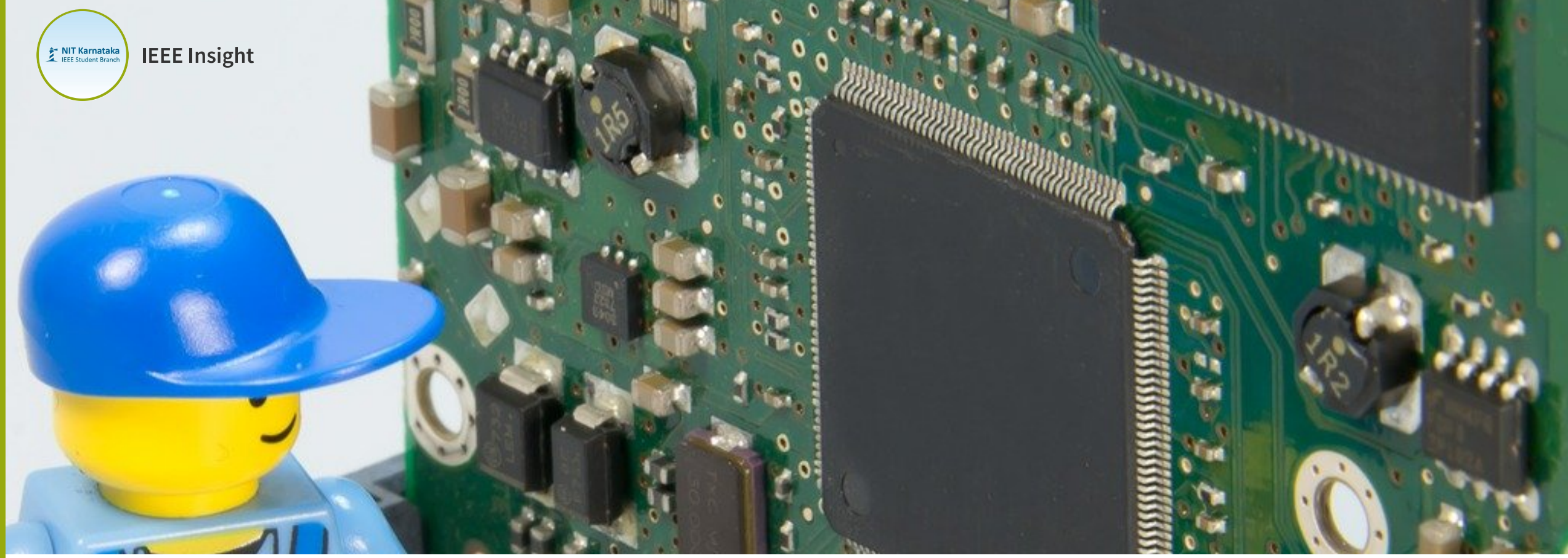
NIT Karnataka
IEEE Student Branch

IEEE Insight



Hacking Your Career

with hardware, academics, research and open-source!

Agenda

1. Who am I?
2. About EE/EC
3. My Journey
4. Career Options
5. General Tips

Hacking

means

- **(v.) be able to manage successfully**

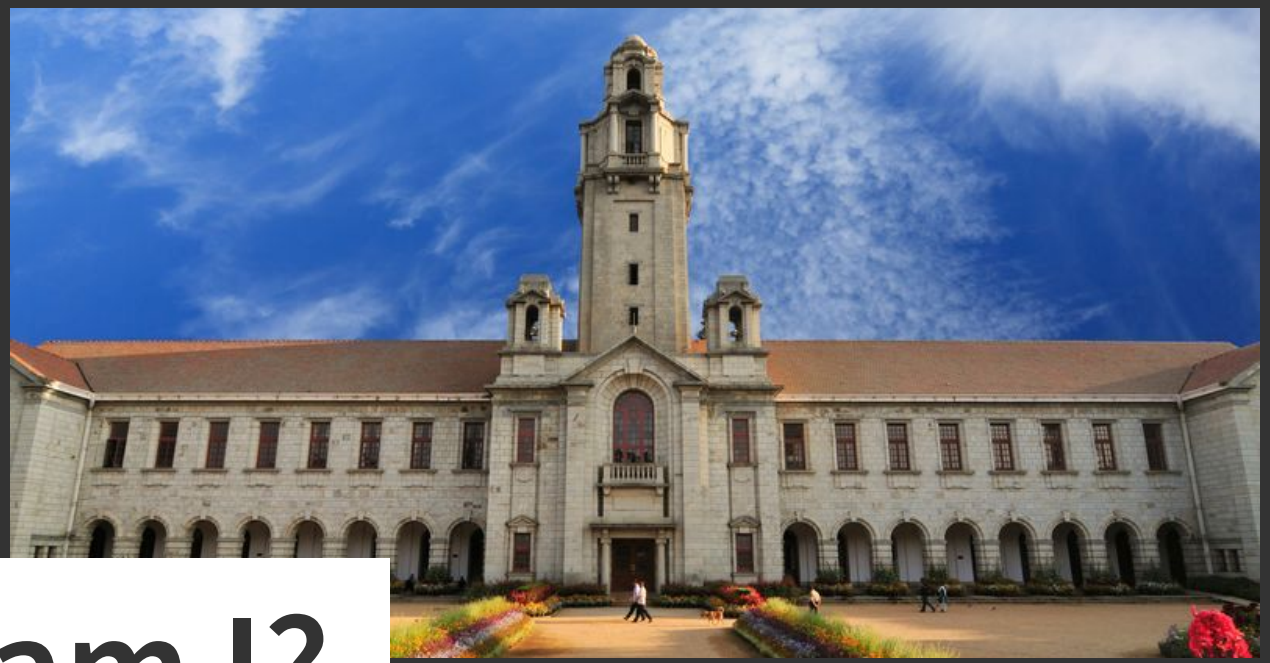
  your NITK life xD

- **(n.) a good solution or piece of advice**

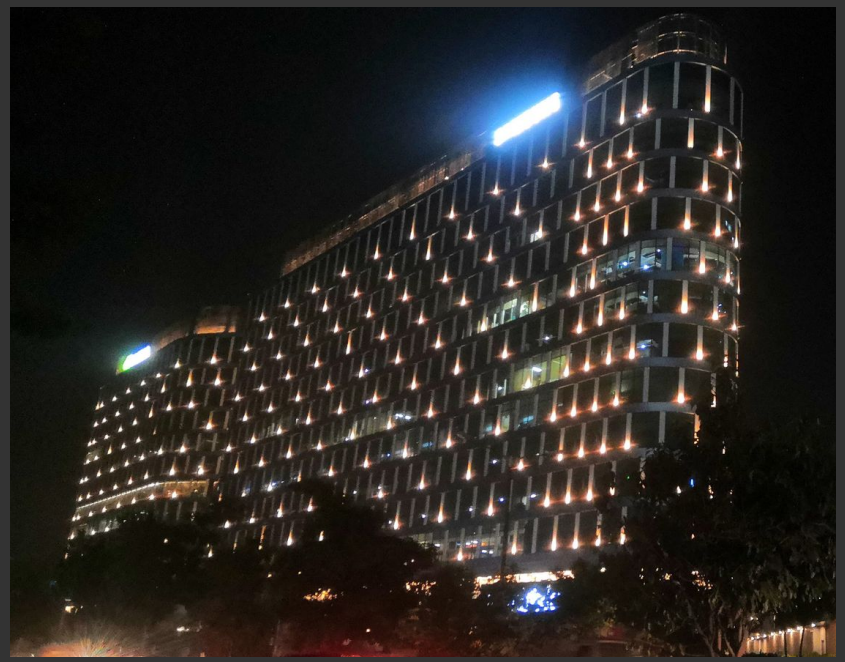
  you will definitely get a lot of this today

- **(v.) intrude computers and hardware!**

  personal favourite :)



Who am I?



