CS 210 Assignment 1

1. 1. (12 pts) Provide a BNF grammar for each of the languages below. Please do not use EBNF. Please be explicit.
    a. The set of all strings containing one or more ‘a’s followed by a single ‘b’ ___5

    b. The set of all strings starting with a lower case letter, followed by any number of upper and lower cases letters, digits or _ followed by .cpp or .txt. For example: _____5
        myFile_1.cpp
        n1DayIWill.txt

    c. The set of all strings consisting of the keyword **begin** followed by zero or more statements with a semicolon after each one, followed by the keyword **end**. Use the non-terminal <statement>, but do not provide productions for it. _____ 5

2. Prove each of the following grammars is ambiguous by providing two parse trees for the same string.
    a. <exp> ::= <exp> + <exp> | a | b | c _____5

String:	
Parse tree 1	Parse tree 2
Give an unambiguous equivalent grammar _____5	

a. <class> ::= <cs210> | <cs395> _____5
<cs210> ::= bill | bob | <empty>
<cs395> ::= alex | ann | <empty>

String:	
Parse tree 1	Parse tree 2
Give an unambiguous equivalent grammar _____5	

a. <class> ::= <cs210> | <cs395> _____5
<cs210> ::= bill | bob
<cs395> ::= alex | bob

String:	
Parse tree 1	Parse tree 2

a. `<S> ::= <S> <S> | ( <S> ) | ()` _____5

String:	
Parse tree 1	Parse tree 2

3. Consider the following grammar:

<exp> ::= <exp> - <mulexp> | <mulexp>

<mulexp> ::= <mulexp> * <rootexp> | <rootexp>

<rootexp> ::= (<exp>) | a | b | c

a. Draw the syntax diagram for <exp> _____ 5

b. Draw the syntax diagram for < rootexp > _____ 5

c. Modify this grammar to add subtraction and division operators (+ and / respectively) with the customary (BODMAS) precedence and (left) associativity. _____10

4. Draw the classical sequence (with all the different file types) that a program goes through on the journey from being a high level language source file to a running program in memory. _____5