

5 – Default size of stack and heap & considerations

- **Stack (default size):** Around **1 MB** in most systems (depends on OS, compiler, and architecture).
 - **Heap (default size):** Much larger — typically limited by available RAM and virtual memory (can be GBs).
 - **Considerations:**
 - **Stack:** Faster access, but limited size → large local variables or deep recursion can cause *stack overflow*.
 - **Heap:** Larger and more flexible, but slower access → requires manual memory management (in low-level languages).
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6 – Time complexity

- **Definition:** A measure of how the runtime of an algorithm grows relative to the input size **n**.
- **Purpose:** Helps compare efficiency of algorithms regardless of hardware.
- **Examples:**
 - **$O(1)$:** Constant time (e.g., array index access)
 - **$O(\log n)$:** Logarithmic time (e.g., binary search)
 - **$O(n)$:** Linear time (e.g., simple loop)
 - **$O(n^2)$:** Quadratic time (e.g., nested loops)