Google Summer of Code

Background

They told you already I believe :)

Sr. Engineer Hardware - Samsung Semiconductor (India R&D)*

Research Assistant, CAD Lab, IISc Bengaluru

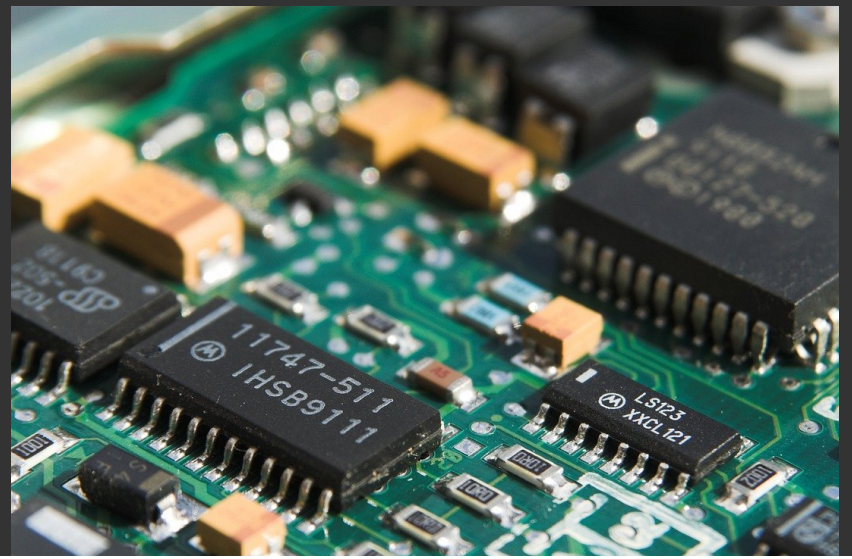
Google Summer of Code '20, FOSSi Foundation

Summer Intern ('19), IIT Bombay

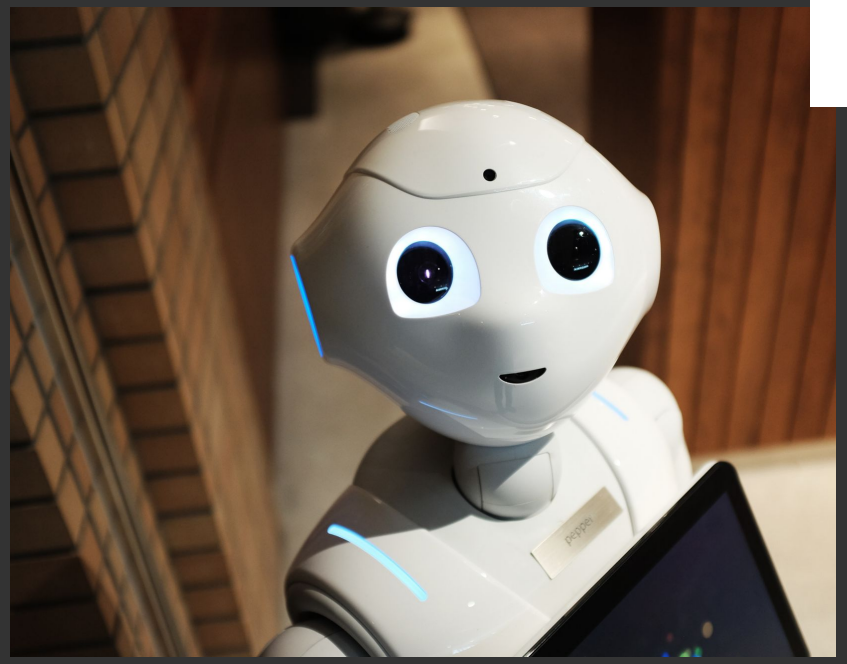
EEE Senior, NITK

Who am I in NITK?

- **Finished 159/170 credits in 3 years :)**
- **Took courses from: EEE, ECE, CSE and CSD**
- **CGPA: 8.62**
- **Clubs:**
  - ACM
  - Flying and Robotics Club (FARC)
  - IRIS NITK
  - Technites



About EE/EC



BROADCOM
tsmc
SAMSUNG
NVIDIA
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Micron
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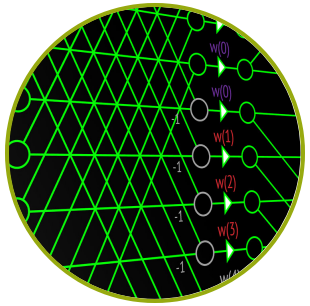
SK hynix
intel
TOSHIBA

Electrical and Electronics

Power Electronics

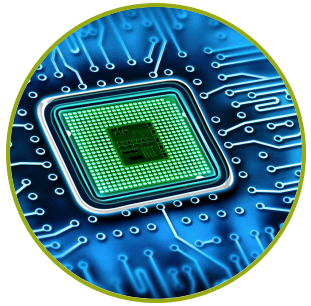
Power Systems



Signal Processing

Control Systems

Electronics and Communication



VLSI (Very Large-Scale Integration)

Communication

Signal Processing and Machine Learning (SPML)

