

Login name _____

Quiz 1
CSE 131
Winter 2010

Name _____

Signature _____

Student ID _____

Compilation/Compiler Overview, Names/Scopes/Bindings

1. Given the following CUP grammar snippet (assuming all other Lexing and terminals are correct):

```
Stmt ::= Des AssignOp Des T_SEMI {: System.out.println("0"); :}
      ;

Des   ::= T_STAR {: System.out.println("1"); :} Des {: System.out.println("2"); :}
      | T_PLUSPLUS {: System.out.println("3"); :} Des {: System.out.println("4"); :}
      | T_AMPERSAND {: System.out.println("5"); :} Des {: System.out.println("6"); :}
      | Des2 {: System.out.println("7"); :}
      ;

Des2  ::= Des2 {: System.out.println("8"); :} T_PLUSPLUS {: System.out.println("9"); :}
      | Des3 {: System.out.println("10"); :}
      ;

Des3  ::= T_ID {: System.out.println("11"); :}
      ;

AssignOp ::= T_ASSIGN {: System.out.println("12"); :}
          ;
```

What is the output when parsing the follow statement (you should have 10 lines/numbers in your output):

```
x = ptr++;
```

Output

What is the operator associativity of the operators in the Des production?
(Lt-to-Rt or Rt-to-Lt)

2. In Ken Thompson's Turing Award Lecture paper I handed out in class, he described

shipping the C compiler binary with code to detect if it was compiling the login program, and if so generate code in the login binary with a Trojan Horse (True or False) _____

shipping the C compiler binary with code to detect if it was compiling the C compiler, and if so generate code in the compiler to detect if it was compiling the C compiler (True or False) _____

shipping the C compiler binary with code to detect if it was compiling the C compiler, and if so generate code in the compiler to detect if it was compiling the login program (True or False) _____

shipping source code to the login program that had no trace of Trojan Horse code in it (True or False) _____

shipping source code to the C compiler that had no trace of Trojan Horse code in it (True or False) _____

3. Given the following variable declarations, determine if each line of code will cause

- A) No Error
- B) Syntax Error
- C) Semantic Error

```
int a;  
bool b;  
float c;
```

a = a + b; _____

c = a c; _____

a = a + a _____

b = a + c; _____

b = a < c; _____

4. Fill in the blanks with one of the following

- A) Front End
- B) Back End
- C) Intermediate Representation (IR)

The parser is considered part of _____.

The code generator is considered part of _____.

The lexical analyzer is considered part of _____.

The semantic analyzer is considered part of _____.

A complete AST is considered part of _____.

Machine independent code improvements are usually performed in _____.

Machine dependent code improvements are usually performed in _____.

5. Describe two common ways a program can contain a dangling pointer/reference error:

1)

2)