

Agenda

1. About this batch pragy@scaler.com
7351769231
2. Core values @ Scaler support@scaler.com
3. Performance Equation
4. Curriculum
5. DSA Teaser - Real life problem
6. QnA

FAQs

1. Are these classes recorded?
Yes.
2. Will these notes be available after the class?
Yes.
3. What spoken language will the course be taught in?
English.
4. What programming language will the course follow?
It will be language agnostic. (to discuss further)
5. If I have no programming background, which programming language should I learn?
Java. (to discuss further)
6. How long will the lectures be?
2.5 hours. (9.00 - 11.30) — with a 10 min break in b/w

About You

Batch Stats

CTO's in your batch, 6-8 years of exp, 16+ years
freshers, non-programming backgrounds.
- please introduce yourself in your slack groups.

Batch Division

- ↳ Beginner
- ↳ Intermediate
- ↳ Advanced

Pragy

Core Values @ Scaler

Quiz: best predictor of success

Consistently maintained
780% problem solving.

Course Intensity

15 - 16 hours per week (including the lectures)

Hectic!!

3 lecture / week → 7.5 hours of lectures

~ 5 assignment + 5 homework problem for each class → 8-9 hours

Consistency is key!

Slacking → to large off.

$$\text{improve 1% each day} \Rightarrow 1 \rightarrow 1.01 \rightarrow 1.02 \xrightarrow[365]{(1.01)} = 37x = 3700\%$$

$$\text{degrade 1% each day} \Rightarrow 1 \rightarrow 0.99 \rightarrow 0.98 \xrightarrow[365]{(0.99)} \approx 0.03$$

"

Nothing in the world can take the place of persistence.

Talent will not; nothing is more common than unsuccessful men with talent.

Genius will not; unrewarded genius is almost a proverb.

Education will not; the world is full of educated derelicts.

Persistence and determination alone are omnipotent.

"

- Calvin Coolidge

Maintaining Consistency

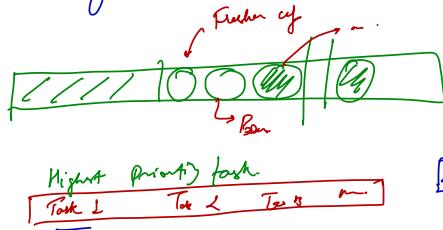
Boredom — hopefully not an issue @ scale.
— we collect feedback

Time Management

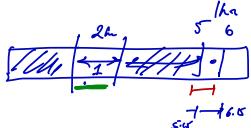
SESSIONS ON TIME MANAGEMENT

please create a schedule for yourself

Google Calendar.



"Don't prioritize your schedule. Schedule your priorities"



Motivation

Completing your task / being productive
is not your goal.

"Motivation is transient. Habits are forever!"

Goal is to build the habit of working on
your tasks.

Addiction hooks & Gamification

Performance Equation

$$\uparrow \text{Performance} = \uparrow \text{Potential} - \downarrow \text{Interference}$$

what are the things
that one can achieve

anything that is stopping you
from achieving your potential

↳ environment you are in
↳ motivating yourself
↳ right mentorship
↳ idea for goals

↳ your responsibility

Scalor's Responsibility

Teaching

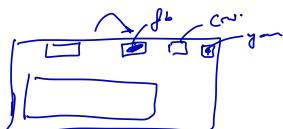
Curriculum

Community — you are the avg. of the 5 people
you spend most time with

Support

Your Responsibility

↳ During the lectures }
solving the assignments }
the focus should
be on the task.



Do's

- take notes!

- don't try to copy everything down.

① whenever you have a question.

② aha-moment — some clicks in your brain

③ find a link b/w two seemingly unrelated topics

Dont's

- during the class please don't
ask questions not relevant to the
topic.

Curriculum

→ Data Structures & Algorithms.

