Lecture #8   Fixing Ambiguous grammars
          Syntax-Directed translation (SDT)
          Dealing with ill-shaped parse trees.

      Bad Grammar => Left recursive.

   # Ambiguity.
   The grammar → correct precedence   in Parse Tree
                        associativity

         Ex):   E → E - E | n

              $\boxed{1 - 2 - 3}$ (see slide)

      => Non-ambiguous grammar

            E → E + T | T
            T → T * F | F
            F → (E) | n.

              1 + 2 * 3

                   E
                 / | \
                E + T

```
          |                    / |  \
          T                   T  *  F
          |                   |     |
          F                   F     n
          |                   |     }
          T                   2
          |
          |
```
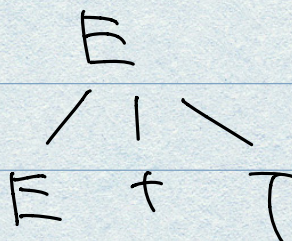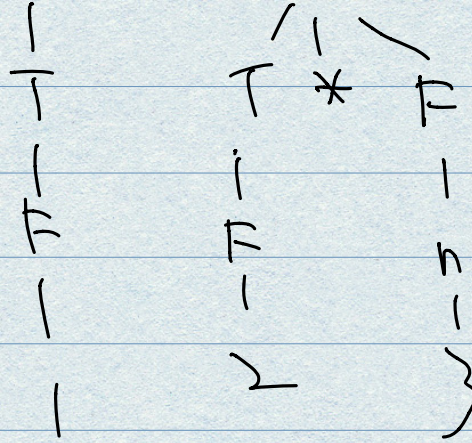
How to Construct. AST.

→ traverse Parse tree bottom up.

construct AST Node

Attribute grammars.

- Construct AST

- Type check. on AST

- document layout information

- syntax highlighting.

Parse Tree Rewrite.

E

T   E

T   E

T   E

T

1   1   2   1   3   1   4