1. Some programming languages are type-less. What are the obvious advantages and disadvantages of having no types in a language?

Answer:

Advantages: Flexibility; any variable can be used for any type value.

Disadvantages: Poor Reliability due to the ease with which type errors can be made and we can't type check them to detect those errors.

2. Write a simple assignment statement with one arithmetic operator in some language you know. For each component of the statement, list the various bindings that are required to determine the semantics when the statement is executed. For each binding, indicate the binding time used for the language.

Answer:

int product;

product = product * 5;

Type of product variable	Compile Time
Meaning of * operator	Compile Time
Possible values of product	Compiler Design Time
Internal representation of literal 5	Compile Design Time
Value of product	Execution Time

3. Dynamic type binding is closely related to implicit heap-dynamic variables. Explain this relationship.

Answer:

Implicit heap-dynamic variables are assigned to a type only when they get assigned a value, which happens during runtime.

Dynamic type binding is the binding of a type to a variable at runtime.

Implicit heap-dynamic variables uses dynamic type binding to assign value at runtime.

4. Describe a situation when a history-sensitive variable in a subprogram is useful.

Answer:

History-sensitive variables are useful in pseudo random number generator subprogram.

In pseudo random number generator usage of history sensitive variables helps to retain values between separate executions thereby enabling the program to generate a random number different from ones it already generated.

5. What is the general problem with static scoping?

Answer:

Static scoping determines the scope of a variable during compile time which gives less flexibility. Also, it can be harder to write reusable code, because variables can only be accessed within their defined scope.