DSA & Problem Solving

Beginner +1 month

absolute 0 → Computer / types

program → Create → Run it

if else for loop → data types

Print your name

Python / Java

Intermediate +2 months

assume you have some programs
experience

- Matrix loops - arrays

- recursion - Lists / Hashmaps / stacks

- foundation for DSA

- Math Basics

Advanced 3 months

assumption → if you know the approach
you will be able to implement it
in code flawlessly.

track → how to think

Data Struct

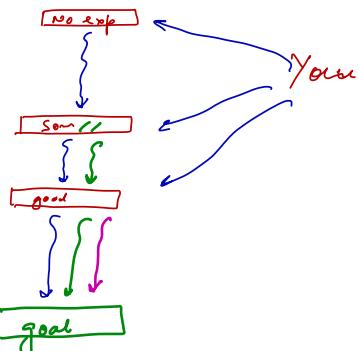
Algorithm

Path

Maths → Prim No / Sieve / Factoring
Mod arithmetic
Combinatorics

By the end of DSA

- { ① J in Java stands for Jobs
- ② Gives you just the right amount of difficulty.
- ③ Most large companies have their major tech stack in Java.



+1 +2 =+3
months

① I don't know which batch to go to?
- safest to start from Beginner

- SAT → based on your performance
either allow you to go to a high
batch or not.

you have extra time after
Scalr batch + assig + HW
Ping me

support@scalr.com
prg@scalr.in → cc

- ① Great problem Solves
- ② Know how to code in any modern programming language
- ③ Crack DSA rounds for any top corpor

Computer Science Fundamentals

4 / month

Database Management Systems →

Operating Systems →

Computer Network →

Low Level Design

Object Oriented Programming

Design Patterns

SOLID

ER diag

DR schema design

Case Studies

Interviews

High Level Design

Load Balancing

Caching

Message Q

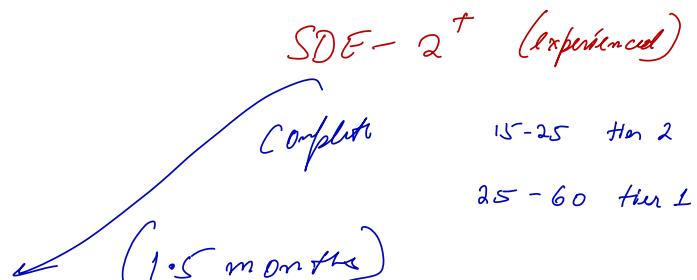
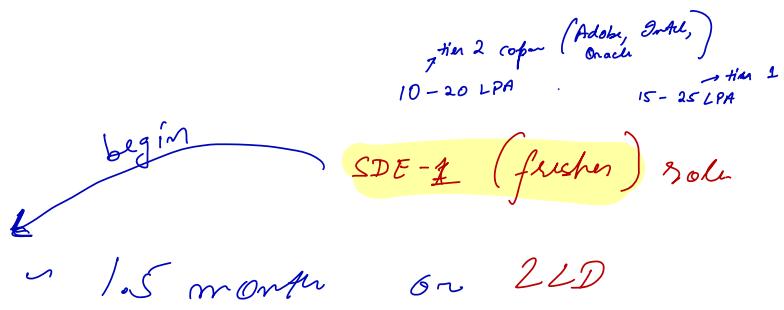
NoSQL vs SQL

