MORE INTERVIEW PRACTICE
FINAL WRAP UP

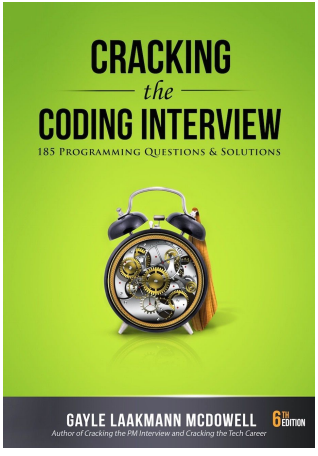
Final exam

- About the final exam: https://ucsb-cs24-s21.github.io/exam/e01/ (June 7)
  - Open book and open notes
  - Must be completed individually with integrity
  - Do not refer to any resources on the internet except those explicitly mentioned in the exam.

Small group exercise

Write a ADT called in minStack that provides the following methods

- push() // inserts an element to the “top” of the minStack
- pop() // removes the last element that was pushed on the stack
- top () // returns the last element that was pushed on the stack
- min() // returns the minimum value of the elements stored so far



① STL stack + a variable to keep track of min

stack<int> S

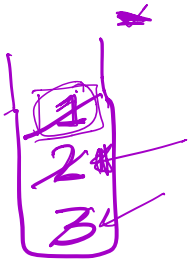
② vector<int> V

top() : element at the end of the vector O(1)
push() : insert at the end O(1)
pop() : remove from the end O(1)
min() : linear search for min O(N)

③ Use two stacks

push, pop, top, min → O(1)

S: numbers
push() pop() top()
pop() → 5, 4

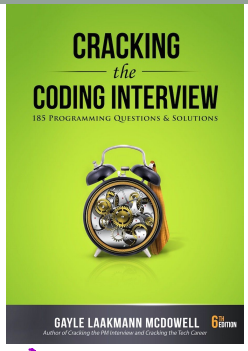


keep tracks → min

top
min
(5, 1)

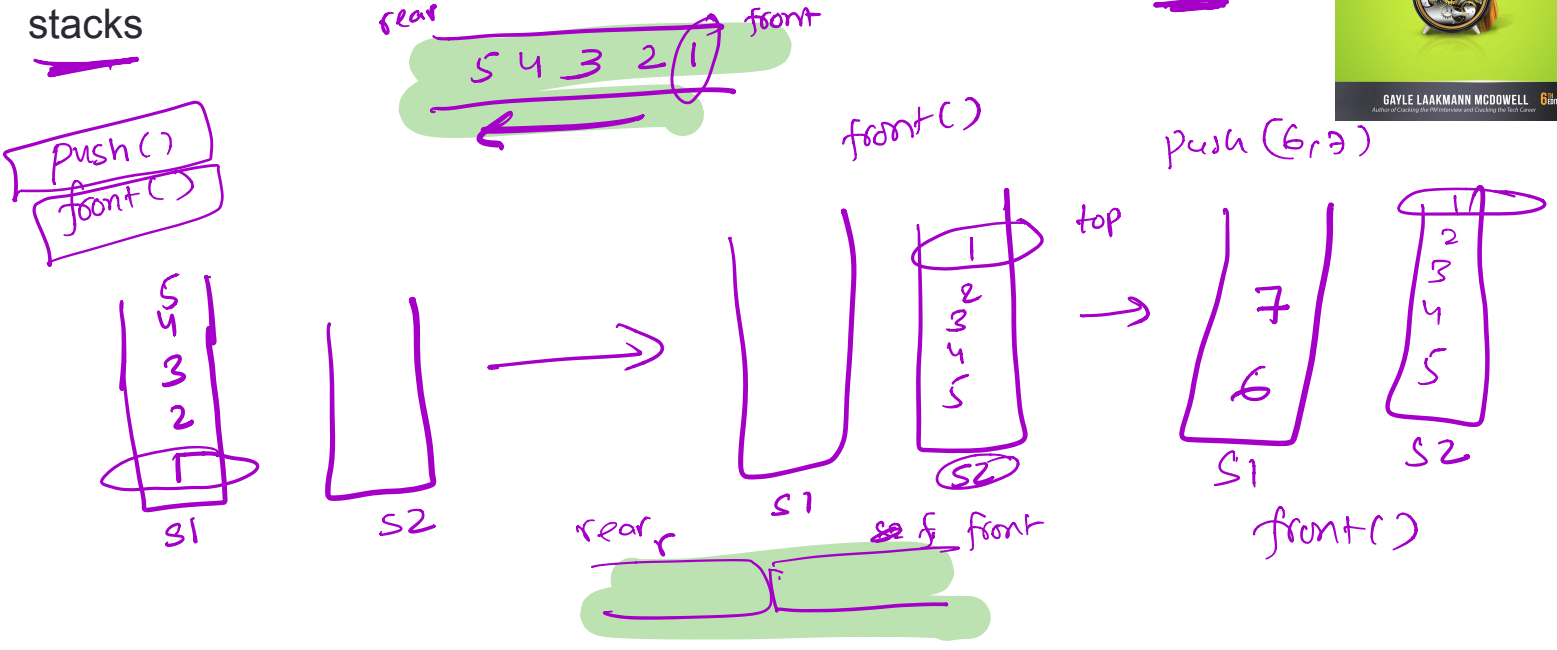
4

(4, 1)
(1, 1)
(2, 2)
(3, 3)



Queue via stacks

Implement a MyQueue class which implements a queue using two stacks



Review copy constructor

Implement the copy constructor for a BST

Data structure Comparison

	Insert	Search	Min	Max	Delete min	Delete max	Delete (any)
Sorted array							
Unsorted array							
Sorted linked list (assume access to both head and tail)							
Unsorted linked list							
Stack							
Queue							
BST (unbalanced)							
BST (balanced)							
Min Heap							
Max Heap							

Data structure Comparison

	Insert	Search	Min	Max	Delete min	Delete max	Delete (any)
Sorted array	O(N)	O(logN)	O(1)	O(1)	O(N) if ascending order, else O(1)	O(1) if ascending, else O(N)	O(logN) to find, O(N) to delete
Unsorted array	O(1)	O(N)	O(N)	O(N)	O(N)	O(N)	O(N)
Sorted linked list (assume access to both head and tail)	O(N)	O(N)	O(1)	O(1)	O(1)	O(1)	O(N) to find, O(1) to delete
Unsorted linked list	O(1)	O(N)	O(N)	O(N)	O(N)	O(N)	O(N) to find, O(1) to delete
Stack	O(1) - only insert to top	Not supported	Not supported	Not supported	Not supported	Not supported	O(1) - Only the element on top of the stack
Queue	O(1) - only to the rear of the queue	Not supported	Not supported	Not supported	Not supported	Not supported	O(1) - only the element at the front of the queue
BST (unbalanced)	O(N)	O(N)	O(N)	O(N)	O(N)	O(N)	O(N)
BST (balanced)	O(logN)	O(logN)	O(logN)	O(logN)	O(logN)	O(logN)	O(logN)
Min Heap	O(logN)	Not supported	O(1)	Not supported	O(logN)	Not supported	O(logN)
Max Heap	O(logN)	Not supported	Not supported	O(1)	Not supported	O(logN)	O(logN)