

COMP3190

Principles of Programming Language

Exercise 3 Answer

1.

Identify substrings of the source program that belong together (lexemes).

2.

- Find all syntax errors; for each, produce an appropriate diagnostic message and recover quickly
- Produce the parse tree, or at least a trace of the parse tree, for the program

3.

- Simplicity: less complex approaches can be used for lexical analysis; separating them simplifies the parser.
- Efficiency: separation allows optimization of the lexical analyzer.
- Portability: parts of the lexical analyzer may not be portable, but the parser always is portable.

4. (Ignore)

5.

The advantage of a typeless language is flexibility; any variable can be used for any type values. The disadvantage is poor reliability due to the ease with which type errors can be made, coupled with the impossibility of type checking detecting them.

6.

Implicit heap-dynamic variables acquire types only when assigned values, which must be at runtime. Therefore, these variables are always dynamically bound to types.

7.

Point 1: a 1

b 2

c 2

d 2

Point 2: a 1

b 2

c 3

d 3

e 3

Point 3: same as Point 1

Point 4: a 1

b 1

c 1

8.

Format is “Variable Where Declared”

(a)

d, e, f fun3

c fun2

b fun1

a main

(b)

d, e, f fun3

b, c fun1

a main

(c)

b, c, d fun1

e, f fun3

a main

(d)

b, c, d fun1

e, f fun3

a main

(e)

c, d, e fun2

f fun3

b fun1

a main

(f)

b, c, d fun1

e fun2

f fun3

a main