HW Assignment 2

Total = 50

(due date: 21st October)

1. How many strings does the following grammar generate? 3 + 3

   (a)
   ```
   X->YY
   Y->ZZ
   Z->1|2
   ```

   (b)
   ```
   X->YY
   Y->ZZ
   Z->1|2|∈
   ```

2. For the Palindrome "`kayak`": 5 + 5
   (a) Write a context free grammar to parse the string,
   (b) Can you parse this string using a regular language? Explain your answer.

3. Consider the grammar: `E -> E * E | E + E | (E) | int.` 6 + 4 + 4
   (a) Generate at least two parse trees for the string: `2 * 3 + (4 * 5) + 1`
   (b) How many unique parse trees are possible?
   (c) How can you remove the ambiguity? Explain.

4. Consider a simple markup language that uses tags. Possible terminal symbols are: <, >, /, =, and word. Every tag begins with < and ends with >. A tag may be an open or a close tag. In an open tag, the first token after < is a word representing the tag's name, followed by an optional list of attributes which are pairs of words related by =. In a close tag, the first token after < is a /, followed by the tag's name, but no attributes. Every open tag must be paired with a close tag. Any number of words or tags may appear between an open and close tags.
   For example, here is a valid string in this markup language:
   `<word><word word=word>word word word</word></word>` 5+ (4*2) +5+2=20

   (a) Write a context-free grammar for this language.
   (b) Find FIRST, and FOLLOW sets for your grammar.
   (c) Construct the LL(1) parse table and identify any conflicts.
   (d) Is this language LL(1)? Explain your answer.