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GeeksforGeeks
A computer science portal for geeks

SIX WEEKS SUMMER TRAINING REPORT

ON,

DATA STRUCTURES AND ALGORITHMS SELF-PACED COURSE

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SCHOOL OF COMPUTER SCIENCE & ENGINEERING

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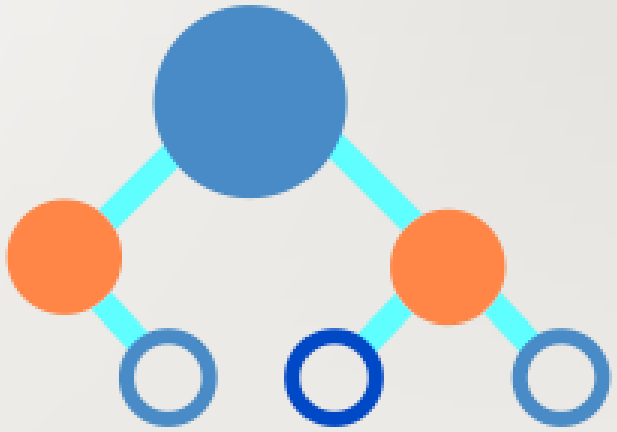
COURSE CONTENT

- Introduction
- Mathematics
- Bit Magic
- Recursion
- Arrays
- Searching
- Sorting
- Matrix
- Hashing
- Strings
- Stack
- Queue
- Deque
- Tree
- Heap
- Graph
- Greedy
- Dynamic Programming

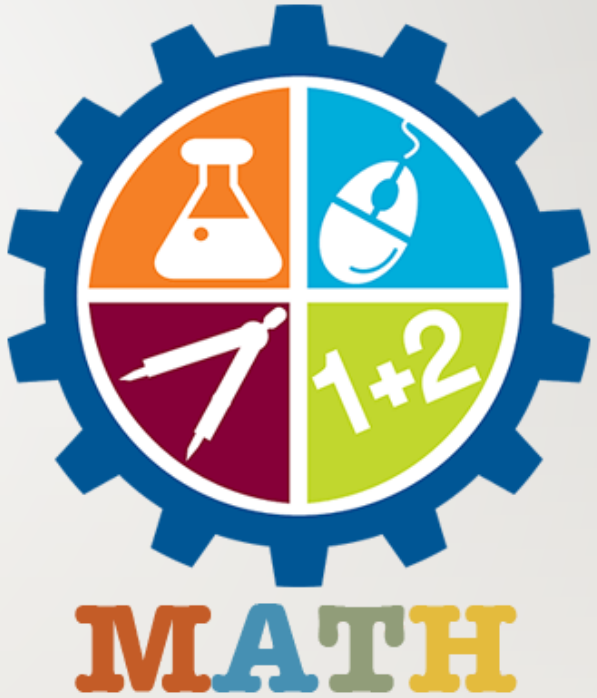
INTODUCTION

- Analysis of Algorithm
- Order of Growth
- Asymptotic Notations
- Big O Notation
- Omega Notation
- Theta Notation
- Analysis of common loops
- Analysis of Recursion
- Space Complexity



MATHEMATICS

- Finding the number of digits in a number
- Quadratic Equations
- Mean and Median
- Prime Numbers
- LCM and HCF
- Factorials



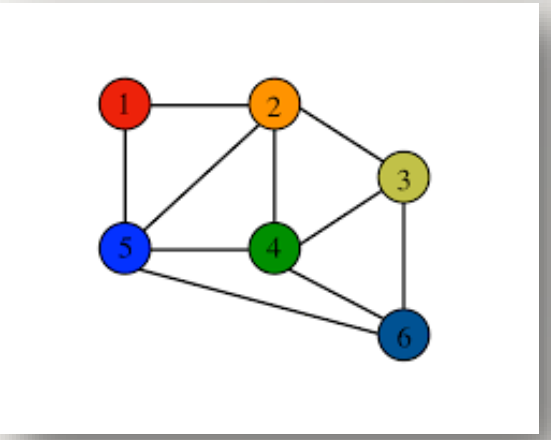
BIT MAGIC

- Binary Representation
- Set and Unset
- Toggling
- Bitwise Operators

- Bitwise Operators in C++
  - Operation of AND, OR, XOR operators
  - Operation of Left Shift, Right Shift and Bitwise Not

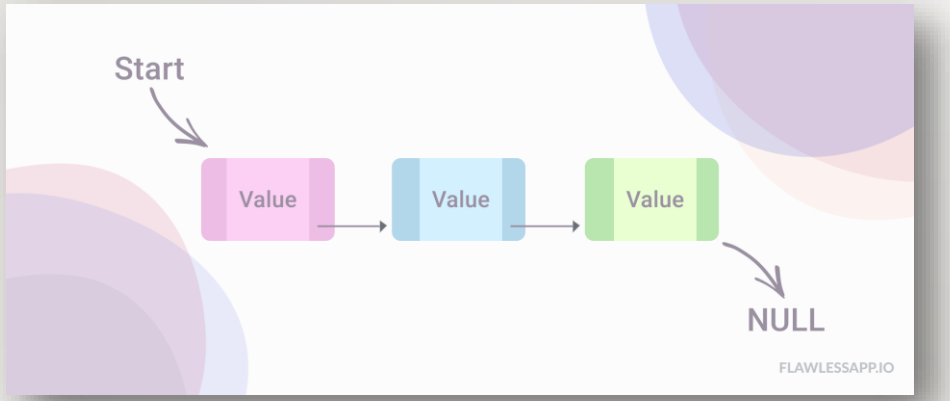
ARRAYS & RECURSION

- Basic Operations
- Shifting and Rotation
- Sum Arrays
- Types of Arrays
  - Dynamic-sized array
- Operations on Arrays
- Recursion Basics
- Advantages