First Year

- **C and Python**

  C is an NITK course and Python online

- **Linux**

  Sooner the better - extremely important in any circuit branch

- **LaTeX**

  Levels up your presentation skills

- **Arduino / NodeMCU**

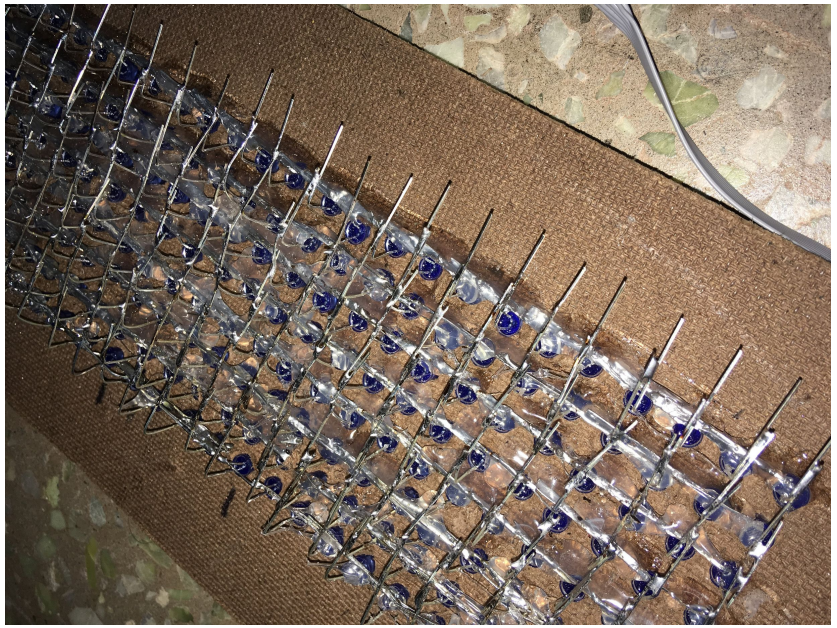
  Hello world of electronics

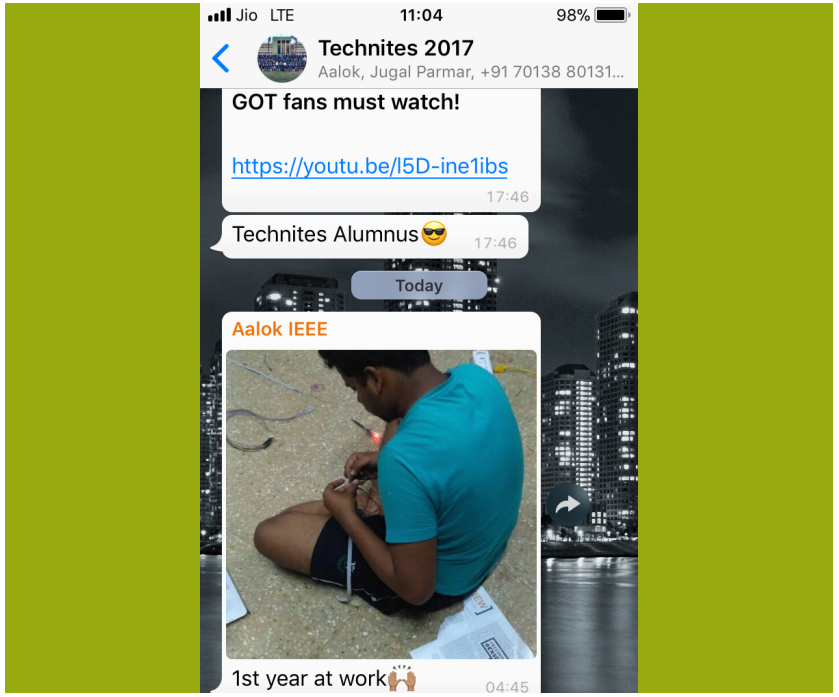
- **Technites**

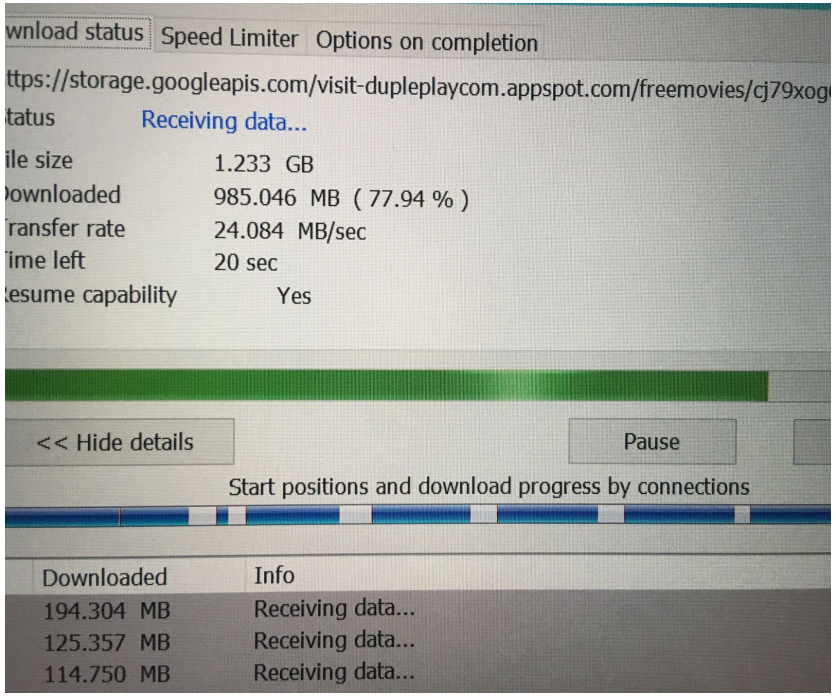
  One of the best places in campus for hands on projects

