



BOSSCODER
ACADEMY



MASTERCLASS NOTES

Bosscoder Academy Masterclass

Starts @ 0905PM

Stack & Queues
Fundamental
to Advanced

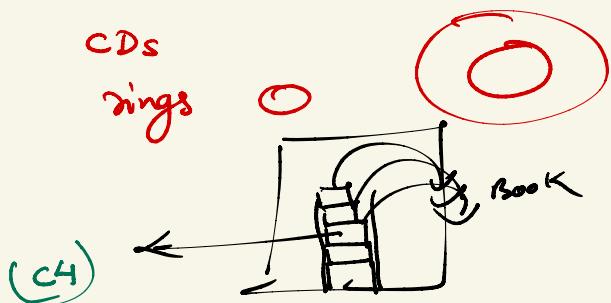
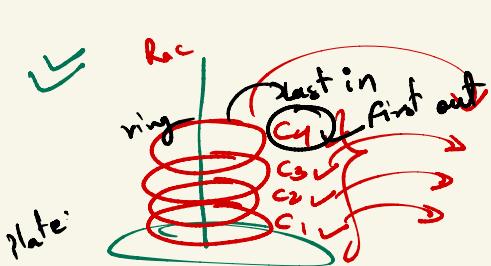
-By
Ashish Prasad

Stack & Queues

Agenda

1. Intro to stacks
 - ↳ Theory
2. Operations in stacks
3. Problems
 - a. spiral stack
 - b. smaller nearest decent
 - c. variation of abv problem
4. Queues & Problems

Stack : \rightarrow LIFO \rightarrow last in first out



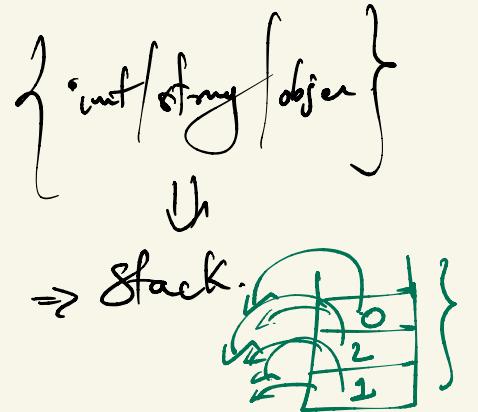
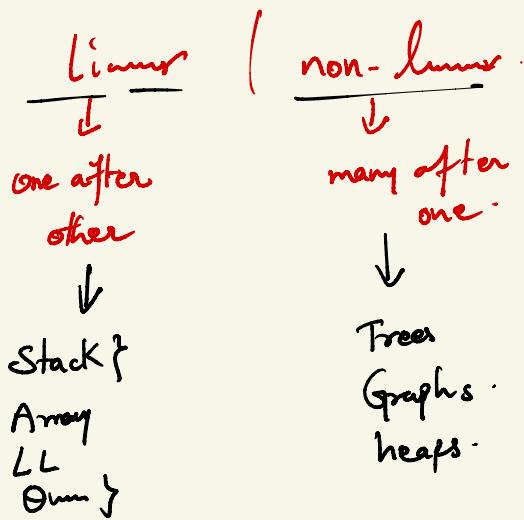
Operations in stack

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Push(x) 2. Pop() | <ul style="list-style-type: none"> \leftarrow add element to stack. \leftarrow Remove the "<u>top</u>" element from stack |
|---|---|

3. Peek()/top() ← Returns the top element

Implementation Stack:

↳ Using Array (Dynamic Array) Vectors
↳ Using Linked List LIST $[]$

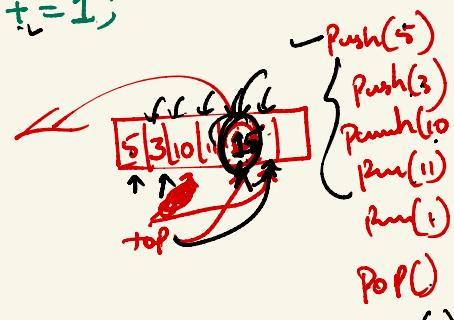


int c::stack = [];
top = 0;

def PUSH(int x){
 stack[top] = x;
 top += 1;
}

int POP()

