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Milestone 2

COMP 520

Work presented to Prof. Laurie Hendren

McGil University

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Symbol Table

The symbol table is slightly different than what was shown in class. The concept of layers is exactly the same and it has the same functions, but instead of using hash tables we are using red-black trees. The idea was to try something new. Unlike hash tables that need a good hash function to be efficient, a red-black tree is always fast because the runtime of all searches and inserts are at most O(log(n)) where n is the number of elements in the tree.

Symbol Pass

Symbols are typed as: variables, type aliases, functions or inferred where inferred has its type determined at type checking. Variables and type alias pointers point directly to the type with with they are associated.

Scoping Rules

These follow the GoLite specifications.

Type Check

Again, these follow the GoLite specifications.

Some Rules:

- **<u>Binary operations (particular to our implementation)</u>**:
  Types must be the same on both sides of the operator. We do not allow any constant coercion, meaning the integer 1 is never automatically converted to a float64 in `1.2 + 1`. This has a side effect that increments and decrements are only supported on integers.
  bin_op_nocoercion.go

- Function types and returns:
  The type of the return statement has to be assignable to the return type of the enclosing function.
  return_mismatch.go

- Variable assignments:
  The expression has to be assignable to the *lvalue* on the left hand side.
  assign_string.go

- Type casts:
  Expressions can only be converted to "int, float64, bool, rune, or a type alias that maps to one of those four"
  conversion_nonbasic.go

- Append:
  First arguments must be a slice.

append_array.go

- Structs:
  Are considered equivalent if they have the same fields of the same type in the same order.
  struct_mismatch.go

- Printing:
  We only allow printing of basic types (no arrays or slices)
  print_nonbasic.go

TEAM ORGANIZATION

Dan:

- Type checker.
- Symbol table printing.

Justin:

- Symbol pass.
- Expression type printing.

Sergei:

- Symbol table.