TYPE SAFETY IN PROGRAMMING LANGUAGES

Haskell
ML
Java
} strongly typed, i.e.

type system comes with safety guarentee.

C.
C++
} have type systeme, but the type systems are not safe.

Python
Scheme
} do not have type systems. argument type checking is done at runtime.

CHALLENGES IN ENGINEERING A TYPE SYSTEM

• type systems for functions

• adding stores, continuations, objects, classes

• polymorphic types, i.e., types parameterized on type variables.

e.g. $\forall t . t \rightarrow t$ for the identity function.

- inference :

    reconstruct the types from programs
    in the absence of type declarations.

- efficiency

    polymorphic type inference is double
    exponential.

- subtyping

- dependent types