Map / reduce

Consistent Hash

Distributed Transaction

Cosine



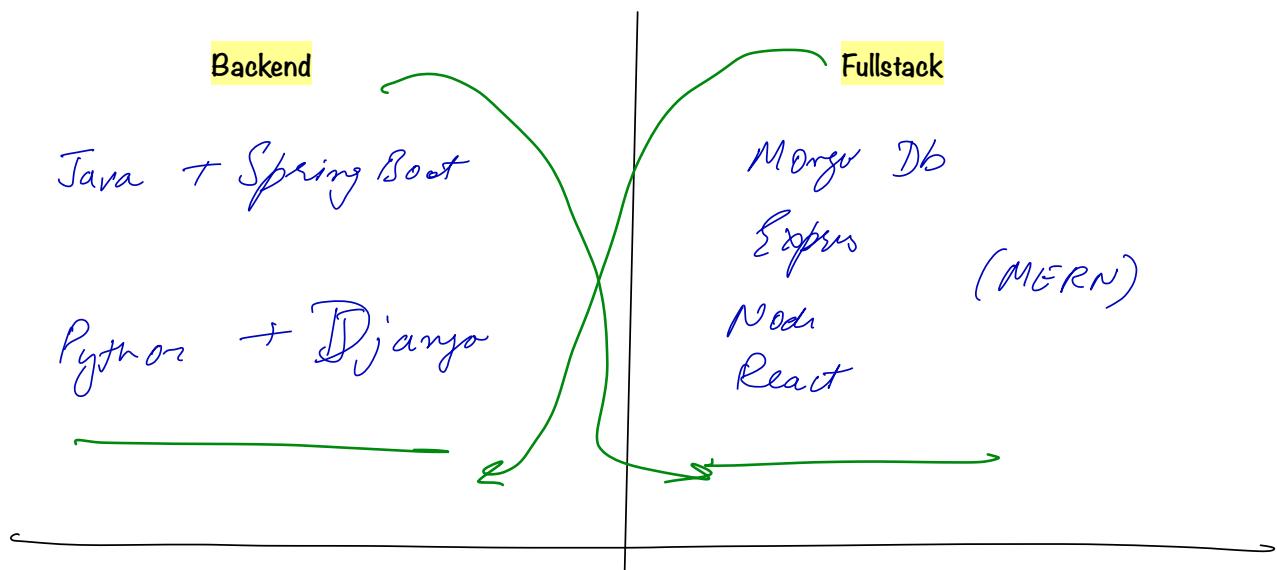
HTML/CSS/JS



∴ web is ubiquitous

Project ✓ 2 months

dedicated class → how to choose



Electives

- Product Mgmt
- Concurrency
- Adv. DSA.

Which Batch / Programming Language should I choose?

- Let the SAT decide
- Safest → Beginner's Batch
- Safest Lang → Java.

~~10^g~~¹⁴ min break.
10:31 → 10:45

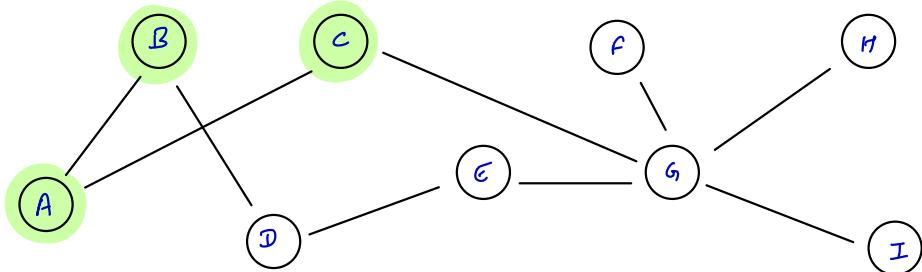
Q - Degree of Separation

examples - demo

Social Net — Facebook, twitter, LinkedIn,
Insta —

Network of People
↳ web

Graph
vertices/nodes → people
edges → connection.



○ People
— Connection
friend
followers

Problems that can be represented using n/w (graphs)

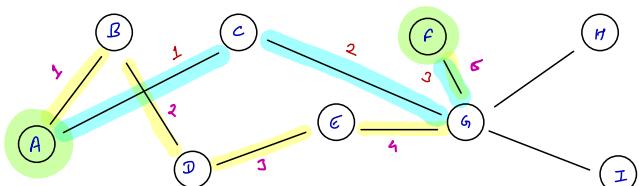
Company hierarchy / family relation / folder structure
roads & railway (Google maps)

block chain
git branches
hyperlinks on website

Degree of Separation

b/w two people

$DOS(A, F) = 3$
→ # of edges taken
min no of hops needed
to go from A to F.



