

Stack & Heap

Computing

Where a variable actually lives, and what that costs.

Stack

- Function locals and call frames
- Allocated and freed automatically
- Very fast — just move a pointer
- Fixed, small size — a few MB
- Overflow: infinite recursion

Heap

- Objects that outlive their function
- Explicitly allocated, or garbage collected
- Slower — must find a free block
- Large, limited by available RAM
- Leaks: allocated and never released

THE DIFFERENCE THAT MATTERS

A stack overflow is almost always runaway recursion. A heap exhaustion is almost always a leak or an unbounded cache.

Passing a large object by value copies it. Passing by reference or pointer copies only the address.