

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)

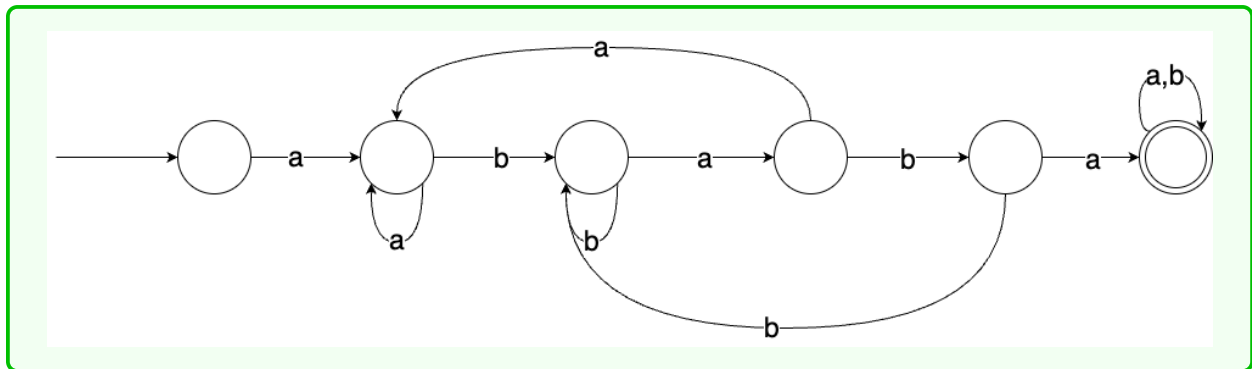
$$(a|bb)^*$$

(c)

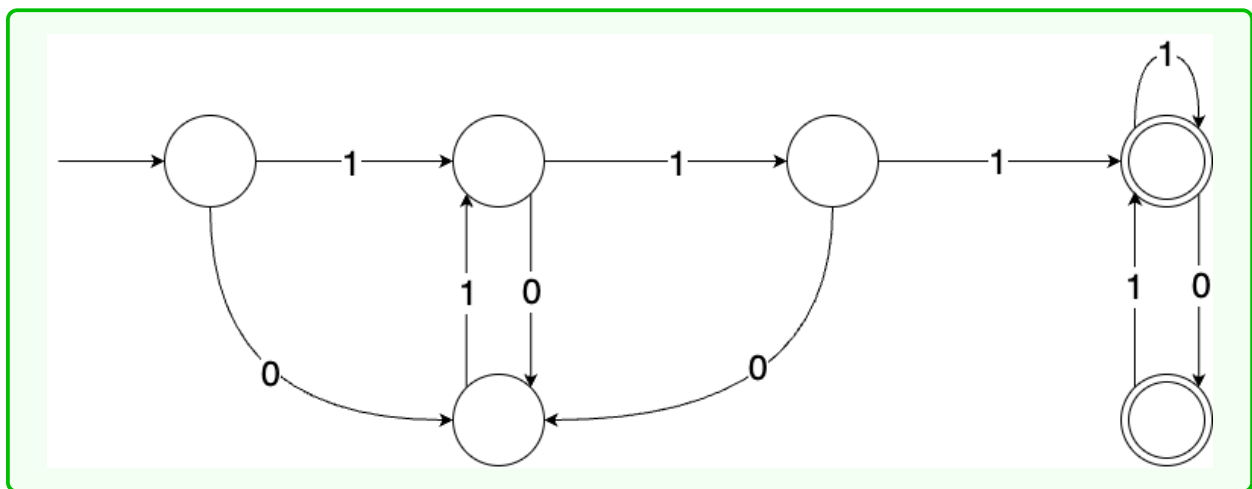
$$[a-z]^*a[a-z]^*e[a-z]^*i[a-z]^*o[a-z]^*u[a-z]^*$$

Question 3

(a)



(b)

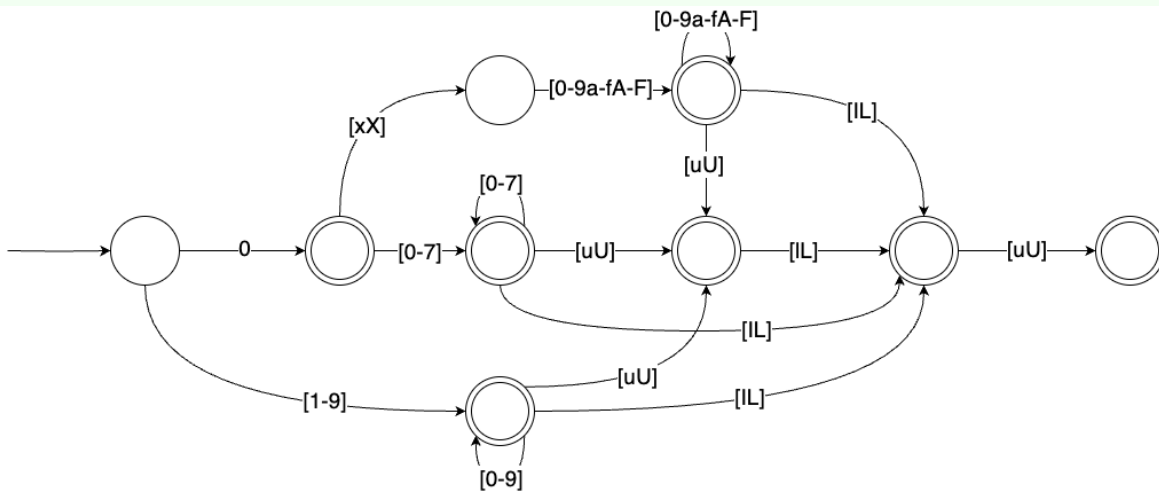


Question 4

(a)

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

(b)



Question 5

(a)

StartSequence	$:= (< ! - -)$
EndSequence	$:= (- - >)$
LegalChar	$:= ([a - z 0 - 9 \backslash s \backslash r \backslash n _ ! < >])$
Comment	$:= \text{StartSequence LegalChar}^* \text{EndSequence}$

note: $\backslash s$ represents a single space character

(b)

