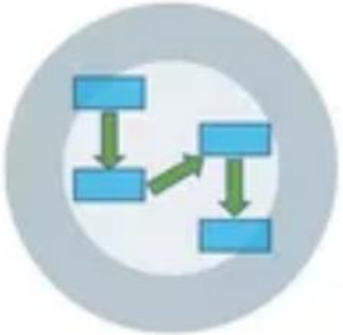
Memory Management and Garbage collection



Data Structures and Algorithms

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Data Structures and Algorithms
Course Contents:
Abstract data types, complexity analysis, Big Oh notation, Stacks (linked lists and array implementations), Recursion and analyzing recursive algorithms, divide and conquer algorithms, Sorting algorithms (selection, insertion, merge, quick, bubble, heap, shell, radix, bucket), queue, dequeuer, priority queues (linked and array implementations of queues), linked list & its various types, sorted linked list, searching an unsorted array, binary search for sorted arrays, hashing and indexing, open addressing and chaining, trees and tree traversals, binary search trees, heaps, M-way tress, balanced trees, graphs, breadth-first and depth-first traversal, topological order, shortest path, adjacency matrix and adjacency list implementations, memory management and garbage collection

Memory management & Garbage collection

- Memory management is the process of allocating and deallocating memory in a computer program.
- In most programming languages, memory management is handled by the ***operating system*** and the runtime environment of the programming language.

Memory management & Garbage collection cont…

- In low-level programming languages such as C or C++, memory management is done explicitly by the programmer through functions such as **malloc()** and **free()**.
- This means that the programmer has to keep track of memory allocation and deallocation, which can lead to errors such as memory leaks (when memory is not freed) or invalid memory access (when memory is accessed after it has been freed).

Memory management & Garbage collection cont…

- In higher-level programming languages such as Java, Python, or JavaScript, memory management is done automatically through a technique called garbage collection.
- Garbage collection is the process of automatically freeing memory that is no longer being used by the program.

Memory management & Garbage collection cont…

- The garbage collector identifies memory that is no longer accessible and frees it up so that it can be used again. This helps to prevent memory leaks and invalid memory access.
- There are different types of garbage collection algorithms, such as mark-and-sweep, reference counting, and generational garbage collection.

Memory management & Garbage collection cont…

- Each algorithm has its own strengths and weaknesses and is suitable for different types of applications.
- Overall, memory management and garbage collection are important concepts in computer programming because they affect the performance and reliability of a program.
- A good understanding of memory management and garbage collection can help programmers write more efficient and robust programs.