1 Instructions

1. The quiz is to be turned in by 11:50 am.
2. Each question is worth 3 points.
3. Attempt as many problems as you can. You will be given partial credit, as per the policy discussed in class.

2 Problems

1. Categorize the errors that can occur in a program, with an example of each category.

2. Let \( \Sigma = \{0, 1\} \) denote an alphabet. Let \( L \subseteq \Sigma^* \) denote the language which consists of all strings that start with 0 and end with 1. Write a regular expression and a CFG corresponding to \( L \).

3. Consider the CFG \( G = (V, T, P, S) \), with \( V = \{S\} \), \( T = \{0, 1\} \) and \( P \) given by:

\[
S \rightarrow 0S1 | 1S0 | \epsilon
\]

Argue that every string in \( L(G) \) has an equal number of 0s and 1s.

4. Consider the CFG \( G = (V, T, P, S) \), with \( V = \{S\} \), \( T = \{a\} \) and \( P \) given by:

\[
S \rightarrow S \cdot S | a
\]

Write the set equation corresponding to this grammar and give a solution to this equation.

5. Consider the following block of C code:

```c
#include <stdio.h>

int a, b;

int p(void)
{
    int a, p;
    a =0; b=1; p=2;
    return p;
}
```
void print( void)
{
    printf(\"%d\n%d\n\",a,b);
}

void q(void)
{
    int b;

    a= 3; b=4;
    print();
}

main()
{
    a=p();
    q();
}

What values will be printed, when the program is parsed using (a) Lexical scope, and (b) Dynamic scope?