{
 if (top <= -1)
 Print("empty stack")



Pop()

Push(15)

```

    return '-100';
ele = stack[top - 1];
top = top - 1;
return ele;
}

```

(2)

```

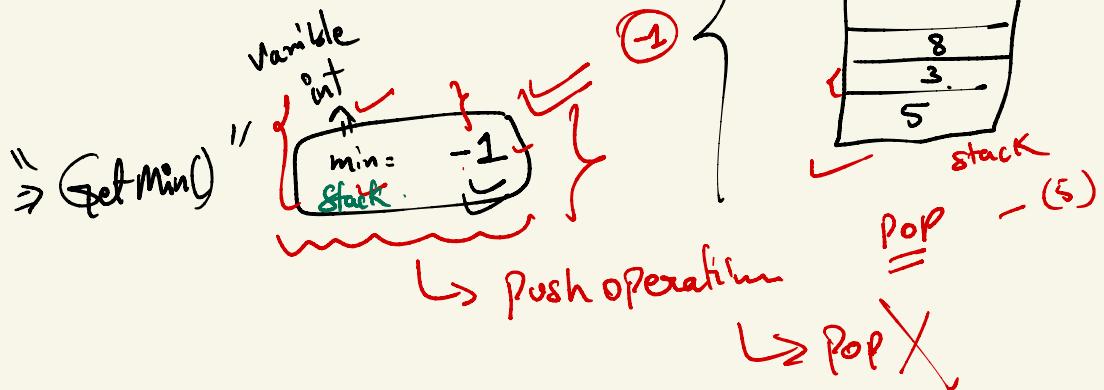
int Peek() {
    if (top <= -1) return "-100";
    return stack[top - 1];
}

```

{

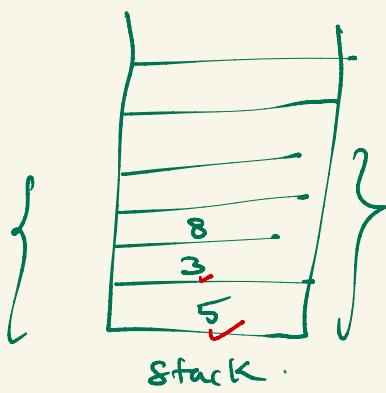
① Create a special stack, getMin()

Push, Pop, Peek, getMin



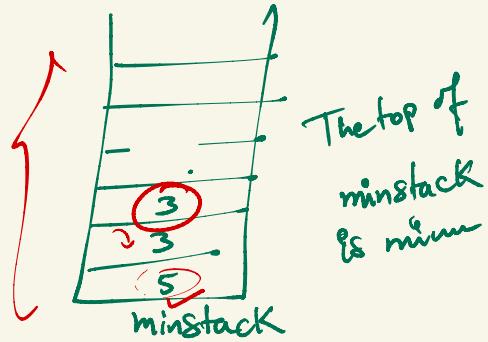
2 stacks

{5, 3, 8, -1, 10, 5}



pop

O(n)



class specialStack :

```
def __init__():
    dataStack = []
    minStack = []
```

def Push(x):

```
    dataStack.append(x)
    minStack.append(min(x, minStack[-1]))
```

}

def POP():

```
    if(len(dataStack) == 0):
        return;
```

```
    dataStack.pop()
    minStack.pop()
```

}

\leftarrow removes the last element.

def GetMin():

// Exception handling:

return minStack[-1]

}

② Smaller nearest element in the left.

