Competitive Programming (SoC'25)

Project id - 22

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## Week 4 :Stacks, Queues, Deques, Expression Parsing, Bitmasks

### Theory:

(these are just resources you can always learn from youtube or other sources)

1. Stack: LIFO, applications(bracket matching, undo, spans): <https://www.geeksforgeeks.org/dsa/stack-data-structure/>
2. Queue: FIFO, applications(scheduling, caching): <https://www.geeksforgeeks.org/dsa/queue-data-structure/>
3. Deque: Double-ended queue, sliding window maximum: <https://www.geeksforgeeks.org/cpp/deque-cpp-stl/>
4. heap(priority queue)(they are binary trees in shape only and are best understood as array based structures):
   1. <https://www.geeksforgeeks.org/dsa/binary-heap/>
   2. <https://www.geeksforgeeks.org/cpp/priority-queue-in-cpp-stl/>
5. Monotonic Stack/Queue(for CF):
   1. Monotonic increasing/decreasing patterns(next greater element, histogram area): <https://cp-algorithms.com/data_structures/stack_queue_modification.html>
6. Expression Parsing
   1. Infix to postfix, postfix evaluation:
      1. <https://www.geeksforgeeks.org/dsa/convert-infix-expression-to-postfix-expression/>
      2. <https://www.geeksforgeeks.org/dsa/evaluation-of-postfix-expression/>
7. Bit Manipulation/Bitmasks
   1. Bit operations: AND, OR, XOR, NOT, shifts: <https://www.geeksforgeeks.org/bitwise-operators-in-c-cpp/>
   2. Set/unset/toggle/check bits: <https://www.geeksforgeeks.org/dsa/set-clear-and-toggle-a-given-bit-of-a-number-in-c/>
   3. <https://www.youtube.com/watch?v=LGrE0siZ-ZA&t=326s>
   4. [https://codeforces.com/blog/entry/18169\](https://codeforces.com/blog/entry/18169%5C)

### Problems:

(increasing difficulty, maintain a git repo)

(continue doing number theory problems)

1. Stack, Queue, Deque, heap, expression parsing:
   1. <https://www.geeksforgeeks.org/bitwise-operators-in-c-cpp/>
   2. <https://leetcode.com/problems/implement-queue-using-stacks/description/>
   3. <https://leetcode.com/problems/daily-temperatures/description/>
   4. <https://leetcode.com/problems/next-greater-element-i/description/>
   5. <https://leetcode.com/problems/top-k-frequent-elements/description/>
   6. <https://leetcode.com/problems/kth-largest-element-in-an-array/description/>
   7. <https://leetcode.com/problems/basic-calculator-ii/description/>
   8. <https://leetcode.com/problems/evaluate-reverse-polish-notation/description/>
2. Bitmasks
   1. <https://leetcode.com/problems/single-number/description/>
   2. <https://leetcode.com/problems/counting-bits/description/>
   3. <https://leetcode.com/problems/subsets/description/> (do using bitmasks)
   4. <https://codeforces.com/problemset/problem/1698/A>
   5. <https://codeforces.com/problemset/problem/1635/A>
   6. <https://codeforces.com/problemset/problem/1903/B>
   7. <https://codeforces.com/problemset/problem/1514/B>