CS314 Problem Set1

1. Draw a parse tree for aabb and aaab in G2?

G2:

<Stmt> => <A> | <A> <B>

<A> => a | a <A>

<B> => b | <B> b

2. Here is a grammar for arithmetic expressions:
   - <expr> ::= <expr> + <expr> | <expr> - <expr> |
     <expr> * <expr> | <expr> / <expr> | <var> | <num>
   - <var> ::= a | b | c | ... | x | y | z
   - <num> ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

Example: Using this grammar, how would we parse: x + 5 * y + z?

3. Regular Expressions

Q1: Construct a regular expression for binary numbers of length two

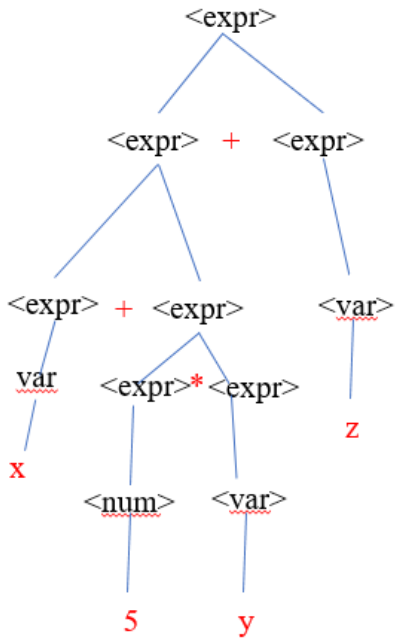
Q2: Construct a regular expression for binary numbers with even length

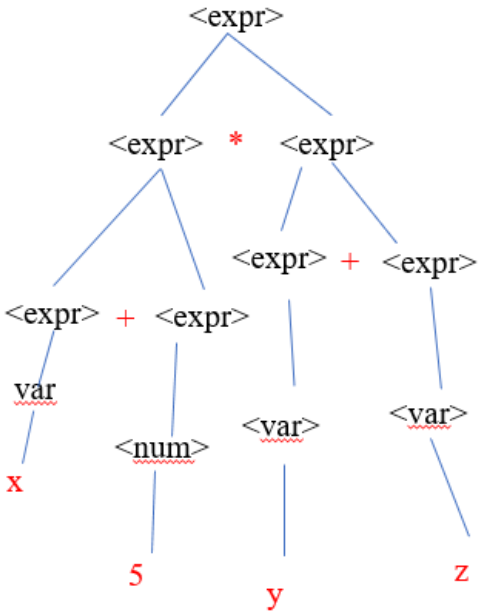
Q3: Construct a regular expression for floating point numbers that don't use scientific notation (e.g., 3.5, 0.15, -47.3).

1.

See the slides.

2.





3.

Answer1: $(1|0)(1|0)$

Answer2: $((1|0)(1|0))^*$

Answer3: $(-|\epsilon)(0-9)^+.(0-9)^+$