→ A : 

Brute force

$5 \times 2 = 10$

Brute force

for
for &
}

$i \rightarrow 0$ to $n-1$
 $j \rightarrow a[i-1] \rightarrow$

$O(n^2)$

$$\cancel{5 \times 2 = 10}$$

$$\left\{ \begin{array}{ccccccccc} \cdot & : & ? & : & b & ? & : & ? & : \\ & & & & \downarrow & & & & \downarrow \\ & & & & 1 & & & & 0 \end{array} \right\} \xrightarrow{i-1 \text{ to } 0} \left\{ \begin{array}{ccccccccc} \cdot & : & ? & : & b & ? & : & ? & : \\ & & & & \downarrow & & & & \downarrow \\ & & & & 1 & & & & 0 \end{array} \right\}$$

$$A = \begin{matrix} & 1 & 6 \\ -\infty & & 1 \\ & 4 & 1 \end{matrix}$$

for

६

A hand-drawn diagram showing a vertical stack of four horizontal lines. The top line contains the number '5'. The second line contains the number '2'. The third line contains the number '1'. A red arrow points to the left of the first line. A red bracket on the right side groups all four lines together. A red checkmark is at the bottom right.

Ans[] 2 6 4 10 2 5 ✓

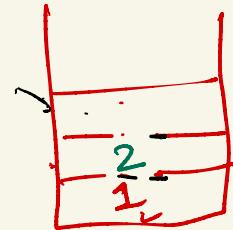
L1
Stack

Ans[0] = 0 1 1 4

1 5

① if st is empty

ans.append(-∞)
st.push(a[i])



② if (a[i] > st.top())

Ans.append(st.top())

st.push(a[i])

③ if (a[i] < st.top())

while (st.top() >= a[i]) {
} st.pop()

ans.append(st.top())

st.push(a[i])

→ nearest smaller to left
 → nearest smaller to right
 → nearest larger to left
 → nearest larger to right

Hard

3.

Largest area rectangle in a histogram.

$$A = 6, 2, 5, 4, 5, 1, 6$$



largest area rectangle

Yello
Green
Blue
Pink

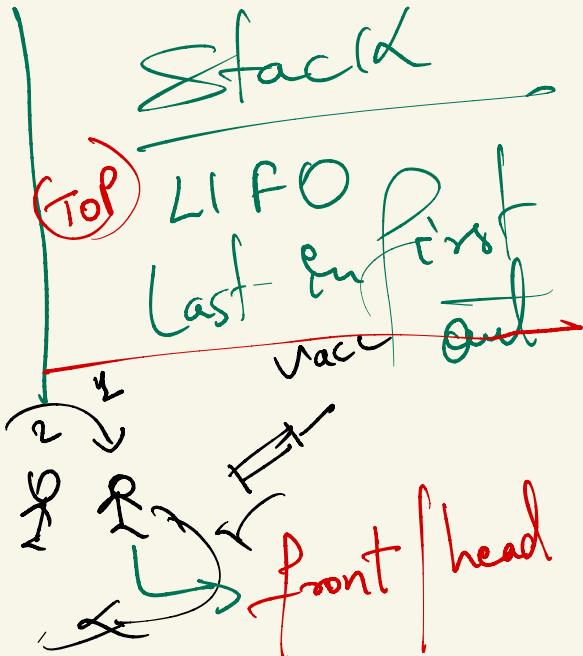
Cumulus =

FIFO

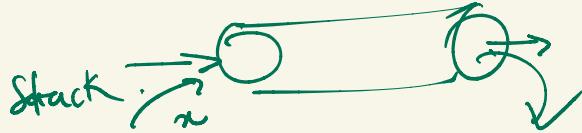
first in first out



Rear | front



Operations



Push(x)

Pop

1. Enqueue(x)

2. Dequeue()

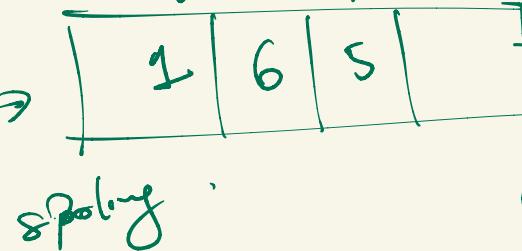
3. front() or peek()

