CONTROL FLOW

Flow of control within expressions

Flow of control among statements

Flow of control among program units

Flow of control among statements

Labels
- An explicit name or number assigned to a fixed position within the source code.
- May be referenced by control flow statements.

Common forms of statement-level sequence control
- Composition
- Alternation
- Iteration

Selection Statement
- Single-way selection
- Two-way selection
- N-way (multiple) selection

Evolution of Control Statements
- Instruction Counter
- Gotos

Control Structure

Control Statement

Break Statement
- Causes control to move forward in the program to an explicit point at the end of a given control structure.

Continue Statement
- Causes control to move forward in the program to an explicit point at the end of a given control structure.

Iterative Statements

Simple Repetition
- Statement head specifies that the body is to be executed some fixed number of times.

Main Issues
- Can K be reevaluated in the body causing the number of iterations to be changed
- What will happen if K is zero or negative

Counter-Controlled Loops
- Has a variable : loop variable
- Some means of specifying the initial and terminal values of the loop variable, and the difference between sequential loop variable values : step-size.

Logically-Controlled Loops
- Repetition control is based on a boolean expression
- Every counter controlled loop can be built with a logically controlled loop, but not the converse.

User-located loop control
- Several languages have loop statements that have no iteration control mechanism; they are infinite loops unless controls are added by the programmer.
- Any loop can be labeled, and when a loop label is included on the exit, control is transferred to the statement immediately following the referenced loop.
- When neither of optional parts are defined, exit causes the termination of only the loop in which it appears

Iteration based on data structures
- Rather than a counter or Boolean expression controlling the iteration, a data structure is used to control the iteration.

User-Defined Iteration Control
- A more general databased iteration statement users a user- defined data structure and a user-defined function, called an iterator, to go through the structure's elements.