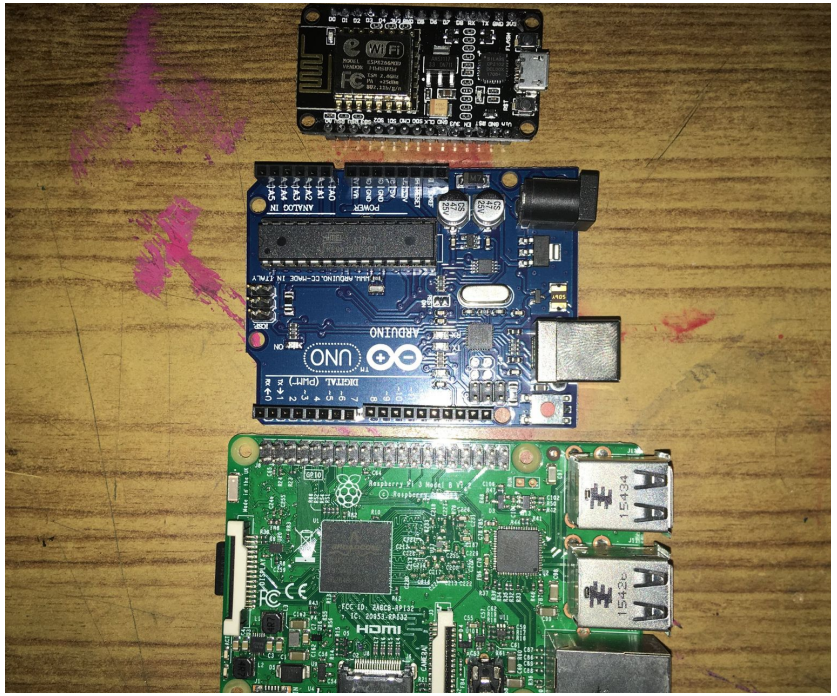
- **Best Time to Explore**

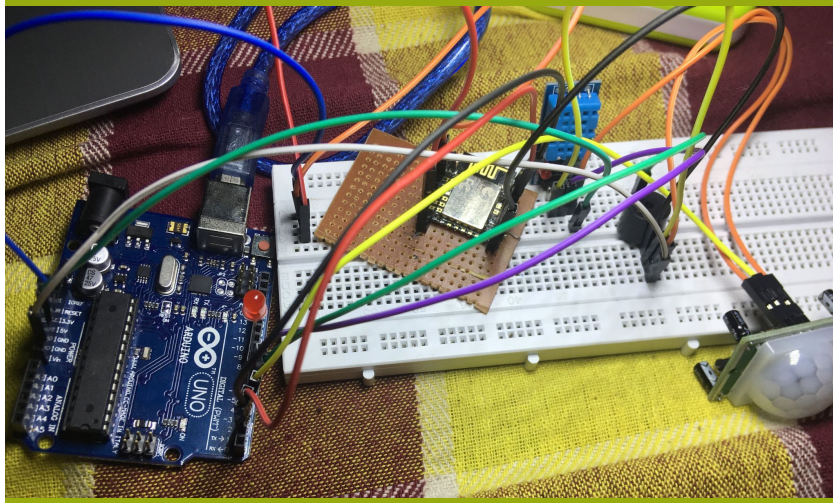
  Friends, Seniors, Mangalore / Manipal, Fests, Institute, Departments, Minors etc.











Second Year

- **Joined ACM, IRIS**

  SMP performance helps!

  IRIS for Product Management

- **Won a Coding Hackathon**

  Based on C/Python and Arduino!

- **Industrial Training on Transformers**

  Again: Try them all !

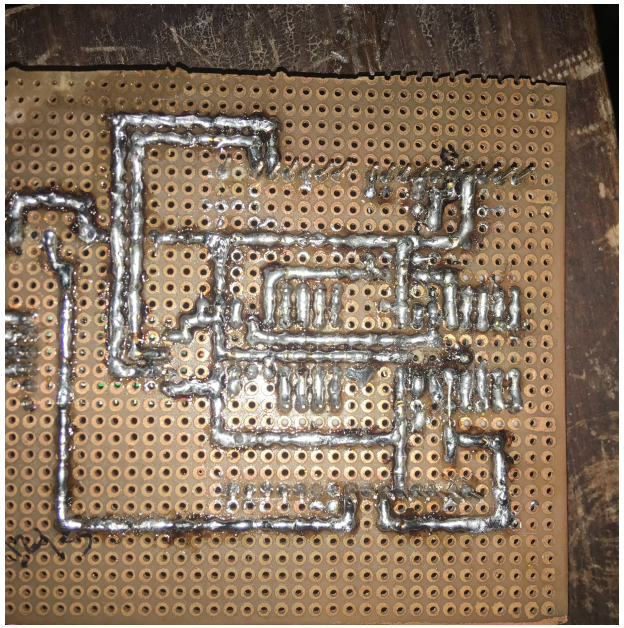
- **eYantra Robotics Competition**

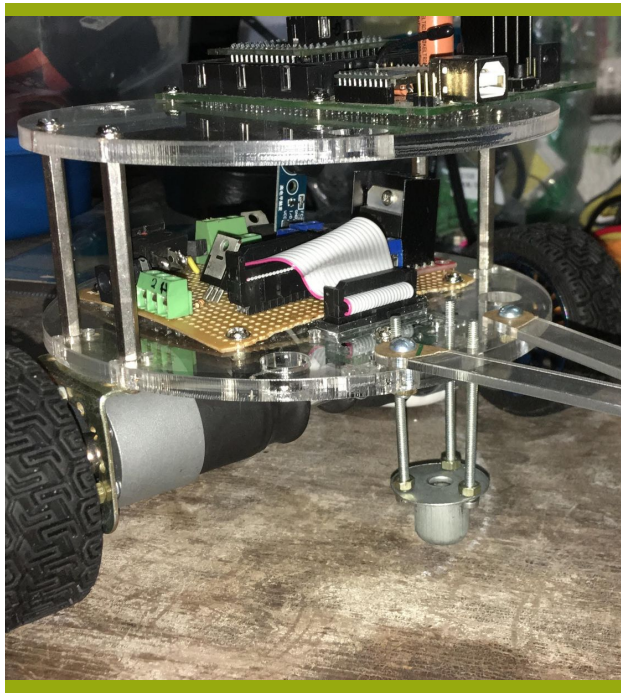
  Advanced Embedded Programming, Computer Vision, a bit of mechanical!

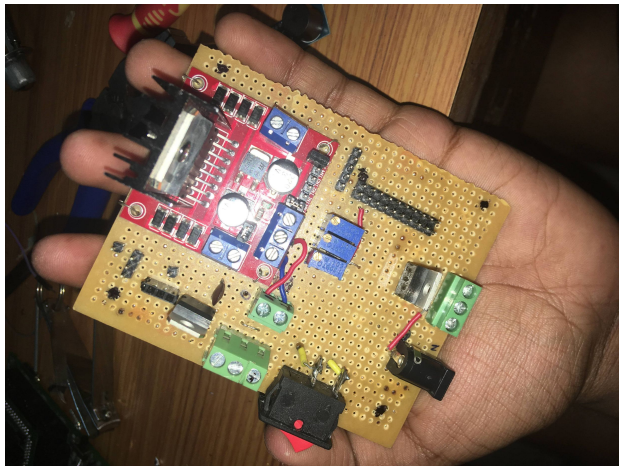
- **First course outside EEE**

  Open Source Virtual Instrumentation - in CSD

- **Summer Internship at IITB!**







```
13
14  architecture alu of alu is
15      signal a_sgn, b_sgn : signed(7 downto 0);
16      signal c_sgn : integer;
17
18  begin                                   -- architecture alu
19      a_sgn <= signed(a);
20      b_sgn <= signed(b);
21      c_sgn <= 1 when cin='1' else 0;
22      y <= not a when opcode = "0000"
23           else not b when opcode = "0001"
24           else a and b when opcode = "0010"
25           else a or b when opcode = "0011"
26           else a nand b when opcode = "0100"
27           else a nor b when opcode = "0101"
28           else a xor b when opcode = "0110"
29           else a xnor b when opcode = "0111"
30           else a when opcode = "1000"
31           else b when opcode = "1001"
32           else std_logic_vector(a_sgn + 1) when opcode = "1010"
33           else std_logic_vector(b_sgn + 1) when opcode = "1011"
34           else std_logic_vector(a_sgn - 1) when opcode = "1100"
35           else std_logic_vector(b_sgn - 1) when opcode = "1101"
36           else std_logic_vector(a_sgn + b_sgn) when opcode = "1110"
37           else std_logic_vector(a_sgn + b_sgn + c_sgn);
```

Hierarchy

Problems | Tasks | Search | Console

```
External compiler
-- Loading package constants
-- Compiling architecture RTL of dut
-- Compiling entity testbench
-- Compiling architecture STR of testbench
-- Loading entity dut
End time: 20:18:19 on Jun 21,2019, Elapsed time: 0:00:00
Errors: 0, Warnings: 0
Finished external compiler run
```

Writable | Insert | 37 : 55

IITB!

