Student ID _____ **Quiz 1** **Name** _____

CSE 131

Signature _____ **Winter 2013** **Login name** _____

Compilation/Compiler Overview, Names/Scopes/Bindings

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

```
Expr  ::=   Expr {: System.out.println("A"); :} AmpOp Expr1 {: System.out.println("H"); :}
      |     Expr1 {: System.out.println("B"); :}
      ;

Expr1 ::=   Expr1 CaretOp {: System.out.println("C"); :} Des {: System.out.println("I"); :}
      |     Des {: System.out.println("D"); :}
      ;

AmpOp ::=   T_AMPERSAND {: System.out.println("E"); :} /* & character */
      ;

CaretOp ::=  T_CARET {: System.out.println("F"); :}  /* ^ character */
      ;

Des   ::=   T_ID {: System.out.println("G"); :}
      ;
```

What is the output when parsing the follow expression (you should have 12 lines/letters in your output):

```
x ^ y & z
```

Output

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

In the above grammar, which has higher precedence: ampersand operator or caret operator or do they have the same precedence? _____

In the above grammar, do multiple ampersand operators associate from left to right or right to left? _____

In the above grammar, do multiple caret operators associate from left to right or right to left? _____

(over)

2. Give the order of the typical C compilation stages and on to actual execution as discussed in class

0 – Loader
1 – Program Execution
2 – as (Assember)
3 – Object file (prog.o)
4 – a.out (Executable image)
5 – Segmentation Fault (Core Dump) / General Protection Fault
6 – ccomp (C compiler)
7 – ld (Linkage Editor)
8 – Source file (prog.c)
9 – Assembly file (prog.s)
10 – cpp (C preprocessor)

gcc ____ –> ____ –> ____ –> ____ –> ____ –> ____ –> ____ –> ____ –> ____ –> ____ –> ____

Use the numbers in the box to the right for the next 3 fill-ins.

1) Lifetime of object lasts longer than lifetime of name-object binding.
2) Lifetime of name-object binding lasts longer than lifetime of the object.

Memory leak _____

An alias (pointer) that refers to deallocated heap space _____

Returning a pointer to deallocated stack space (local variable or parameter). _____

Fill in the blanks.

_____ analysis deals with verifying correct <u>meaning</u> of a program.

_____ analysis deals with verifying correct <u>structure</u> of a program.

A(n) _____ performs thorough analysis and nontrivial transformations on a program in language L1 into an equivalent program in language L2 as in contrast to a(n) _____ which directly performs operations implied by the program.

Check #1: For the T_EQU and T_NEQ operators, the operand types must be either BOTH _____, or BOTH *equivalent* to _____, and the resulting type is _____.

Based on this quarter's Project spec, if a check has a list of multiple bullet points to check, _____

A) check them in the order of the bullet points. Report only the first error occurring in the list.
B) check them in the order of the bullet points. Report all errors occurring in the list.
C) check them in any order you wish. Report all errors in the order of the bullet points.
D) check them in any order you wish. Report one error only if it is a syntax error.
F) WNBT - we will not test any checks with multiple bullet points.

In the Project's starterCode, what is the name of the file that contains the CFG? _____

Where are uninitialized global and static vars allocated in the C runtime environment? _____

Where are dynamically allocated memory allocated in the C runtime environment? _____