

Login name \_\_\_\_\_

# Quiz 1 CSE 131

Name \_\_\_\_\_

Signature \_\_\_\_\_

Winter 2009

Student ID \_\_\_\_\_

## Compilation/Compiler Overview, Names/Scopes/Bindings

1. Given the following phases of compilation in a typical production-quality C compiler as discussed in class

0 – Machine-Specific Optimization

1 – Code generation (for ex., Assembly)

2 – Parser (Semantic Analysis)

3 – Parser (Syntax Analysis)

4 – Scanner (Lexical Analysis)

Which phases are considered part of the front end of the compiler?

Which phases are considered part of the back end of the compiler?

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

```

Stmt ::=      Expr T_SEMI
           {: System.out.println("____"); :}
        ;

Expr ::=      Expr1 AssignOp {: System.out.println("____"); :} Expr
           {: System.out.println("____"); :}
        |     Expr1 {: System.out.println("____"); :}
        ;

Expr1 ::=     T_ID {: System.out.println("____"); :}
           ;

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

```

Fill in the blanks in the above action code to match the output below when parsing the follow statement:

a = b = c;

<u>Output</u>
1
=
B
1
=
B
1
2
C
C
A

What is the associativity of AssignOp in the above grammar?

\_\_\_\_\_

(over)

3. Briefly explain the difference between syntax analysis and semantic analysis.

4. Check #1:

For the T\_LT, T\_LTE, T\_GT, and T\_GTE operators, the operand types must be \_\_\_\_\_,

and the resulting type is \_\_\_\_\_.

5. What is the name of the main data structure used in the compiler to store/retrieve information about names (variable names, function names, etc.) and other information/attributes (for example, types) associated with these names?

6. Text \_\_\_\_\_ Data \_\_\_\_\_ BSS \_\_\_\_\_ Heap \_\_\_\_\_ Stack \_\_\_\_\_ My grade on this quiz \_\_\_\_\_

- A) Known fixed size at compile time and thus part of the resulting executable file.
- B) Sized dynamically at run time (size not known at compile time).

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

- |   |                            |
|---|----------------------------|
| A – Loader  | B – ccomp (C compiler)     |
| C – Program Execution   | D – ld (Linkage Editor)    |
| E – as (Assembler)  | F – Source file (prog.c)   |
| G – Object file (prog.o)                                      | H – Assembly file (prog.s) |
| I – prog.exe/a.out (Executable image)                         | J – cpp (C preprocessor)   |
| K – Segmentation Fault (Core Dump) / General Protection Fault |                            |

gcc \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_ -> \_\_\_\_\_

8. Returning a pointer to deallocated stack space (local variable or parameter). \_\_\_\_\_

Memory leak \_\_\_\_\_

An alias (pointer) that refers to deallocated heap space \_\_\_\_\_

- A) Lifetime of name-object binding lasts longer than lifetime of the object.
- B) Lifetime of object lasts longer than lifetime of name-object binding.