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Foreword by the Principal

Throughout my several years of work in education and industry expertise, I have seen thousands of new comers, beginners and students. Each time, I am fascinated at how each Individual approached a problem differently and how he/she unravels a new dimension to its approach and comes up with a solution. It is this uniqueness that I am intrigued about and this is what we try to nurture at MRCET. I am confident that all the faculty members and student community involved with this magazine have put their efforts in this in a way that the magazine both entertains and ignites the reader's mind. As one of the fastest growing nations in the world, we are in more need of "Ignited Minds" than ever before. I hope this magazine shall contribute this vision in how ever small way it can. Going by what Mother Theresa says "even if our work is just a drop in the ocean, without it, the ocean will be one drop lesser."

Regards,
Dr. V.S.K. Reddy,
Principal,
MRCET.



Foreword by the HOD

Technology is advancing day by day at a rapid pace like never before. There is always something new replacing the old that has become obsolete. With these changing and uncertain times we have no option but to keep ourselves updated and be culturally relevant by every passing day. Learning is no longer being limited to a specific degree or age. Diversity, Relevance and expertise are the keys to succeed in this fast changing world. I am confident that my students will find all the necessary guidance and equipment with our faculty to remain relevant and stay focused on their goals.



Hope that this magazine will give you necessary inputs that will help you get motivated and mentor you through your journey.

Regards,
Dr. Sujatha,
Head of Department – CSE,
MRCET.

Foreword by the editors

The main aim behind this herculean project is to enlighten YOU. Because YOU are the future, YOU are the creator of your own destiny and YOU are the master of your will. This is what we believe in. After months of brainstorming and procrastination we thought what many of YOUs lack is two things; and of course, we are no exception to the YOUs.

- Motivation
- Mentorship

For all the millions of magazines and newspapers around the world, we did not find any one that truly addresses this issue and was custom made for a students mind. Hence, we came up with M-WAVE. A magazine that is truly custom made and crafted for YOU. The content here is a result of months of brain storming, weeks of writings, days of editing and hours of touch ups. By the time you reach the last words of this Magazine, we assure you that you will have a smile across your face coupled with a surge of positivity and a newly discovered confidence.

Regards,
Anurag Jayanthi,
Rishabh Awasthi
Adil Shaik.



Table Of Contents

1. Foreword by Principal

2. Foreword by HOD

3. Foreword by Editors

4. Departmental Events

5. Student Articles

6. Glossary

Department events

The Computer science department actively organises several events and activities keeping in view of the overall development and growth of the students. Here are some of the important events that have been conducted over the past few months.

- One Week Workshop On "Microsoft Certification Programme" is scheduled for all III BTech CSE from Jan 17th - 23rd, 2018.
- Two Days Workshop On "C Mini Projects" scheduled for I BTech CSE on Jan 22nd - 23rd, 2018
- A three days' workshop on "Web Development" organized by the department of Computer Science and Engineering on Jan 6th, 8th and 9th, 2018 for all II BTech students.
- Big Data Analytics workshop for all III BTech students of CSE was conducted in MRCET campus for two days on 13/10/2017 and 14/10/2017
- Engineer's Day on 15th September 2017 @ MRCET
- Personal Skills Development Program for all II BTech students was conducted for four days from 02/09/2017 till 06/09/2017.
- 5th September is celebrated as Teachers' Day
- THANKS GIVING PARTY-26th Aug 2017 by MTech students

WebDevelopment Workshop

A three days workshop on “Web Development” with interactive hands-on sessions has been conducted by the department of Computer Science and Engineering at Mallareddy College of Engineering and Technology on Jan 6th, 8th and 9th, 2018 for all II BTech students.



Dr. V.S.K. Reddy garu, Principal, MRCET along with Prof. K Kailasa Rao garu, Director of CSE/IT, and Dr. D Sujatha, HOD, Department of CSE, MRCET inaugurated the workshop by lightning the lamp of wisdom.

Dr. V.S.K. Reddy garu, Principal, MRCET emphasized the need of digital transformation in the current scenario. He educated the gathering on the growth and integration of technologies and importance of web applications. He also explained how such workshops would help us in gaining knowledge of using web applications to turn India into "Digital-India".

Prof. K Kailasa Rao garu, Director of CSE/IT, MRCET formally welcomed the dignitaries and expert from Peramson's Software Development Private Limited in his opening address. He requested the participants to pay eager attention to the topics covered during the workshop so that it would help them to meet the industrial demands.