Third Year

- **Embedded Systems and VLSI from ECE**

  One of the most practical courses I have ever had

- **First significant open-source contribution!**

  for e-Yantra, IITB in Hacktoberfest

- **Tried Machine Learning**

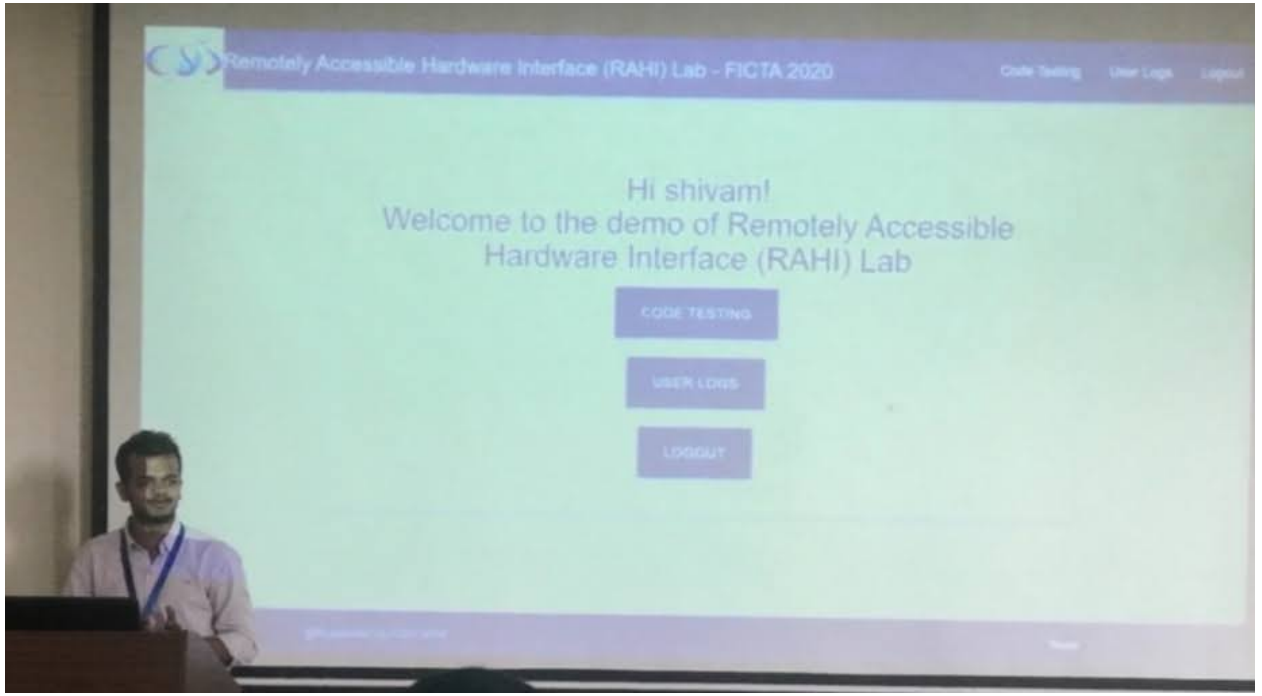
  with Winter School on ML in Medical Image Analysis

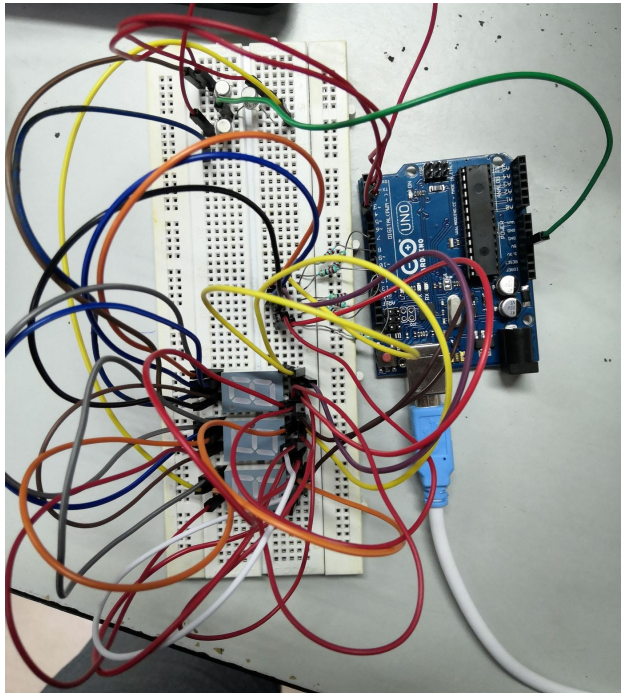
- **First research paper!**

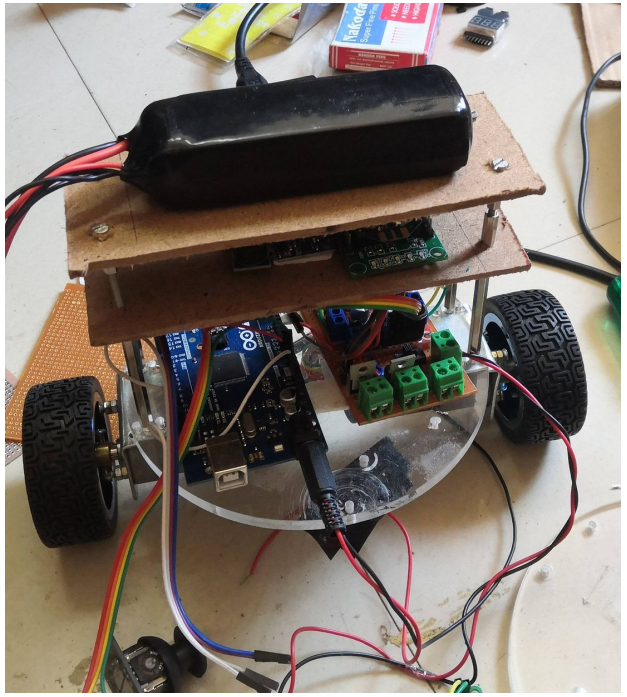
  Evolved from OSVI project

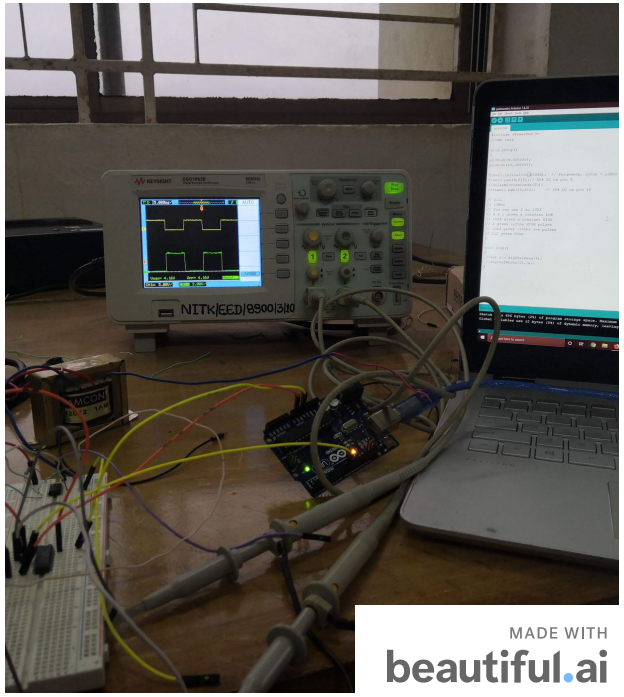
- **Computer Architecture course from CSE**

