Data Type Questions

Why do programming languages have data types?

How can data types be classified?

What kinds of identifiers are used to name types?

Describe finite mappings, cartesian products, sequences, disjoint unions, power sets, recursive data types.

How is each implemented in programming languages?

How do we implement a record or struct in Java?

How is a record or struct different from a cartesian product in mathematics?

How is a discriminated union implemented in Java?

What structure in the Java collection framework is similar to a record?

Where are sequences found in Java? in ML? in Prolog?

How can aliasing be implemented using a disjoint union?

How are sets implemented in Pascal?

What is a recursive data type?

Why do some programming languages have user-defined pointers?

Why do some programming languages not have user-defined pointers?

Can pointers be typed?

What is a dangling reference?

Can a dangling reference be created in Java?

What is garbage?

Can garbage be created in Java?

What is an anonymous variable?

What is an anonymous type?

What is type equivalence?

Define name equivalence.

Define declaration equivalence.

Define structural equivalence.

How does Java define type equivalence?

Explain coercion and conversion.

What problem arises when a language has coercion and overloading?

Describe size conversions and encoding conversions.

What do the terms *static* and *dynamic* mean in a programming language?

How can a programming language help us write correct programs?

Describe some static consistency checks?

Describe some dynamic consistency checks?

What are the four kinds of programming errors? Which are easiest to find?

What attitudes may a programming language take toward type checking?

Explain static type checking and dynamic type checking.

Why is dynamic type checking necessary in Java?

Explain strong typing and weak typing? Which programming languages follow each of them?

Explain static typing and dynamic typing.

What are the four kinds of polymorphism?

Describe three kinds of overloading?

Explain context-independent overloading and context-dependent overloading.

How can coercions be viewed as polymorphism?

What is universal or parametric polymorphism?

What is a polytype?