Dr. D Sujatha, HOD, Department of CSE, MRCET, emphasized upon the importance of learning new technologies and tools for the students. She gave the introduction regarding the schedule and contents to be covered in the workshop focusing on the vast scope of web development field.

The resource person Mr. Rajasekhar Reddy, CEO at Peramson's Software Development Private Limited highlighted the importance of web oriented applications with intensive hands-on sessions as well as the technical details of the workshop in his address.

Workshop coordinators - M. SambaSivudu and M. Sandeep Kumar proposed the vote of thanks to all the dignitaries, guest and participants.

CONTENTS OF THE WORKSHOP

1. Introduction and interactive session (1st Day)

Topics covered: What is a Website, What are different types of websites (blog, e-commerce, social media, portals, etc), purpose of websites, interesting facts and figures related to web development, Prerequisites such as front end/back end/scripting, etc for Website development technologies used in creating website

2. Creating static web pages with HTML5 (2nd Day)

Topics covered: Introduction to HTML, Writing HTML code using Header Tags, Paragraphs, Ordered and Unordered lists, Forms, Links, Tables, frames, Images, Text formatting, Image Maps etc. Encoding URL, Using HTML5 introduced features, Embedding audio and video in a webpage, drag and drop, etc.

3. Creating dynamic web pages with PHP (3rd Day)

Topics covered: PHP - Introduction, Basics, Functions/Arrays/Strings, Loops, Database Connection, SELECT Query with PHP , Form, Form Handling, Form Validation, Validations with HTML5/PHP, Sessions, API Methods, GET, POST, and similar topics related to scripting.

At MRCET, we are sure that the students enhance their conceptual knowledge and harness their skills through continuous training and practice.

Engineer's Day

"Scientists investigate that which already is; Engineers create that which has never been."

- Albert Einstein

Engineers are shaping the future by applying their skills to almost everything. They convert the theoretical knowledge of basic sciences into actual products and thus make our lives easy. Engineers possess versatile minds and help in filling the gap between science, technology and the community. Engineers in India contribute greatly to the nation's technological and industrial growth. There really is no limit to what engineers can do.

Engineers' Day is celebrated on September 15 every year in India commemorating the birthday of one of the greatest engineers in India and Bharat Ratna recipient, Sir Mokshagundam Visvesvarayyagaru, recognizing his contributions in harnessing water resources in India. He had successfully designed and constructed several river dams, bridges and revolutionized the irrigation system all over India.

We @ MRCET celebrated Engineer's Day on 15th September 2017 in honor of Dr. M Visvesvarayya, a true gem of India and to identify the great works done by our hard working engineers each year. The main objective of the event was to encourage self evaluation, motivation, effective communication and team building among the students.

Dr. V S K Reddy Sir, Principal, MRCET addressed the students and advised them to take Dr M Visvesvarayyagaru as their role model, be confident in their mission and sharpen their skills to meet the global industrial demands. Dr. MuraliKrishna, Dean of Academics, MRCET encouraged the students to broaden their perspective and enhance their skills to be successful.

Prof. K Kailasa Rao, Director of CSE and Dean placements urged the students to aim to be great engineers with technical skills as well as personal qualities. Dr. D Sujatha, HOD, CSE department added that career planning is an ongoing process during engineering and students need to be strong technically.

On this occasion, best seminars were presented by the students – Abhinava Krishna, Karthik Sai Raj, and B Surya - on the role of an engineer and his responsibilities towards the society. Department of CSE organized a Debate competition at individual class level followed by group activity to inculcate competitive spirit among the budding engineers. Faculty coordinators played a major role in collection of topics. Topics included:

1. Is country talent sold at cheaper rates via outsourcing?
2. Is the increasing number of colleges a boon to the society?
3. If a person is good at his subject, will he definitely get a job?
4. Impact of social networking sites on the today's youth.
5. Is the term "Engineer" gender-biased?

7. Is subject knowledge more important than any other skill in being employable?

CSE-III/IV

Winners: Rishabh Awasthi, Rahul Valluri, T Sri Harsha, T Radha, P Sindhuja, S Spoorthi.
Runners: Dixith Bandari, Kranthi, Jyothish, Basil, Prasuna, Anshula, J Anurag, Sai Krishna, Hima Bindu, Manu Sree, Tejaswini, Maghana.

