ICS-365 HW6

\* Due Date – See Class Schedule \*

1. Compare the tombstone and lock-and-key methods of avoiding dangling pointers, from the points of view of safety and implementation cost.

A tombstone works by having a pointer point at a tombstone instead of the previous data that was stored. A lock and key uses less memory and runtime by having pointers work as pairs of keys and addresses.

1. What is a data type?

A data type defines a collection of data objects and a set of predefined operations on those objects.

A way of signifying how to treat the data stored inside of memory. Such as signifying a number as a char rather than an int.

1. What is an abstract data type?

An abstract data type is a user defined data type.

An abstract data type is different than a regular primitive type in that it is a model of data being stored rather than strictly a single type of data. Example: Structs in C.

1. How are floating-point types represented?

A single-precision floating point, by the IEE-754 standard, is represented by a single sign bit followed by 8 exponent bits, followed by 24 mantissa/significand bits.

1. What languages support complex data type?

Fortran, Python, Scheme

1. Why is Java not strongly typed?

Java is not strongly typed because it has explicit type casting, you are able to coerce one type of data into another type of data.

1. What significant justification is there for the -> operator in C and C++?

Certain situations call for accessing parts of a structure as a pointer.

Writablity - it is easier to write the code with it rather that the ugly code without it.

1. What are the arguments for and against Java’s implicit heap storage recovery, when compared with the explicit heap storage recovery required in C++? Consider real-time systems.

Implicit heap storage recovery ensures that dangling pointers are never created, but requires more runtime. Explicit heap recovery is faster but doesn’t require as much storage.

Java uses garbage collection which prevents dangling pointers.

The drawbacks are that programmers do not learn how to use memory management.

1. In what way is static type checking better than dynamic type checking?

It causes the code to compile faster and makes sure that errors are discovered earlier.

It is always more efficient to do operations at compile time so in that it way it is more efficient to have static type checking.

1. Explain how coercion rules can weaken the beneficial effect of strong typing.

You may accidentally end up coercing a piece of data wrongly, causing under or overflow. Strong typing would not allow this to happen.

They can allow the language to not pick up a programming error that occurs if the programmer accidentally assigns a wrong data type.