STANDARD ALGORITHMS

Fountain Problem

Shortest subarray of sum greater than given value

Longest subarray of sum smaller than given value

Minimum refuelling stops

Longest palindromic substring

Longest palindromic subsequence

Longest common substring

Longest common subsequence

Longest increasing subarray

Longest increasing subsequence

Largest sum continuous subarray – Kadane's algorithm

Cycle detection in graph

Union find algorithm – Disjoint set union

Dijkstra's shortest path algorithm

Bellman-Ford shortest path algorithm

Floyd-Warshall shortest path algorithm

Kruskal's minimum spanning tree algorithm

Prim's minimum spanning tree algorithm

SORTING ALGORITHMS

Quick sort

Merge sort

Heap sort

Bubble sort

Insertion sort

Selection sort

Counting sort

Radix sort

Bucket sort

C and C++ LANGUAGE

Stack vs heap

Malloc vs calloc vs realloc

New vs malloc

Delete vs delete[]

Struct vs union vs enum

Structure padding in C

C struct vs C++ struct

Struct vs class

Pointer vs reference

Static functions

Static global variables vs global variables

Const member functions in a class

Storage classes – register, auto, static, extern, const, volatile,mutable

“final” keyword to disable function overriding

Smart pointers in C++ (OPTIONAL)

OPERATING SYSTEMS

Types of memories - register, cache, primary, secondary

Program counter

Process vs Threads

Multiprocessing vs Multithreading

Mutex vs semaphore

Dining philosophers' problem

Four conditions for deadlock and how to avoid them

Banker's algorithm

What is process starvation

Process scheduling algorithms

Fragmentation – internal and external

What is paging

What is demand paging

What is page fault

Pages vs frames

Virtual memory vs physical memory

Swap space and how swapping works

What is thrashing

LRU cache and its implementation

Page replacement algorithms

OBJECT ORIENTED PROGRAMMING

Four pillars of OOP

Constructor and destructor

Copy constructor and copy assignment operator

Access modifiers – public, protected, private

Friend functions and friend classes

Overloading vs overriding

Virtual functions, virtual destructors, virtual tables, virtual pointers

Runtime vs compile time polymorphism

Pure virtual functions and abstract classes

Public, private and protected inheritance

Virtualness of a function is also inhertited

Which properties are not inhertited by a derived class

Multiple inheritance, virtual inhertitance and diamond problem

COMPUTER NETWORKS

What is an IP address

IPv4 vs IPv6 addresses

Static IP vs dynamic IP addresses

How does a URL work

Forward proxy vs reverse proxy

Proxy vs VPN

Subnetting and supernetting

Hub, repeater, switch, bridge, router, gateways

OSI model – all layers in detail

TCP/IP model – all layers in detail

Sockets and ports

Ping and traceroute

Networking protocols – TCP, UDP, HTTP, HTTPS, FTP, DHCP, ICMP, IGMP, IMAP, SMTP, DNS

TCP connection 3-way handshake

Distance vector routing protocol

Link state routing protocol

REST API and its CRUD functionalities

DATABASE MANAGEMENT SYSTEMS

ACID properties – atomicity, consistency, isolation, durability

Primary key vs Foreign key

Types of attributes in ER model

1:1, 1:N, N:N relationships

Codd's 12 rules for RDBMS