CSE-II/IV

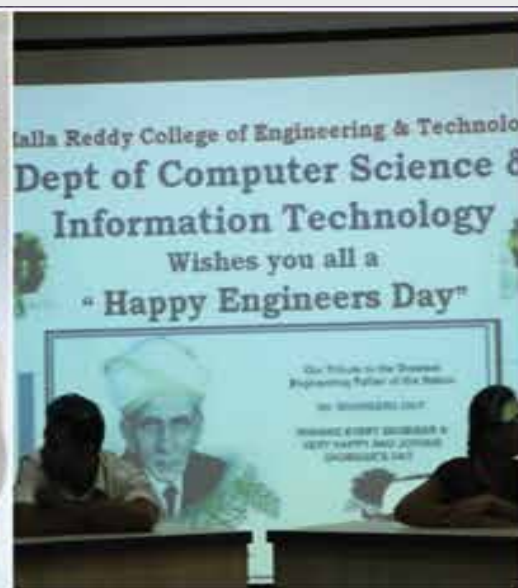
Winners: Ch Sai Likhith, B Sidhdharth, Ch Abhinava Krishna, B S Surya Krishnan
Runners: S Raja Sekhar, M S K Chaitanya, M S Dhanush, Mohd Roshan, Ravi Shankar, Manasi Joshi

More than 250 students participated in this event.

The initiative taken by CSE department at MRCET was highly appreciated by all the staff members and the students. It was an open opportunity to all the BTech II/IV and III/IV CSE students to showcase their talents. Students with the remarkable performances were awarded with attractive gifts.

“To the optimist, the glass is half full. To the pessimist, the glass is half empty. To the engineer, the glass is twice as big as it needs to be.”





ENGINEER'S DAY CELEBRATION



Microsoft Certification Programme

One Week Workshop On "Microsoft Certification Program" has been conducted by the department of Computer Science and Engineering at Mallareddy College of Engineering and Technology from Jan 17th - 23rd, 2018 for all III B Tech students.

Microsoft Certification Program validates IT professional and develops technical expertise through rigorous, industry-proven and industry-recognized exams. It provides training on the core functional and technical skills, combining highly rated online instruction with hands-on labs, concluding in a final capstone project.

This program @ MRCET commenced with huge expectations from the student communities with the traditional lighting of the lamp by Dr. V.S.K. Reddy garu, Principal, MRCET along with Prof. K Kailasa Rao garu, Director of CSE/IT, and Dr. D Sujatha, HOD, Department of CSE. The program followed by Saraswathi-Vandana.

Dr. V.S.K. Reddy garu, Principal, MRCET formally welcomed all the participants and mentioned about the significance of Microsoft certifications to the engineering graduates. Prof. K Kailasa Rao garu, Director of CSE/IT, MRCET briefed about the importance of the certification program and our esteemed resource persons. Dr. D Sujatha, HOD, Department of CSE, MRCET wished for the success of the workshop, and added that it's a wonderful opportunity for the students to gain additional skills and training in their respective fields.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Permanently affiliated to JNTUH, Approved by AICTE, Accredited by NBA & NAAC-A-GRADE, ISO 9001-2015 Certified)
(Autonomous Institution, UGC-Govt. of India)
Maisammaguda, Dhulapally (Post via Hakimpet), Secunderabad - 500100 Website: www.mrcet.ac.in

DEPARTMENT OF CSE

**One Week Workshop
on
Microsoft Certification Program**

18th to 23rd January, 2018

Convenor Dr. V.S.K Reddy Principal	Co-Convenor Prof. K.Kailasa Rao Director, CSE & IT.	Organising Secretary Dr. D.Sujatha H.O.D. CSE Dept.			
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The resource person, Mr. Raja Sekhar Reddy from Peramsons Software Development Private Limited announced that this program aims to expose students to critically important technology trends and practices earlier, during their formative years, thereby preparing them with vital skills and experiences that will enrich their careers and fuel innovation



Big Data Analytics



Big Data Analytics workshop for all III BTech students of CSE was conducted in MRCET campus for two days on 13/10/2017 and 14/10/2017 at Robert Elliot Hall. This workshop was inaugurated by Dr.VSK Reddy, Principal, MRCET, who welcomed the participants and appreciated CSE department for taking the initiative to organize the event.

Prof. K Kailasa Rao, Director of CSE and Dean placements, informed the students that the hardware to process big data is easily accessible, the software is free, and the processing models are accessible. With big data, a whole lot of information comes in, and not much comes out.