4. IsEmpty()

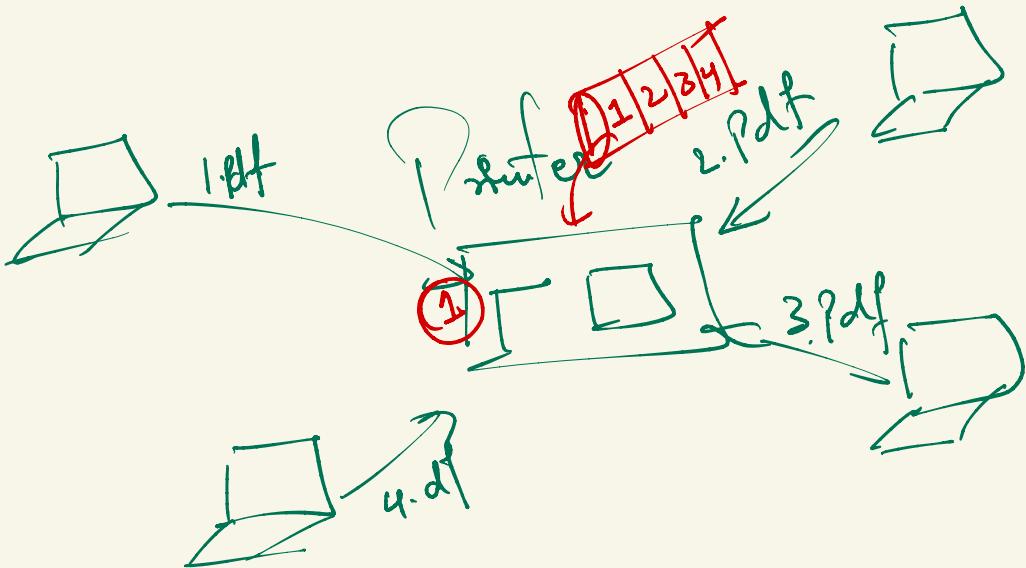
rear

front

enqueue



dequeue



ABOUT BOSSCODER

Bosscoder is an online upskilling platform for techies. We help learners upskill in tech roles to get them placed at top tech companies. We do so through our structured & mentored program designed by industry experts.

USP of our program include:

✨ **STRUCTURED CURRICULUM:**

Covers everything you need to get placed at top tech companies: Problem solving in DS & Algo, CS Fundamentals, System Design (HLD + LLD), Full Stacks & Queues Projects

✨ **LIVE CLASSES:**

An active learning classroom program taught by engineers working at companies like Microsoft, PayPal, Amazon

✨ **1:1 MENTORSHIP & MOCK INTERVIEWS:**

Personal mentors from top tech companies help you provide the right guidance, feedback, and support.

✨ **24/7 DOUBT SUPPORT:**

Through our army of Teaching Assistants

✨ **INDUSTRY-RELEVANT PROJECTS:**

Full Stacks & Queues specialization with Industry-relevant projects

✨ **PLACEMENT SUPPORT:**

Providing opportunities to tech engineers in eminent startups & top tech companies.

BUILD YOUR CAREER WITH US

-  **400+** Alumni placed at Top Product-based companies.
-  Highest package of **86 LPA**
-  Average package of **22 LPA**.
-  Resume reviewed and interview scheduled for **1000+** students



Lakshmi susmitha
Software Engineer II, JP Morgan

Service Based to JP Morgan in 4 months

From a tier-3 college to working in service-based companies, my thirst to join a product-based company didn't go away. BossCoder helped me provide a very detailed path from coding to system design. The way of teaching, and 1:1 mentorship helped me a lot.