$$DOS(A, H) = 3$$

$$DOS(C, B) = 2$$

$$DOS(B, I) = 5$$

$$A \xrightarrow{1} C \xrightarrow{2} G \xrightarrow{3} H$$

$$C \xrightarrow{1} A \xrightarrow{2} B$$

$$B \xrightarrow{1} A \xrightarrow{2} C \xrightarrow{3} G \xrightarrow{4} H$$

$$I \xrightarrow{1} D \xrightarrow{2} E \xrightarrow{3} G \xrightarrow{4} H$$

Task \rightarrow API $(\text{source}, \text{dest}) \rightarrow \text{int}$

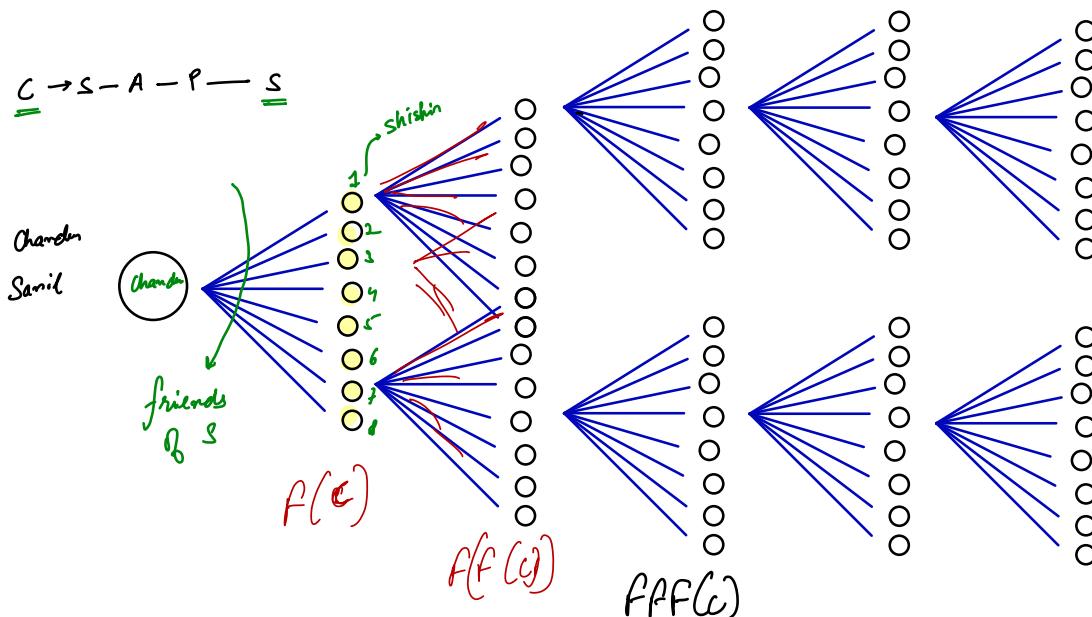
```
degree_of_separation(source, dest) {
```

```
}
```

↙ naive / simpl. / obvious
way

Basic Approach (Brute Force)

↑ don't apply your brain. Just *force* hand



```
degree_of_separation(source, dest) {
```

```
    if ( source == dest )
```

 0

```
    else if ( dest is in Friends(source) )
```

 1

```
    else if ( dest is in Friends(Friends(source)) )
```

 2

```
    else if ( dest is in F^3(source) )
```

 3

```
    else if ( dest is in F^4(source) )
```

 4

```
    else
```

 5+

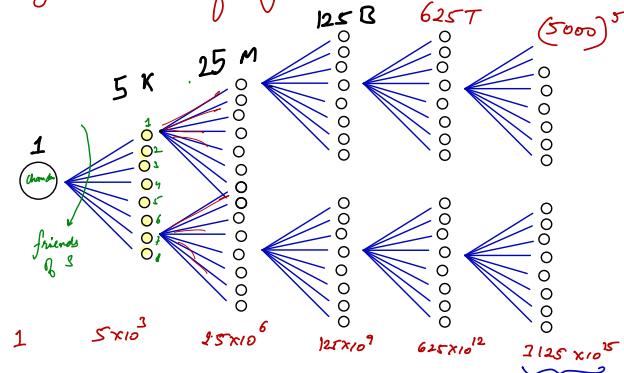
```
}
```

Chandru

Chandru \rightarrow Samil

Time Analysis

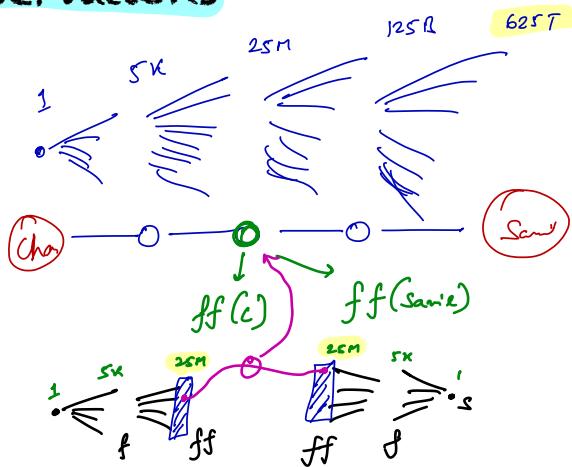
On avg. no of friends any profile has $\approx 5,000$