Dr. D Sujatha, HOD, CSE added that Big data grows by the easy sharing of data on the web and with mobile applications, and is the backbone of social interactions and many business transactions. When integrated with data from social media like Twitter (7 terabytes/day) and Facebook (10 terabytes/day), big data acquires a real-time dimension. The challenges of big data are difficult as new approaches for handling the increasing amounts of data need to be specified precisely based on the context from that definitional space. The four different ways to view the problem were discussed: volume of data (too much data), ubiquity of sensor data, data fusion challenges, and too much of a certain type of data.

Open source projects like Hadoop and Cassandra are common platforms for big data solutions. Using the open source environment is both economical and ensures that efforts continuously remain at the cutting edge of technology.

At the end of the workshop the participants established their own Hadoop Environment.

Event co-ordinators: Mr M V Kamal, Mrs V Suneetha, Mrs. R Radha, Mr Y Dileep Babu, Mrs R Sujatha, Mr Chandra Sekhar, Mrs Novy Jacob, Mrs P Soujanya.



Thanks Giving Party



MRCET culture is highlighted by the amazing event of Thanks-giving arranged by students of MTech, expressing their gratitude and honor to the supreme art of the faculty awakening the joy in them through creative and innovative knowledge shaping their personality and thoughts.



Beyond just sharing activities, an arena is provided for the students and teachers to share their thoughts and experiences. Participants find it to be a fun and interesting way to exchange ideas, customs, and other cross-cultural issues. This platform renders a great support to both faculties and students to develop their potentials and embrace their strengths.

The future of mankind lies in the hands of ambitious teachers rather than the new technological inventions and scientific breakthroughs. This day is one of the best opportunities for the students to express their appreciation towards the way someone selflessly works hard and contributes immensely to help them shine out as brilliant individuals.

The day started with the speeches of student coordinators for that event. They thanked Dr.V.S.K Reddy garu, Principal, MRCET, a distinguished personality for the vital post of a Principal, unique in his thirst for excellence.

They thanked Dr.MuraliKrishna, Dean of Academics, proficient in academic correspondence, followed by Prof. K Kailasa Rao, Director of CSE and Dean placements, for lending tremendous support during placements and academics, followed by Dr. D. Sujatha, Hod of CSE, an epitome of strength paving ways to new horizons and dimensions, followed by Mr.Vazralu, Department MTech coordinator, a great pillar of the CSE department supporting MTech students.

They thanked all the faculty members for grooming them by opening the frontiers of knowledge, revealing new horizons of change, broadening their mindsets and for creating positive attitudes that helped them to excel. They thanked each and every member of MRCET who contributed for the curricular and extra-curricular activities held in campus that helped in moulding them.

Dr. V.S.K. Reddy garu, Principal, MRCET addressed the students that there are absolutely unprecedented no of opportunities in this world. A lot of product based companies hire masters student with specialization in different fields and even promote them to do a fully funded doctoral as a part of their research. A Masters degree certainly provides an opportunity for people who enjoy teaching. Many universities in India and abroad provide Doctoral programs for candidates in M.Tech Computer Science.

Dr.MuraliKrishna, Dean of Academics, MRCET motivated the students to continue their higher studies by opting to do Doctoral programs. Prof. K Kailasa Rao, Director of CSE and Dean placements, MRCET suggested that if they prefer to get into industry, its recommended to join the product division companies like IBM, HP etc. and look for R&D based on their area of expertise.

Dr. D. Sujatha, Hod of CSE, MRCET encouraged the students to opt for doctoral programs by attending the entrance tests for Ph.D admissions. She even advised that they can find job opportunities in both private and public sector firms. Prof.MuraliKrishna, MTech coordinator for all departments, MRCET discussed about the numerous opportunities for candidates after completing the master's degree. Mr.Vazralu, MTech coordinator(CSE) guided them that they could find job opportunities in teaching or look for R&D departments in companies like Google, Microsoft, Amazon etc; such that they can pursue higher education too.

It was followed by a delicious lunch and photo-sessions cherishing all the old memories.



Teacher's Day

In India, 5th September is celebrated as Teachers' Day as a mark of tribute to the contribution made by teachers to the society. 5th September is the birthday of a great teacher Dr. Sarvapalli Radhakrishnan, a staunch believer of education and a well known diplomat, visionary, statesman, scholar, President of India and above all a perfect Teacher.