- **Year-off at IISc!**









Final Year

Ft. COVID-19

- **GSoC**
  - Hardware + Open Source + WFH = Perfect 2020 Combo
  - Earned first stipend!
- **First presentation in an International Conference**

  Virtually :'(and attended many more as all were online
- **Placed at Samsung Semiconductor India R&D**

  GSoC and IISc experience helped!
- **Teaching Assistant (TA) Experience**

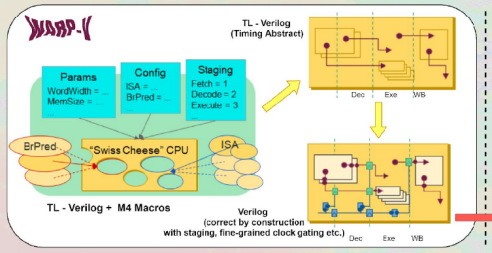
  4 workshops with Kunal Ghosh!
- **Made many global connections**
  - Open-Source community as a whole is very welcoming!
  - Use LinkedIn, Twitter, Reddit, Discord

DAC YF

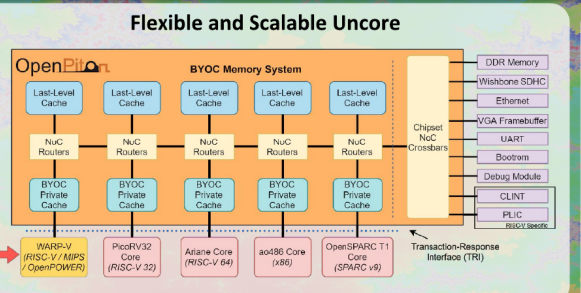
Flexible Manycore CPU Design with TL-Verilog

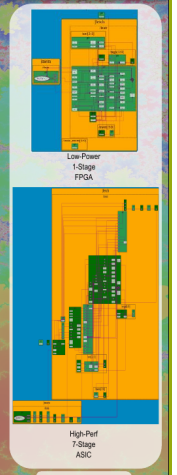
Shivam Potdar (YF), Steve Hoover, Jonathan Balkind (Mentors)

Flexible and Configurable CPU Microarchitecture

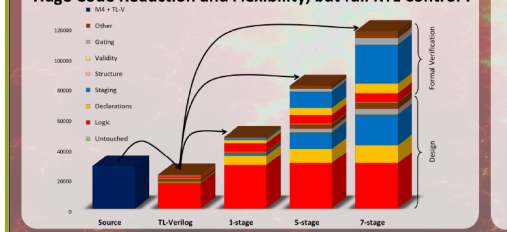


Flexible and Scalable Uncore





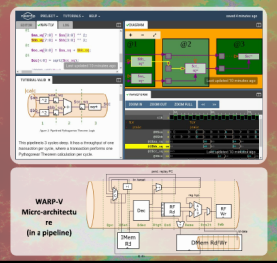
Huge Code Reduction and Flexibility, but full RTL Control !



Key Takeaways :

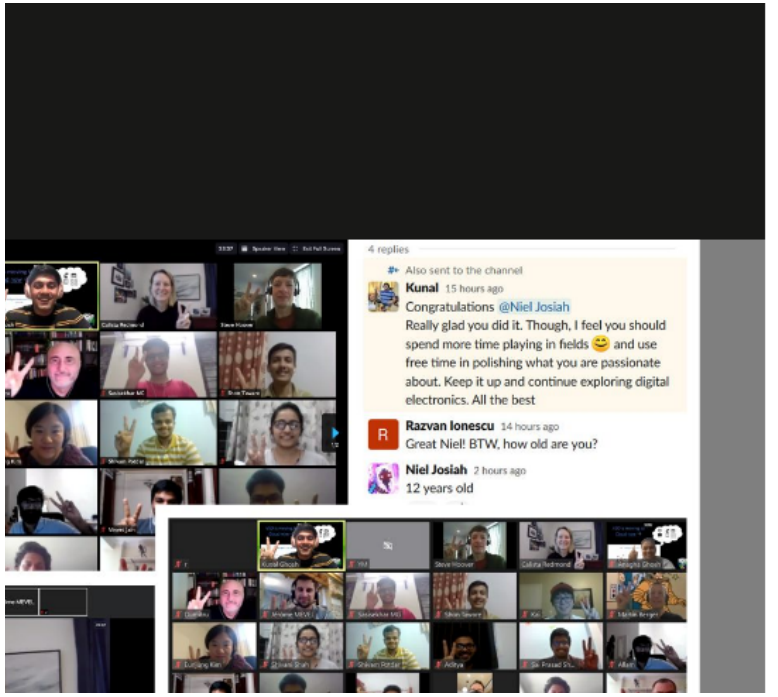
- Demonstrates large-scale design in new Verilog-compatible transaction-level design and formal verification methodology
- Hardware *Design*, not HLS
- Pipeline staging, clock gating, hierarchy etc. *implied*

This research is sponsored by Google under Google Summer of Code 2020



shivampotdar99@gmail.com

GitHub Links and My Portfolio - https://linktr.ee/shivampotdar



kunal ghosh (vlsisystemdesign.com) • 1st
Co-Founder at VLSI System Design(VSD)
1w • Edited •

RISC-V workshop - 2 cool things happened
Calista Redmond did workshop Closure call and Youngest participant Niel Josiah was 12years

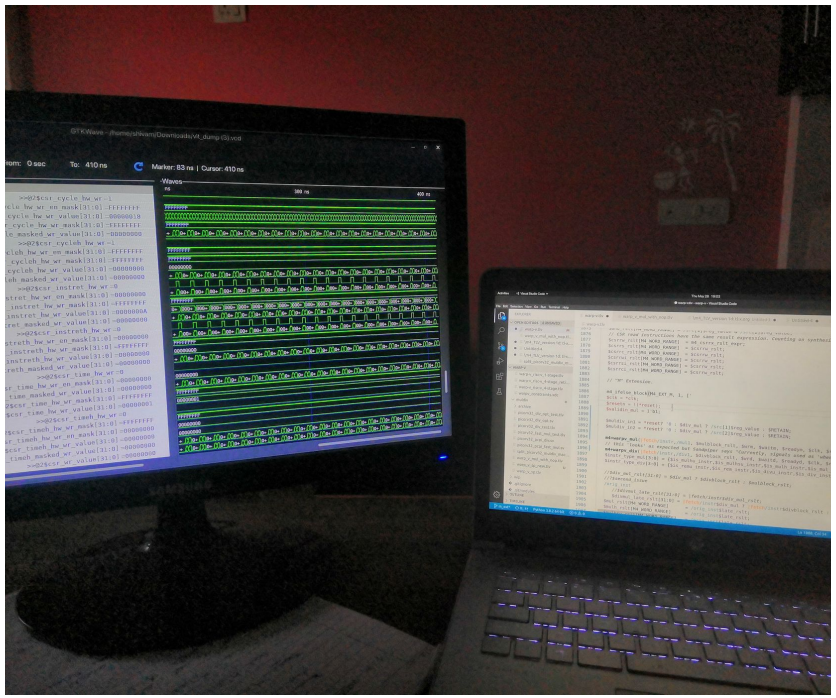
Isn't this the best way to close the year 2020? A wonderful hands-on workshop, with participants from over 13 time-zo collectively working day/night to build their own RISC-V pip lined CPU from scratch in matter of just "Thirty Hours" and on their way to get their core listed on riscv.org

