CSD101: Introduction to computing and programming (ICP)

Definition 3 (Block)

A block is a function or any set of statements enclosed within {...} (curly brackets). Variable declarations can be made within blocks. **C** versions from C99 onwards allow declarations anywhere in the body of a function. The for, while, do loops also form a block. if, switch and inner statements form a block. Variables declared within a block are alive and accessible only within the block. Storage is allocated when a declaration is encountered and de-allocated when the block is exited. Unless specified the default storage class is **auto**.

Scope of variables/names

Definition 4 (Scope)

The scope of a variable or name is the body of the program text where it is accessible.

- The scope of a variable or name extends from the point of declaration till the end of the block in which it occurs.
- **Global/ external** variables are those that are declared outside any function.
- Variables declared within a function or a block are called local variables.
- Function names and global or external variables have file scope. That is they are accessible in the file where they have been declared.
- A function **cannot** be declared within a function.

Properties of variables I

- Storage duration: when memory is allocated and deallocated. Auto: allocated when block executed, deallocated when block exited.
 - static: allocated when program starts, deallocated when program ends.
 - extern: allows multiple files to share a variable. extern int
 - i; tells compiler i is an int does not allocate storage.
- Scope: the text of the program where the variables values can be accessed. Typically, within the block in which it is declared or file in which it occurs (global to a file).
- Linkage: extent to which it can be shared in different parts of a program.
 - external can be shared across different files.
 - internal can be shared within a file.

Properties of variables II

The default storage duration, scope and linkage properties of a variable depend on where it is declared. int i; extern int j; static int k; void f(int a1) { auto int l; int m; static int n; extern int o; }

Var	Sto. Dur.	Scope	Linkage
i	static	file	external
j	static	file	internal/external
k	static	file	internal
a1	auto	block	none
I	auto	block	none
m	auto	block	none
n	static	block	none
0	static	block	internal/exteranl