In 1962, when Dr. Radhakrishnan became the President of India, he was approached with a request of celebrating his birthday. He said, "Instead of celebrating my birthday, it would be my proud privilege if this day is observed as Teachers' Day". This showed his love for the teaching profession. From then onwards, this day is celebrated as Teachers' Day in India.

Teachers mould the lives of the students by guiding them, by enriching their personalities, by imparting ethical and moral values and have more influence on them. Teacher's Day is celebrated with great enthusiasm in many parts of the world. This day is dedicated to the teachers with the sense of respect, appreciation, encouragement and support for their devotion to their students.



“Teachers are the torch bearers of the Gen-next”

The teacher's day was celebrated by the students of CSE department at MRCET campus on 6th September to express their gratitude for the immense contribution put forth by their teachers towards their development. Teachers are the cornerstone of students' future.

Students decorated the college campus with the decorative items on the eve of Teacher's day and the faculties were welcomed warmly. Each of the faculties was given a gift as a token of gratitude to show the acknowledgement and recognition of the hard work put by the teachers towards their development, wishing them a Happy Teachers Day.

KODE FEST HACKATHON 2018

As a part of nurturing their students with qualities like teamwork, technical skills and a glimpse of the competitive world of engineering and technology, MRCET-CSE has conducted a workshop on 23RD & 24TH of January, 2018 on Windows Mobile Application Development and using Microsoft Technologies and Visual Studio.

The workshop started with a brief introduction of various tools provided by Microsoft for software development. The sessions in the workshop were led by the executives of Microsoft Innovation Center. They later went on to explain the basics of Visual Studio and all the students started developing basic real-time software like Web views, Calculators, Web pages, etc.

After the first day we started getting a hold of various tools and software that were used to develop applications. Basics of gaming were introduced through Construct2, a software used to develop two dimensional games.

After educating the students with essential concepts and helping them create a few working models, a two-day hackathon was conducted to test out the skills that the students have developed.

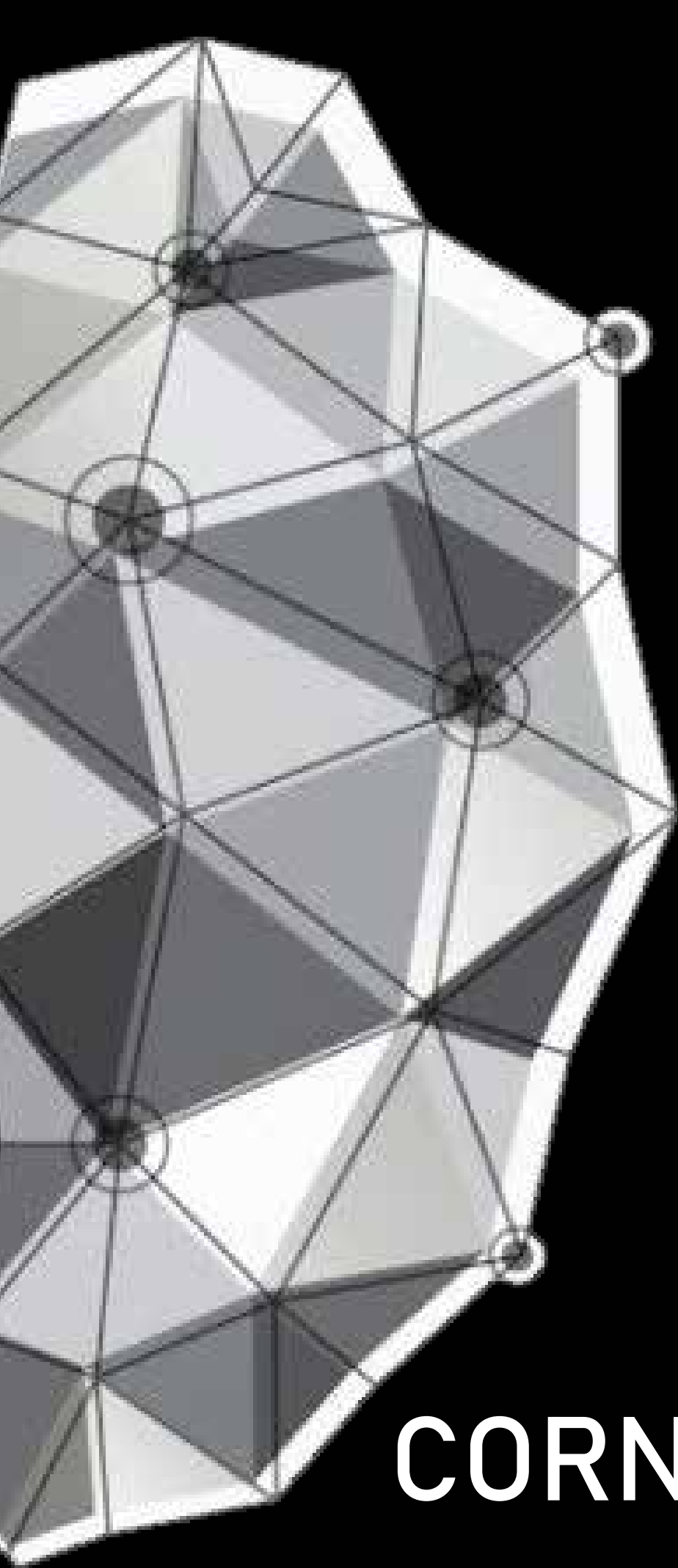
Students came up with several games, application software's and web pages. After the hackathon and upon verifying each project done by individual teams, the best project was awarded to an electronic ticketing systems android application developed by Adil Shaik, Anurag Jayanthi, Rishabh Awasthi and Sai Krishna of 3RD year CSE.