After the horrible situation created all over world by Covid, t really a moment of achievement that needs to be celebrate which gives a clear message, whatever the situation may be am gonna rise and win. That's exactly what all participants f the end of workshop. They rose and won

All the best to all participants from all 4 RISC-V workshops conducted this year. Let's call it a day.

Thanks Steve Hoover, Shivam Potdar, Shivani Shah and Vi Jain for your 24/7 support. This would not have been possil without.

Year 2021 - Wait for something exciting - Gautham Pai Be r



Google

Google LLC
1600 Amphitheatre Parkway
Mountain View CA 94043

650 253-0000 main
google.com

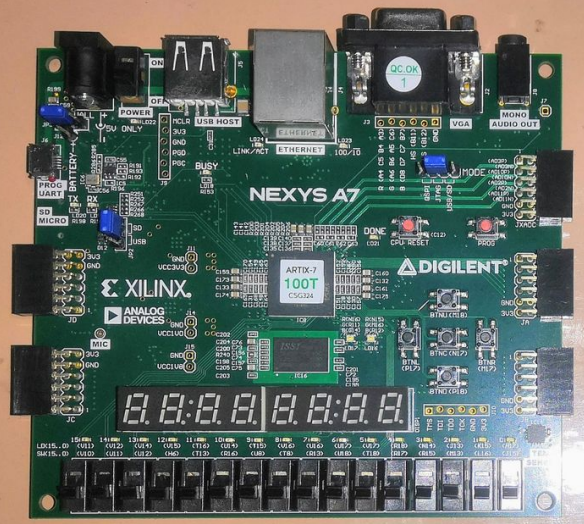
September 9, 2020

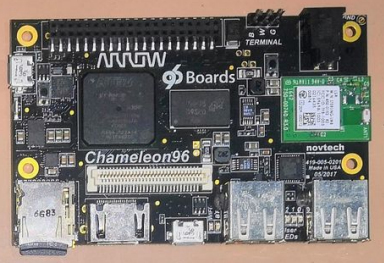
To Whom It May Concern:

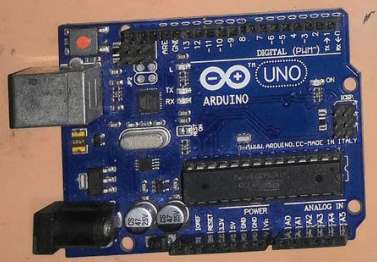
Google is pleased to inform you that Shivam Potdar has successfully completed Google Summer of Code 2020, a program which connects students with mentors for 3 months to develop open source software. Each year many students apply to participate with only a portion of them being accepted into the program, and not every student finishes the program successfully.

Shivam was accepted into the program by, and developed open source software for, Free and Open Source Silicon Foundation beginning June 1, 2020 and ending on August 24, 2020. Over that period, they passed each of the three evaluations conducted by their mentor.

More information on Shivam's project can be found at:







Career Options

Career Options

- MS / PhD
- MTech / MS (R)
- Management
- Industry
- UPSC / IES / Defence
- Startup
- Something else...

