

Login name _____

Quiz 1 CSE 131

Name _____

Signature _____

Spring 2008

Student ID _____

Compilation/Compiler Overview, Names/Scopes/Bindings

1. Give the order of the phases of compilation in a typical C compiler as discussed in class

0 – Target language file (for ex., prog.s)

4 – Parser (Syntax Analysis)

1 – Source language file (for example, prog.c)

5 – Intermediate Representation(s)

2 – Parser (Semantic Analysis)

6 – Scanner (Lexical Analysis)

3 – Code generation (for ex., Assembly)

_____ -> _____ -> _____ -> _____ -> _____ -> _____ -> _____

Machine-independent improvements typically can occur immediately before, during, and/or immediately after which phase? _____

Machine-specific code improvements typically can occur immediately before, during, and/or immediately after which phase? _____

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

```

Stmt ::=      Designator T_ASSIGN Expr T_SEMI
              {: System.out.println("C"); :}
        ;

Expr ::=      Expr MulOp {: System.out.println("S"); :} Designator
              {: System.out.println("I"); :}
              | Designator {: System.out.println("2"); :}
        ;

MulOp ::=     T_STAR {: System.out.println("*"); :}
        ;

Designator ::= T_ID {: System.out.println("1"); :}
        ;

```

What is the output on the screen when the follow statement is given as input:

a = b * c;

Give an example of a terminal symbol from this grammar

Give an example of a non-terminal symbol from this grammar

(over)

3. Specify the sizes of the various data types listed for the following Compiler Models

	ILP-32	LP-64
int	_____	_____
long	_____	_____
long long	_____	_____
pointer	_____	_____

4. Check #1: For the T_PLUS, T_MINUS, T_STAR, T_SLASH operators, the operand types must be _____ (meaning equivalent to either int or float), and the resulting type is _____ when both operands are int, or _____ otherwise.

5. What are the two types of programming errors that garbage collection essentially eliminates that can easily occur when the programmer is left to deal with dynamic memory management?

- 1)
- 2)

6. What is an advantage of using handles to implement references in an OOP environment?

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

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

gcc _____ -> _____ -> _____ -> _____ -> _____ -> _____ -> _____ -> _____ -> _____ -> _____

8. In the following grammar piece from rc.cup

```
Expr2 ::=      Expr2 T_CARET Expr3
|             Expr3
;

Expr3 ::=      Expr3 T_AMPERSAND Expr4
|             Expr4
;
```

Is T_CARET higher or lower operator precedence compared to T_AMPERSAND?

Does the T_CARET operator have Lt-to-Rt or Rt-to-Lt associativity?