On avg. your computer can perform 10^8 op/s

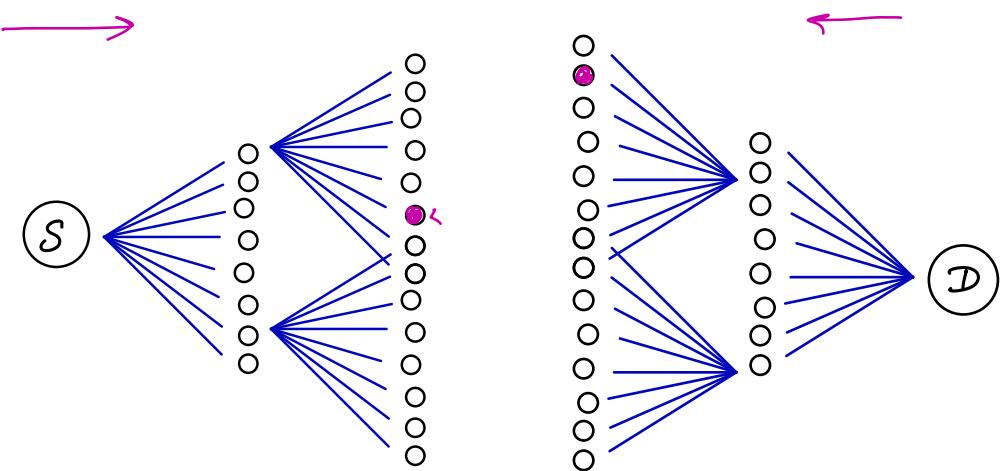
1s $\rightarrow 10^8$ friends (100m)
? s $\rightarrow 2 \times 10^{18}$ friends

Observations



$$\begin{aligned} 1s &\rightarrow 10^8 f \\ \frac{1s}{10^8} &\rightarrow 1f \\ \frac{1}{10^8} \times 2 \times 10^{18} &\rightarrow 2 \times 10^{18} f \\ &= 2 \times 10^{10} s \approx 30 \text{ billion seconds.} \\ &\approx 950 \text{ years.} \end{aligned}$$

Improved Approach



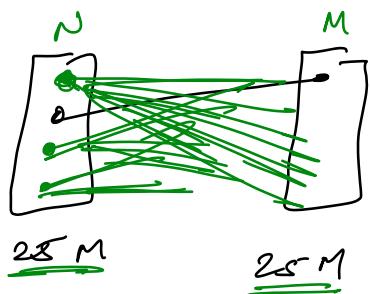
Bi-directional Search.

```

degree_of_separation(source, dest) {
    if ( source == dest )
        0
    else if ( dest is in Friends(source) )
        1
    else if ( Friends(source) <=> Friends(dest) )
        2
    else if ( F^2(source) <=> Friends(dest) )
        3
    else if ( F^2(source) <=> F^2(dest) )
        4
    else
        5
}

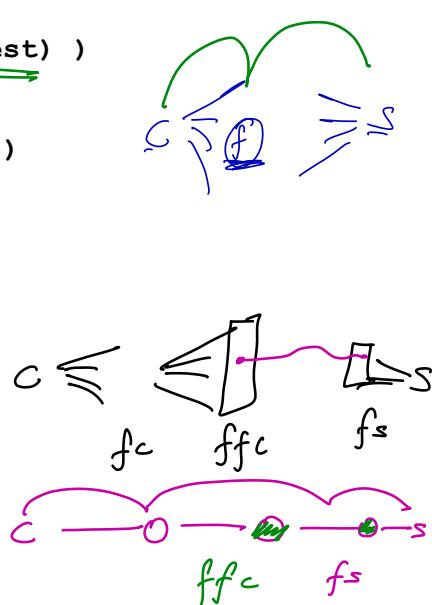
```

