Homework 1 - Regular expressions / DFAs

Question 1

(a)

- (ii) **English description:** Any number of repetitions of 'a' or 'xy' in any order, including the empty string.

(b)

- (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.

(a)

$$\boxed{(a|b)^*a(a|b)^*a(a|b)^*a(a|b)^*}$$

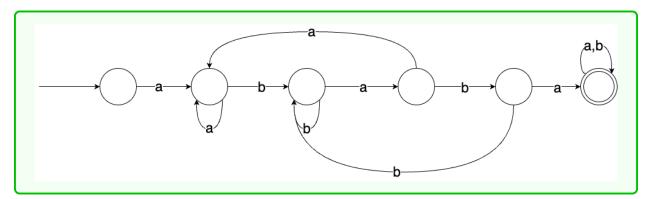
(b)



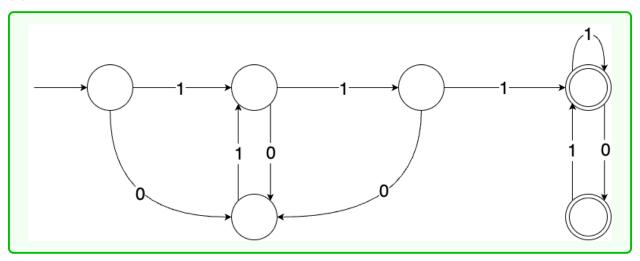
(c)

[^aeiou]* a [^aeiou]* e [^aeiou]* i [^aeiou]* o [^aeiou]* u [^aeiou]* note: [^aeiou] represents any lower-case letter that is not a vowel.

(a)



(b)



(a)

Unsigned $\coloneqq [uU]$ Long $\coloneqq [lL]$

 $Unsigned And Long \qquad \qquad := ([uU][lL] \mid [lL][uU])$

 $Suffix \qquad \qquad := (Unsigned \mid Long \mid UnsignedAndLong)$

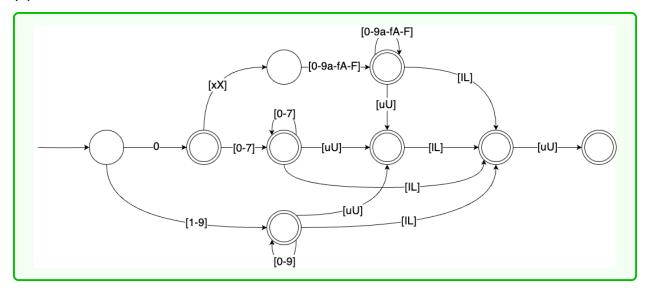
Octal := 0[0-7]*Suffix?

Decimal $:= [1-9][0-9]^*$ Suffix?

Hex $:= 0[xX][0 - 9a - fA - F]^{+}Suffix?$

CInteger $:= Octal \mid Decimal \mid Hex$

(b)



AllExceptDash

(a)

:= (<!--)StartSequence

:= (-->)EndSequence $:= ([a - z0 - 9 \backslash s \backslash r \backslash n! <>])$

(the "-" in between a and z, 0 and 9 are range operators not a literal dash)

AllExceptDash&GreaterThan $:= ([a - z0 - 9\s\r\n! <])$

(the "-" in between a and z, 0 and 9 are range operators not a literal dash)

 $:= AllExceptDash^*(-AllExceptDash\&GreaterThan AllExceptDash^*)^*$ Content

(the "-" in front of AllExceptDash&GreaterThan is a literal dash)

:= StartSequence Content EndSequence Comment

note: $\$ represents a single space character, $\$ represents a carriage return, $\$ n represents a newline character.

(b)