Gallery





CREATIVITY



CORNER



courtesy: Google images.
Introspection.

How to learn

“It is the studying that you do apart from your school curriculum that really counts. Otherwise, you know only that which everyone else knows.” Look what our design editor, Adil from 3rd year CSE has to say about how to learn.

Clickety clack goes the keyboard, reacting to my frustrated bangs. “Android Studio has stopped responding” displays a dialog box with a dim and mournful background. It was only 10 minutes since I had begun working on my Android App this time, with a deep and a long-drawn sigh! I cursed my old Pentium PC, but knew inside that this soldier had served me enough. The time had come for me to buy a new laptop, one which could run smoothly even in the harsh environment that the Android Studio creates. I brought this request in front of my parents who in turn took it to my brother who lives in the US. My brother told me one thing, “If you really want a laptop, don’t bother father about it, instead, do some job and earn it”. It hit me so hard that I started to introspect my life. I realized I was 19 and should have been financially independent by now and mustn’t bother my parents for everything



So from here, I started my journey to rightfully earn the laptop that I looked up on the Internet. At start I didn't know where to start. It seemed as if my journey had come to an end before it even started. For 15 days, I searched vigorously for tutoring jobs on Quikr, Justdial, Urban Clap and also tried searching for paid internships(though I didn't have many skills at that time to score one). I didn't get any response at the start but one day I got a call from a woman who asked me to come for a small talk featuring me as a home tutor tutoring her bright son for an Olympiad Test. Their house was right next to Google's Office in Hitech City. The magnificent view of the Google office pumped me with motivation and got me ready for the upcoming me-

-eting with Mrs. Ruchika Sharma* which I knew would be more of an Interrogating Interview than a small talk. What I didn't know was that the person I was going to talk to was an entrepreneur (founder of Being Women) and title holder of "Mrs. South Asia International 2014". Once I reached their home, I was bombarded with questions and I had to think twice before uttering anything. In the end, I got the job and after the Olympiad Exam, they liked my teaching and extended my job of tutoring Rushat.

Lessons Learnt:

- *I learnt that it was not that difficult to get a job but the start can be challenging as you try to come out of your shell. The best way to tackle this is to think, "leap and a net will appear".*
- *I learnt how to talk and negotiate with people.*

PHASE 2: Hustling .

While I was tutoring Rushat, I had a hectic schedule. 7-8 am went in getting ready to attend college, 8-9 went in travelling to college, 9-4 at college, 4-6 in my college bus, 7-9pm, thrice a week, I used to home tutor Rushat and in the end, reach my home at 10. I realized that I was wasting 4 hours daily for traveling and 9 hours, including the day I didn't have class with Rushat. And the money I got for tutoring Rushat was not enough to get me the laptop which I wanted in 6 months. So once again, I went on and searched for more jobs to do. At the same time, my cousin brother came to know about my endeavour and contacted me regarding his friend who was doing his masters in Information Security in University of Cumberland's (Williamsburg, Kentucky). He said his friend was looking for someone who can write his Subject Assignments after learning ISS courses. At first, I was overwhelmed because of the huge task it was. But then I remembered the lesson I learned from my previous experience to be open to a challenge and "leap". The starting few weeks were quite hectic and

