CECS 524
Assignment 4
Total: 38 Points

General Instruction

- I absolutely recommend that you type your answers to exercise questions by using LaTeX.
- Submit a `PDF` file via BeachBoard (Not email or in class).

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1. (7 points) Write EBNF descriptions for the `C switch` statement

2. (7 points) Rewrite the BNF to give + precedence over * and force + to be right associative.

```
<assign> -> <id> = <expr>
<id> ->  A| B | C
<expr> -> <id> + <expr>
       | <id> * <expr>
       | ( <expr> )
       | <id>
```

3. (10 points) Using the grammar and `ANTLR`, show a parse tree for the statement, `A = B * (C * (A + B))`. (Insert a screen shot from `ANTLR`, or zero grade will be given).

```
<assign> -> <id> = <expr>
<id> -> A | B | C
<expr> -> <expr> + <term> | <term>
<term> -> <term> * <factor> | <factor>
<factor> -> ( <expr> ) | <id>
```

4. (7 points) Prove that the following grammar is ambiguous:

```
<S> -> <A>
<A> -> <A> + <A> | <id>
<id> -> a | b | c
```

5. (7 points) Write a grammar for the language consisting of strings that have n copies of the letter `a` followed by the same number of copies of the letter `b`, where $n > 0$. For example, the strings `ab, aaaabbbb`, and `aaaaaaaabbbbbbbb` are in the language but `a, abb, ba`, and `aaabb` are not.