Checking for common values



(1) $n \neq m$

625 T Cof

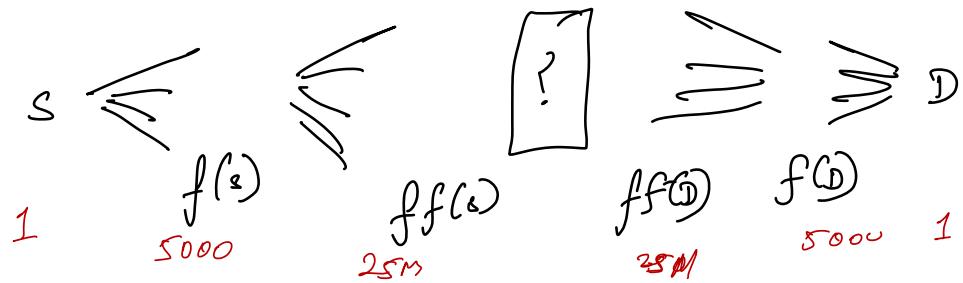


HashSet → adv. DSA

↳ Intermediate

↳ Magic Box → Comparison in 1 Operation

Time Analysis



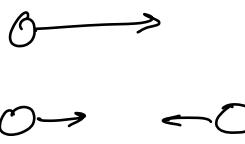
$$50M = \underline{50 \times 10^6}$$

1s $\rightarrow 10^8$ friends

$$\frac{1}{10^8} s \rightarrow 1 f$$

$$\frac{50 \times 10^6}{10^8} \rightarrow 50 \times 10^6 f$$

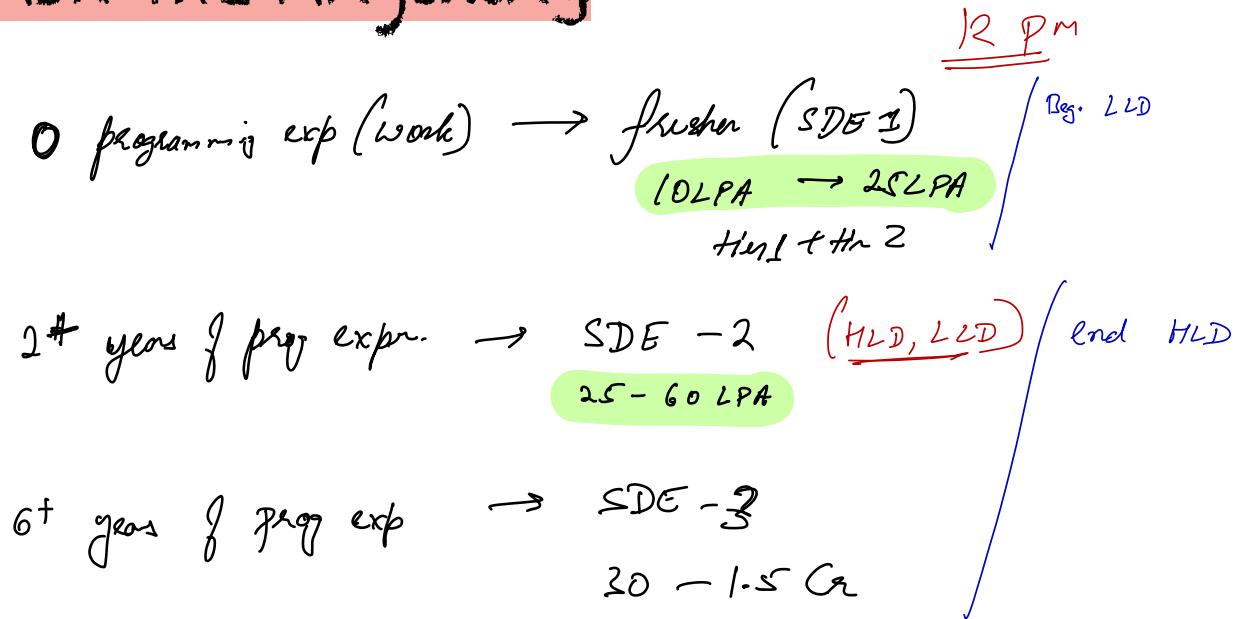
$$= \frac{50}{100} s = 0.5 s$$



950 years $\rightarrow 0.5$ sec.

$$\left\{ \begin{array}{l} O(n^k) \\ O(n^{4/2}) = O(\sqrt{n})^k \end{array} \right.$$

Ask me Anything



Maths — whenever we use a Maths concept
we will first introduce it.

$$10^3 \times 10^3 = 10^6$$

① Power, multiplication

② Unitary method

$$10^8 f \leftarrow 1 s$$

$$1 f \leftarrow \frac{1}{10^8} s$$

$$10^{10} f \leftarrow \frac{10^{10}}{10^8} = 10^2 s$$

Researcher → Scala course is NOT for that

industry → Scala.

much better than Maths
from IITB

Kshitij Mishra → boss

↳ 12th pass → does NOT have a BTech degree

Me → BTech from UPTU then →
↳ backlogs / I almost got an
year back

→ 2 years of gap

→ Meena → new company at
Dropout

Scaler Fair Play.

7351769231

Fragy @ Scaler.com