Before
IBM
Application Engineer



After
JP Morgan
Software Engineer II



Dheeraj Barik
Software Engineer 2, Amazon

System Engineer at Service Based to SDE 2 at Amazon

Working in Infosys, I was looking for a platform to prepare for interviews of product-based companies. I found BossCoder has a highly structured program covering DSA, System Design etc. in detail. Top-quality instructors and mock interviews proved helpful for me.

Before
Infosys
Systems Engineer



After
Amazon
SDE 2



Vishal Srivastava
Software Developer, Barclays

Service Based to London Based Bank

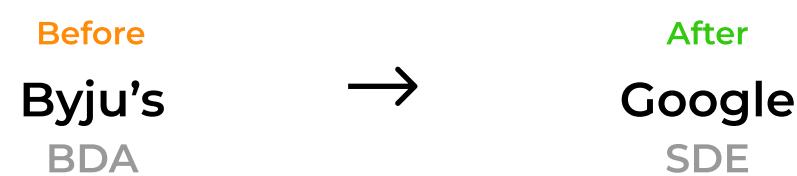
Doing self-prep, I couldn't even pass online assessments of Top companies. But the change BossCoder Academy brought into my preparation is phenomenal. Crucial topics taught in Live classes like DSA, HLD, and LLD, and my personal mentor's guidance ensured I clear my dream company.



Ujesh Nada
Software Development Engineer, Google

Business Development Associate to SDE at Google

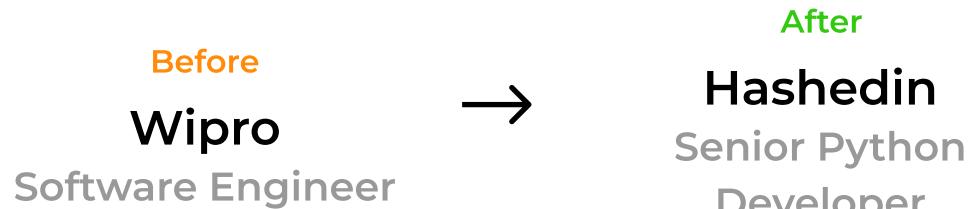
I self-prepared DSA for 8 months, without any results. I joined BossCoder Academy since I wanted to be mentored by industry experts, and it proved to be a great decision for my DSA and System Design preparation. Their 1-on-1 mentor sessions and Live classes helped me transform my career.



Rakesh Kumar Satapathy
Sr. Developer, Hashedin

Bsc. Graduate stuck in service based to Hashedin

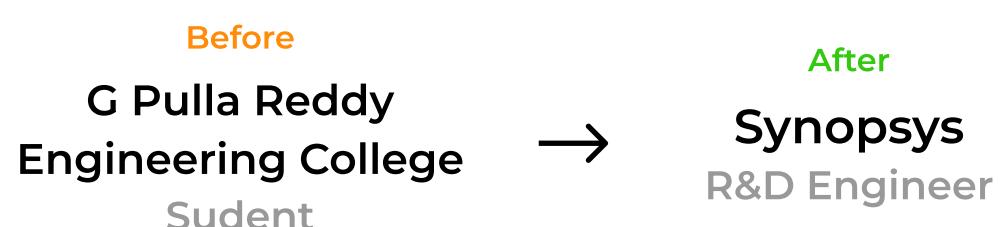
Stuck in a service-based company with no exposure, I always believed that I can realize my dream life, but didn't know how. BossCoder Academy showed the right path to coding geek inside me. Their world-class curriculum and personal mentorship enabled me to switch to my dream role.



Harshith Ravinoothala
R&D Engineer 1, Synopsys

Tier 3 College Student to Product Based Company

I always wanted to get into a product based company, but being a tier 3 college student lacked exposure to coding. BossCoder Academy helped me gain confidence in DSA and core subjects like OS, DBMS and System Design. Instant Mentor support helped me stay clear of doubts.

