Control Flow: what is the order things happen in the program?

Unstructured: goto, try/catch, break, continue

Structured: loops, iterators, subprograms, conditional statements

Unstructured code leads to spaghetti code

The throw continuation must see the environment at the point of try/catch and return the value to that point, restoring any state changes to the environment. The environment is what point of state is in scope.

Non-determinism:

Theory definition: an algorithm can make a correct guess if a path to the solution exists

PLC definition: the order of operations in your program can be changed from how the program wrote it

Example:

What is the order Java evaluates “a+b+c”? 🡺 a + b then (a + b) + c (left associative)

Some languages like Fortran allows non-deterministic order

Suppose we only have one bit of precision

A = 1.0

B = 0.5

C = 0.5

(A + B) + C

1. + 0.5) + C

1.0 + 0.5

0.5

Whereas a + (b + c) would have been = 1.0 + 1.0 = 2.0

Iterators: controlled loop where you’re iterating over a set of values

For (Day d from Mon to Fri)

Java does not have true iterators

for (Stirng s : str\_lst)

Is considered syntactic sugar for

for (Iterator<String> i = list.iterator(); i.hasNext(); String s = i.next())