SEARCHING & SEARCHING

- Linear Search
- Binary Search
- Two Pointer Approach Problems



- C++ STL sort()
- Implementation in Vectors
- Sort(arr.begin(), arr.end());
- Quick Sort

STRINGS, MATRIX AND HASHING

- Strings in CPP
- push_back()
- pop_back()

- Transposing a matrix
- Matrix Multiplication
- Operations

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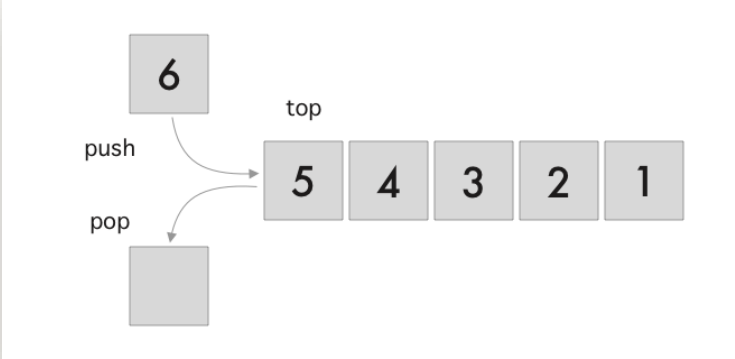
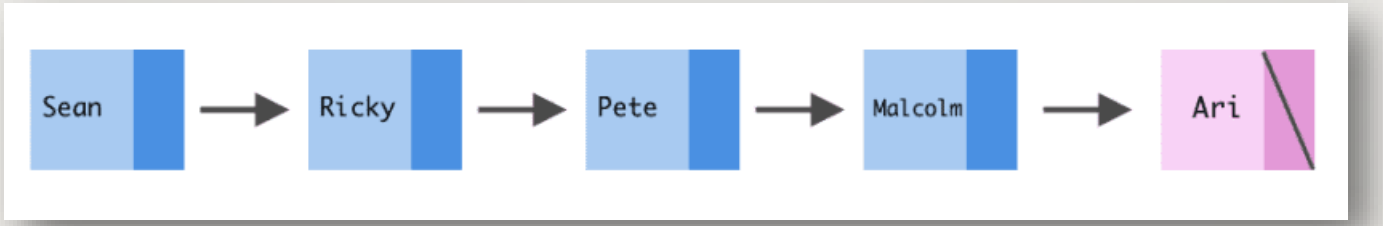


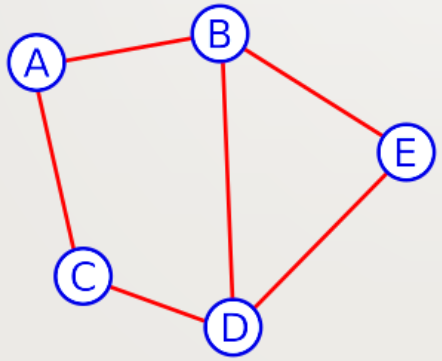
STACK, QUEUE AND DEQUE

- *Stack* works on LIFO (last in, first out)
- Queue works on First In First Out (FIFO)
- Double-ended queue, DEQUE
- All are of dynamic sizes



TREES, HEAP AND GRAPHS

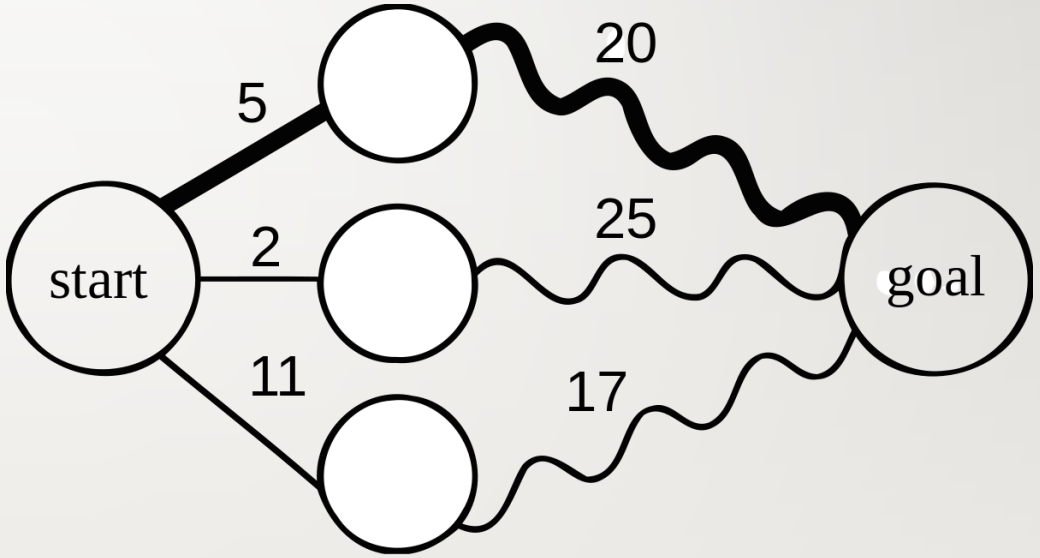
- Tree Traversal
  - Inorder Traversal (Left, Root, Right)
  - Preorder Traversal (Root, Left, Right)
  - Postorder Traversal (Left, Right, Root)



- Min Heap and Max Heap
- Heapify
- Graph Traversals
- Breadth-First Search
- Depth First Search

GREEDY & DYNAMIC PROGRAMMING

- Optimization problems
- Overall optimal way
- Memoization
- Recomputation



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THANK YOU!!