

Homework 1 - Regular expressions / DFAs

Question 1

(a)

- (i) **Can be generated:** axy, aaxy **Cannot be generated:** ayx, axay
- (ii) **English description:** Any number of repetitions of 'a' or 'xy' in any order, including the empty string.

(b)

- (i) **Can be generated:** bozo, bozozo **Cannot be generated:** bzoo, boozzo
- (ii) **English description:** Strings start with a 'b', followed by one or more 'oz', and end with an 'o'.

(c)

- (i) **Can be generated:** 01, 0101 **Cannot be generated:** 10, 0110
- (ii) **English description:** Any number of repetitions of '01' or '1' in any order, including the empty string.

Question 2

(a)

$(a|b)^*a(a|b)^*a(a|b)^*a(a|b)^*$

(b)

$(a|bb)^*$

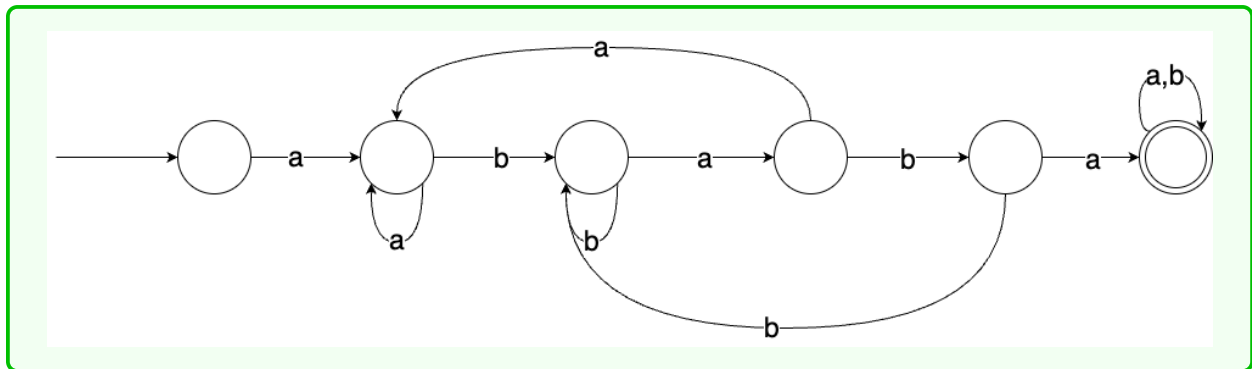
(c)

$[\text{^\aeiou}]^*a[\text{^\aeiou}]^*e[\text{^\aeiou}]^*i[\text{^\aeiou}]^*o[\text{^\aeiou}]^*u[\text{^\aeiou}]^*$

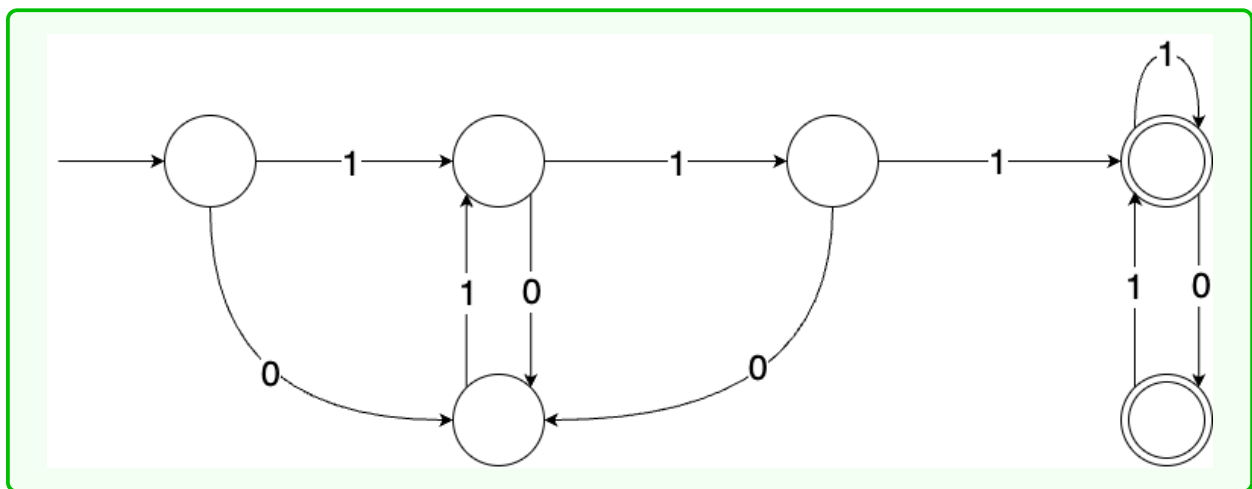
note: $[\text{^\aeiou}]$ represents any lower-case letter that is not a vowel.

Question 3

(a)



(b)



Question 4

(a)

Unsigned	$:= [\text{uU}]$
Long	$:= [\text{lL}]$
UnsignedAndLong	$:= ([\text{uU}][\text{lL}] \mid [\text{lL}][\text{uU}])$
Suffix	$:= (\text{Unsigned} \mid \text{Long} \mid \text{UnsignedAndLong})$
Octal	$:= 0[0 - 7]^*\text{Suffix?}$
Decimal	$:= [1 - 9][0 - 9]^*\text{Suffix?}$
Hex	$:= 0[\text{xX}][0 - 9\text{a} - \text{fA} - \text{F}]^+\text{Suffix?}$
CInteger	$:= \text{Octal} \mid \text{Decimal} \mid \text{Hex}$

(b)