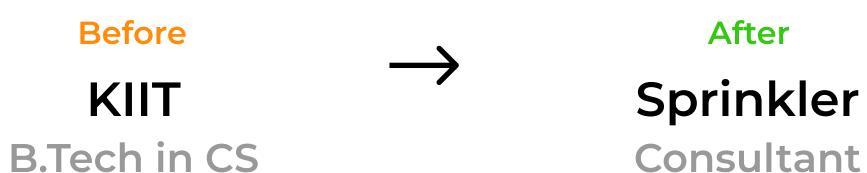




Sarveshwar Neogi
Consultant, Sprinkler

Clueless college student to Consultant at Sprinkler

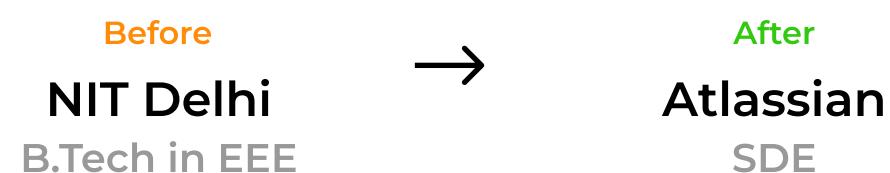
I was wasting my time in college, with no idea how to improve my coding skills. The structured roadmap provided by BossCoder transformed me into a Tech Rockstar. In-depth live lectures and daily handpicked questions helped me become consistent in problem-solving.



Aarushi Jain
Software Development Engineer, Atlassian

No interest in coding to SDE at Atlassian

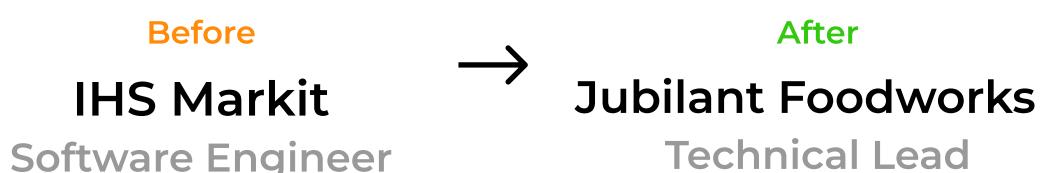
My journey in college was a roller coaster ride, and I wasted lots of time in learning from free resources. BossCoder Academy's excellent curriculum helped me become consistent and invest my efforts in the right direction. With my mentor's guidance, I received offers from Amazon and Atlassian.



Sumedha Khandelwal
Technical Lead at Jubilant Foodworks

Scared of Technical Interviews to Technical Lead

Having 7 years of experience, I always believed there is more to achieve in my career but failed in technical interviews. BossCoder helped me gain confidence to face technical interviews and I received many offers. Mock interviews and mentor feedback helped a lot.



Irshad K
Software Engineer, ByteDance

NIT Delhi to SDE in Singapore

I am among those talented students who require proper guidance to prosper. Cracking ByteDance was possible due to the guidance of my personal mentor at BossCoder Academy. Their structured curriculum helped me gain confidence in DSA and System Design.





Want to Upskill?

Go through our website, or email us at
ask@bosscoderacademy.com

VISIT WEBSITE
www.bosscoderacademy.com

A screenshot of a mobile application for BossCoder Academy. The left side shows a dark sidebar with navigation options: Home, Payment, My Course (selected), My mentor, Placement, Calender, Store, Problems, Lead board, Refer Earn, Profile, and Support. The main content area is titled 'My Courses' and displays four course modules: 'Beginners Lectures' (100% completed, 20/20 problems solved), 'Advance DSA' (80% completed, 15/20 problems solved), 'High Level design' (0% completed, 00/20 problems solved), and 'Low level design' (0% completed, 00/20 problems solved). Each module has a 'View Module' button. At the bottom of the main screen, it says 'Advance DSA' with 'Full course context' and 'Full report' buttons. On the right side, there's a profile section for 'R. Ekunde' with a welcome message, a notification bell, and a circular progress bar. Below the profile are performance metrics: Points (1856 / 15/1000), Streak (32 days), Solution (64 / 100), and Rating (4.8 / 5).