

Category	Keyword/Type	Memory Allocation	Memory Size	Scope	Lifetime	Storage Class	Notes
Primitive Data Types	int	Stack (auto) or Heap (dynamic)	Typically 4 bytes (platform-dependent)	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	Signed integer.
	float	Stack (auto) or Heap (dynamic)	Typically 4 bytes	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	Single-precision floating point.
	double	Stack (auto) or Heap (dynamic)	Typically 8 bytes	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	Double-precision floating point.
	char	Stack (auto) or Heap (dynamic)	1 byte	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	Stores a single character.
	bool (C++)	Stack (auto) or Heap (dynamic)	Typically 1 byte	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	Boolean type (true or false).
	void	N/A	N/A	N/A	N/A	N/A	Used for functions that do not return a value or pointers to

C++ Storage Classes and Data Types							
Derived Data Types	Storage Class						
	Storage Class	Memory Location	Size	Scope	Initialization	Storage Class Specifier	Memory Location
	array	Stack (auto) or Heap (dynamic)	Size = Number of elements × Size of each element	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	Contiguous memory allocation.
	pointer	Stack (auto) or Heap (dynamic)	Typically 4 or 8 bytes (platform-dependent)	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	Stores memory address.
	struct	Stack (auto) or Heap (dynamic)	Sum of sizes of all members (plus padding for alignment)	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	User-defined composite data type.
	union	Stack (auto) or Heap (dynamic)	Size of the largest member	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	All members share the same memory location.
	enum	Stack (auto) or Heap (dynamic)	Typically 4 bytes (platform-dependent)	Block scope (if local), File scope (if global)	Automatic (if local), Program (if global)	auto, static, extern	User-defined enumeration type.
Storage Classes	Storage Class	Memory Location	Size	Scope	Initialization	Storage Class Specifier	Memory Location
	auto	Stack	Depends on data type	Block scope	Automatic (local to block)	auto	Default for local variables.

	register	CPU Register (if possible)	Depends on data type	Block scope	Automatic (local to block)	register	Suggests compiler to store in CPU register for faster access.
	static	Data Segment	Depends on data type	Block scope (if local), File scope (if global)	Program (retains value between function calls)	static	Local: retains value between calls. Global: limited to file scope.
	extern	Data Segment	Depends on data type	File scope	Program	extern	Declares a global variable/function defined elsewhere.
	mutable (C++)	Stack or Heap	Depends on data type	Class scope	Same as containing object	N/A	Allows modification of class member in const objects.
	malloc	Heap	User-defined	Depends on pointer scope	Until free is called	N/A	Allocates raw memory in bytes.
Dynamic Memory	calloc	Heap	User-defined	Depends on pointer scope	Until free is called	N/A	Allocates and initializes

Functions							memory to zero.
	realloc	Heap	User-defined	Depends on pointer scope	Until free is called	N/A	Resizes previously allocated memory.
	free	Heap	N/A	N/A	N/A	N/A	Deallocates memory allocated by malloc, calloc, or realloc.
	new (C++)	Heap	User-defined	Depends on pointer scope	Until delete is called	N/A	Allocates memory and calls constructor.
	delete (C++)	Heap	N/A	N/A	N/A	N/A	Deallocates memory allocated by new and calls destructor.
	Function	Code Segment	Depends on function size	File scope (if global), Block scope (if local/static)	Program	extern, static	Functions are stored in the code segment.
	Inline Function	Code Segment	Depends on function size	File scope	Program	inline	Suggests compiler to expand function in-place to

							reduce overhead.
	Lambda (C++)	Stack or Heap	Depends on captured variables	Block scope	Automatic (local to block)	N/A	Anonymous functions with captured variables.
Class/Objects (C++)	Class Member	Stack or Heap	Depends on data type	Class scope	Same as object lifetime	static, mutable	Members can be static (shared across instances) or non-static (per-instance).
	Object	Stack or Heap	Sum of sizes of all non-static members (plus padding for alignment)	Depends on object scope	Automatic (if local), Program (if global)	N/A	Instances of a class.
	Virtual Function Table	Data Segment	Depends on number of virtual functions	Class scope	Program	N/A	Used for dynamic dispatch in polymorphism.
Other Keywords	const	Stack or Data Segment	Depends on data type	Depends on scope	Depends on scope	N/A	Immutable variable.

volatile	Stack or Data Segment	Depends on data type	Depends on scope	Depends on scope	N/A	Prevents compiler optimization for variables that may change unexpectedly.
typedef	N/A	N/A	N/A	N/A	N/A	Creates an alias for a data type.
namespace (C++)	N/A	N/A	Namespace scope	Program	N/A	Groups entities to avoid name collisions.
template (C++)	Code Segment	Depends on instantiation	Depends on scope	Program	N/A	Generates code for different types at compile time.