General Tips

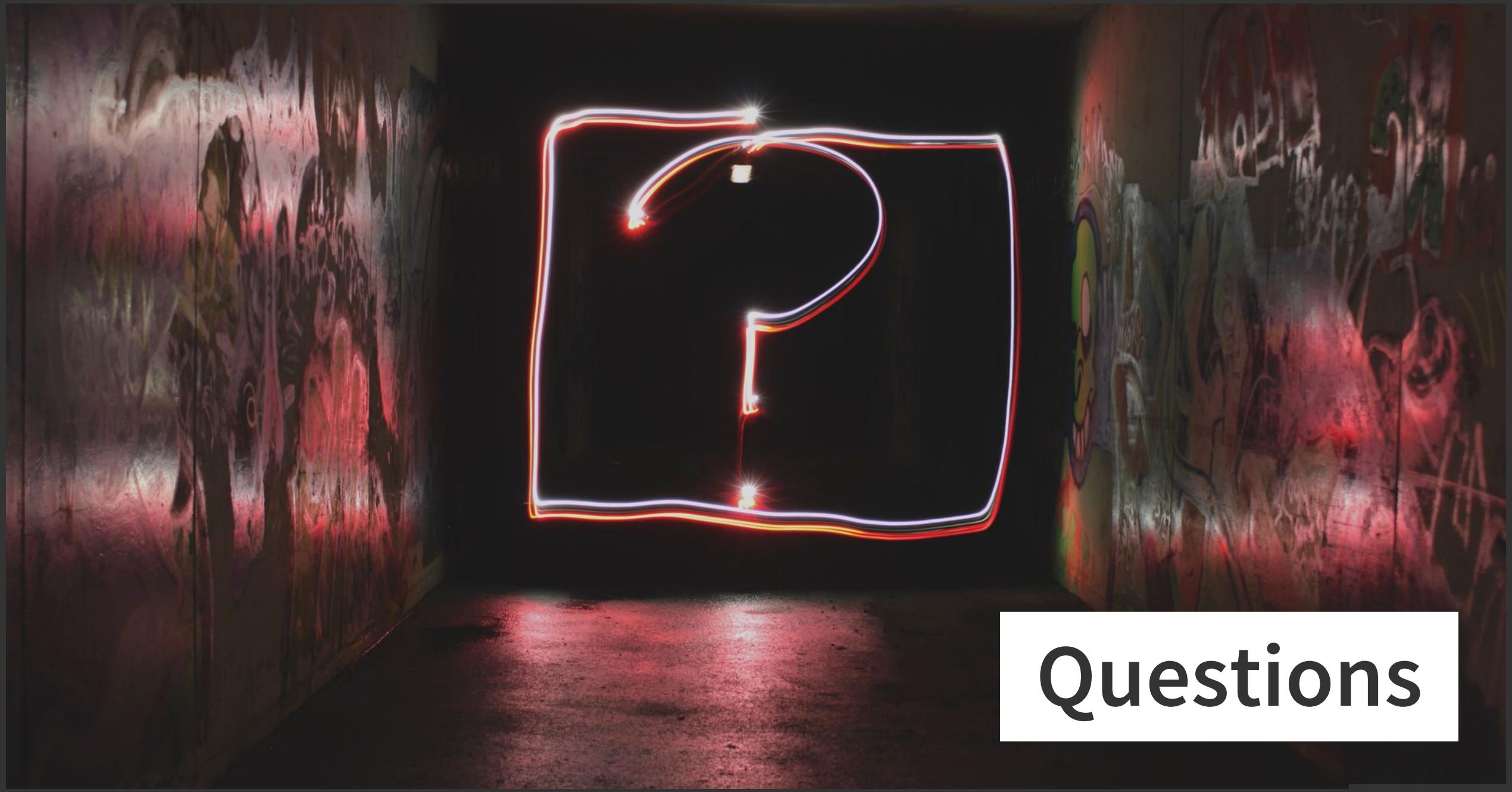
General Tips

- **So many areas! What do I choose?**
  - “Pehle istemaal kare fir vishwas kare :)”
  - Explore everything!
- **Does GPA matter?**
  - For your future university / employer - maybe
  - For Sharma ji - NO!
- **Core vs Software**
  - Am I bound by being in some branch to its fields? NO!
  - My whole portfolio is in the intersection of ECE and CSE (w.r.t NITK curriculum)
- **Knowledge**
  - “Chaaro taraf gyaan bat raha hai, jahan se mile lapet lo” - Baba Ranchoddas Chanchhad
  - Coursera, YouTube, NPTEL, edX, MIT OCW, Udemy ....
- **Experience**

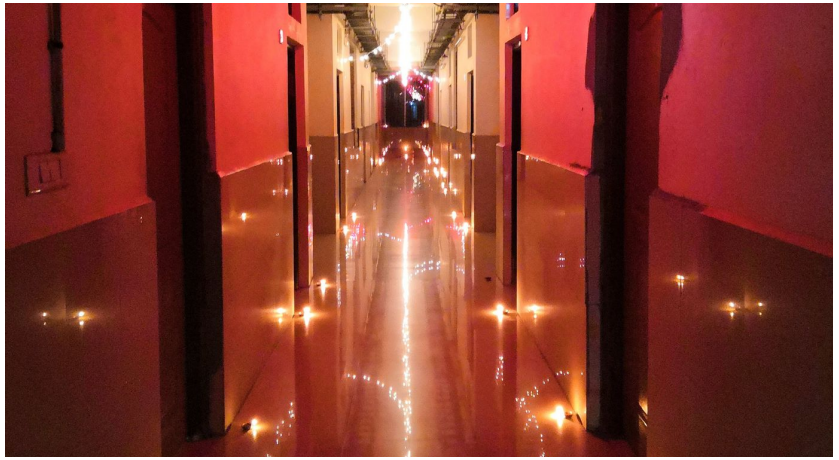
  Research or Industry? Startup or MNC? Paid or Unpaid?

  Work matters!
- **Think Out-of-the-box**

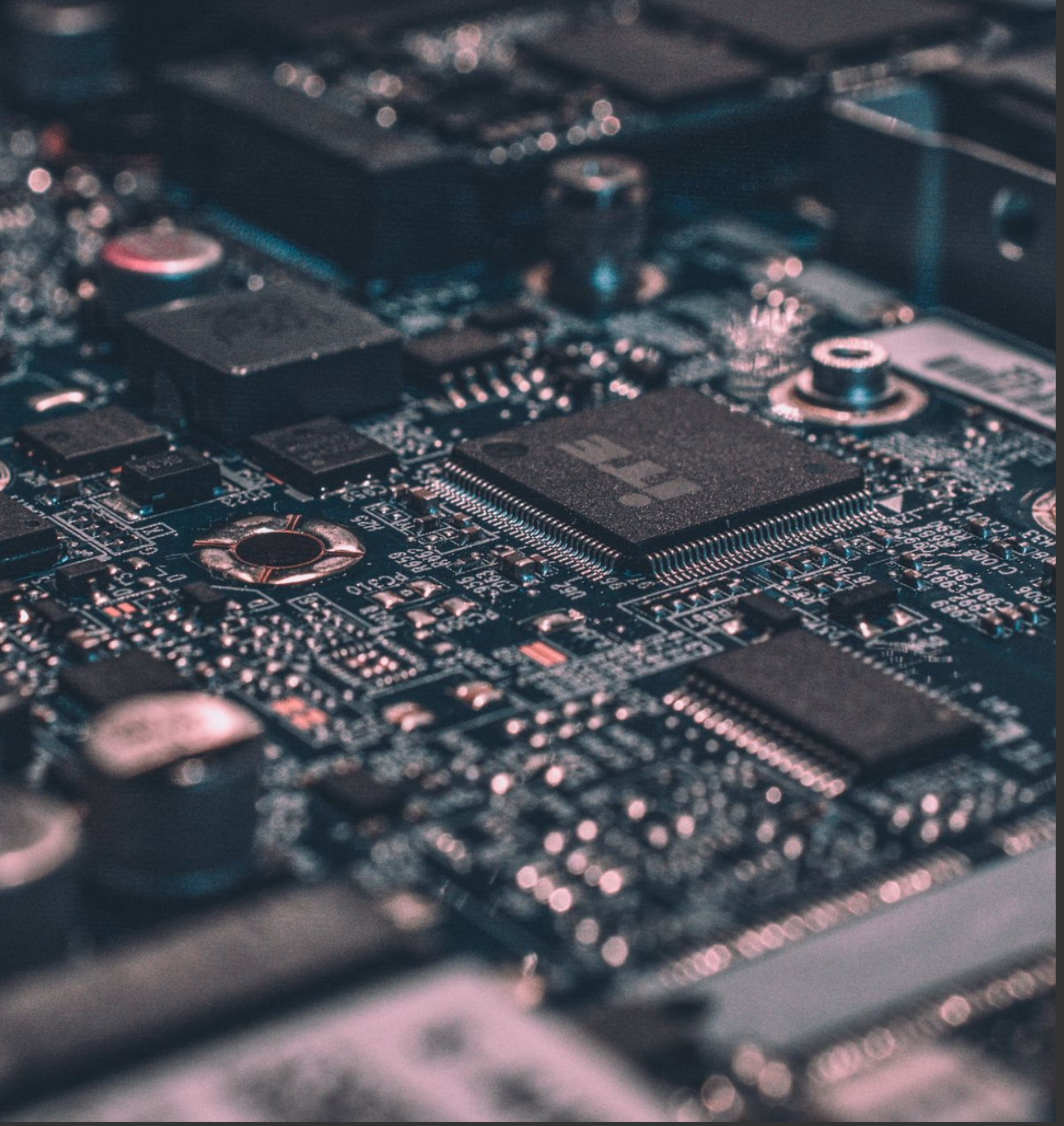
  Always find ways of connecting things and doing what no one else does!



HAVE FUN!



Thank You!



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