

Student ID _____

Quiz 1 CSE 131

Name _____

Signature _____

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Compilation/Compiler Overview, Names/Scopes/Bindings

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

- 1 – Source language file (for example, prog.c)
- 3 – Parser (Semantic Analysis)
- 5 – Target language file (for ex., prog.s)
- 7 – Code generation (for ex., Assembly)

- 2 – Intermediate Representation(s)
- 4 – Scanner (Lexical Analysis)
- 6 – Parser (Syntax Analysis)

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

Is syntax analysis considered part of the front-end or the middle-end or the back-end? _____

Is code generation considered part of the front-end or the middle-end or the back-end? _____

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("A"); :}
        ;

Expr ::=      Expr MulOp {: System.out.println("B"); :} Designator
            {: System.out.println("C"); :}
            |   Designator {: System.out.println("1"); :}
            ;

MulOp ::=     T_STAR {: System.out.println("2"); :}
            ;

Designator ::= T_ID {: System.out.println("3"); :}
            ;

```

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

a = b * c;

Is MulOp considered a terminal or non-terminal symbol in this grammar

Is T_ID considered a terminal or non-terminal symbol in this grammar

(over)

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

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

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

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

	LLP-64	LP-64
int	_____	_____
long	_____	_____
long long	_____	_____
pointer	_____	_____

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. 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.

7. Describe two common ways a C/C++ program can contain a dangling pointer/reference error:

1)

2)

8. In the following grammar piece from rc.cup

```
Expr2 ::=      Expr3 T_CARROT Expr2
      |      Expr3
      ;
```

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

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

Is T_CARROT higher or lower operator precedence compared to T_AMPERSAND?
