * means 0 or more.

(b|c|d)(ϵ|a)(e)(e)*

2 Finite State Automata

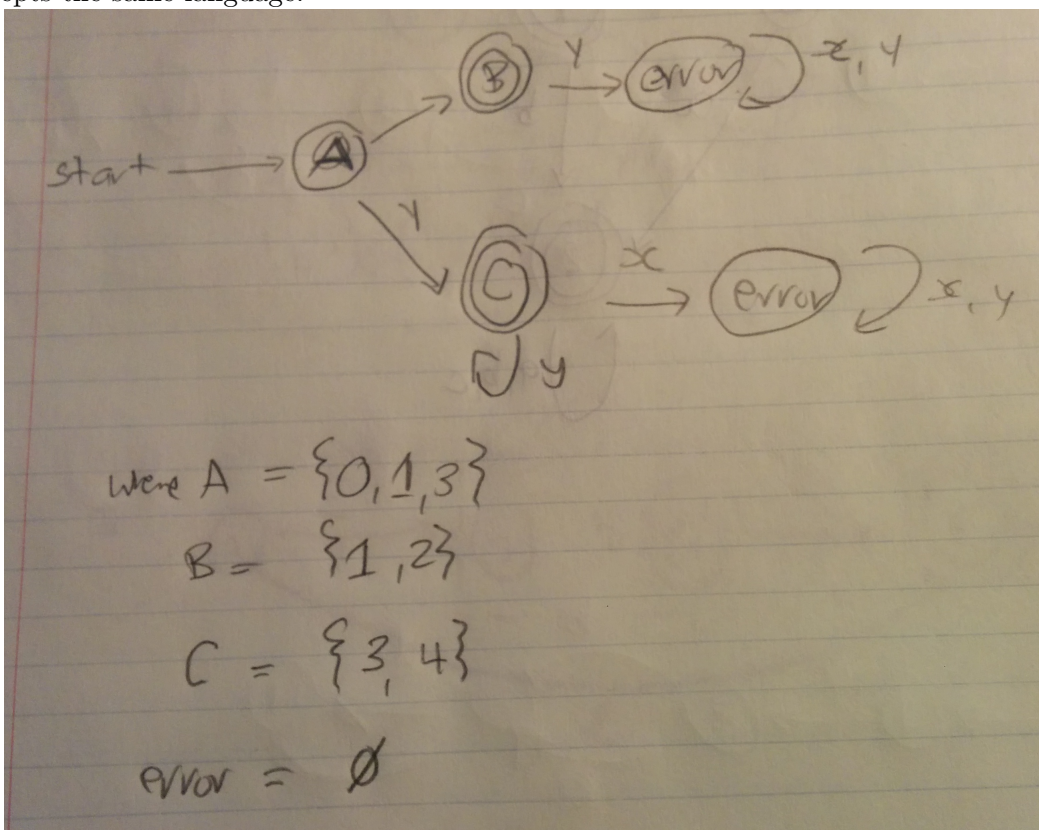
2.1 Question 2.1

Show an NFA as a transition diagram that recognizes/accepts the same language.



2.2 Question 2.2

Describe informally the kind of strings that is accepted by this NFA, and show a DFA that accepts the same language.



2.3 Question 2.3

Describe informally the kind of strings that is accepted by this DFA, and show a regular expression that accepts the same language.

A type of phrase that would fit here would be: ‘cbc’, ‘cacba’

c (0 or more) then b, a or c (0 or more) OR a or b then a or c (0 or more) then b then a or b or c (0 or more)

This ends on both 1 or 2. So we have to take this into account

regular expression: c*(b(a|c)* | (a|b(a|c)*b (a|b|c)*))

3 Regular Expressions

Running celsius := 20; fahrenheit := celsius * 1.8 + 32; on hacs gives:

```
LDF T , #20
STF celsius , T
LDF T_1 , celsius
LDF T_2 , #1.8
MULF T_1_31 , T_1 , T_2
LDF T_2_88 , #32
ADDF T_82 , T_1_31 , T_2_88
STF fahrenheit , T_82
```