I was still wasting my time in the bus (i.e. 4hours). So, I was introduced to the world of Digital Marketing. I discerned there were so many business pages on Instagram and wondered If they really made any money. I contacted an owner of one of the pages. To my amazement she revealed that she earned 40k per month. I asked her help to get me started in this business. She gave me contacts of few people to talk to. And like every job I had taken before there were some difficulties in the beginning. Here, I had no knowledge of Makeup. So, it was difficult to sell it but thanks to the Internet, I learned about all the facets of makeup products and in the end, I was making a decent amount after investing 4 hours daily in my college bus. Yes, all this was quite hectic but every day when I went to sleep I used to have this sense of Accomplishment that made me follow this restless program.

Lessons Learnt:

- *There is always time to get things done.*
- *Never feel shy to ask people for help. Because of my brother and that lady, I was able to get and excel in those jobs*

PHASE 3: Reaping & Beyond .

It was on the evening of August 4th, 2017 that I was hit by an Avalanche of Happiness. After returning from my college, I found the laptop from my dreams sitting elegantly and beautifully there on the bed. After a long 6 months of hard work, it was now time to reap. And "oh~ ", what a great feeling it was to use it for the first time. Every touch of the key sent a jolt of happiness through my fingers straight to the brain. I am not really addicted to anything but If I would I would like to be addicted to this feeling, the feeling of reaping your efforts and hard work But after sometime, I went blank, I didn't know what to do next. My motivation for working hard and earning money was to get this laptop for past six months and now I had achieved it. So, for the next few moments, I kept pondering on the question "what next?". Well after some time it became obvious to me that I wanted to do some Android Development Internship and the cycle continued, again there was this inception of my idea to

to do an internship, then I hustled and struggled to get one (how I did that is another story) and right now, I am reaping its benefits while writing this article. This Laptop opened many opportunities for me and so did the internships, every goal that we have achieved will help us to achieve our next goal. I have till now made more than 60k ₹, have got four internship offers and have done three, worked as a freelancer on Android Projects and I am also looking forward to my coming Google's Android Certification exam soon, all because of these cycle of "wanting to achieve" that have taught me a lot.

Lessons Learnt:

- *Enjoy your harvest to the max.*
- *You see this cycle keeps repeating and should keep repeating in a person's life, so get used to it. Keep having small goals which bring you closer to your long-term goals*

TL; DR:

Best way to learn something is to have a goal. While achieving that goal, you will learn all there is to learn.

*“Keep having small goals
which bring you closer to your
long-term goals”*





HOW TO BE A UNICORN.

From Shaktimaan to today's Game of Thrones, We've all grown up watching TV, except for a fact that the TV series then are being replaced by Web Series today. Shreya, from third year CSE – D shares her perspectives on what important life lessons these characters have to teach us and how we can adopt them to make our lives better.

Yes, I know the title is a bit weird (but come on its catchy!) and before you go all "oh man! This girl has completely lost it, talking about a mythical creature" *rolling eyes and snickering* BUT COME ON, cut some slack for your homie! So, cut to reality, one night before submission there I was munching on a pack of monster gems and chugging coffee, trying to be creative enough to write a presentable essay. Who am I kidding? I was never the type to have presentable essays; I was always the psycho kid in school having strange topics or strange content (zero regrets). A little heads up; I have the attention span of a squirrel, so ignore my mini-rants. OKAY! On with the topic!

Definition – unicorn is all about as unique as YOU can be. To me, it's being a happier and better person through every-passing-day, having the courage to stand up every time. I tumble, fall and along the way lending a hand to people who need to pull themselves up again. It's about being passionate about what I do and never losing my site from my goals. (A little secret, unicorn is always being as curious as a 2 year kid, It sounds crazy but that is what it is.)

To become a unicorn, there are some **RULES** (Nothing to be intimidated or scared here. These are rules which can change, altered and modified according to your comfort).

1. Believe in yourself

The most over-rated quote the mankind has ever heard! but in practicality, it does work. This quote means that you need to stop thinking about getting a validation from people. You need to build yourself stronger, where you become your own competition and what others do doesn't matter anymore. As Dany said-"A fortnight ago i had no Army. A year ago I had no Dragons

But here I am with three dragons and an army willing to fight for me." She believed in herself and she got what she wanted. You have to fight against self-doubt and people who try to lower your moral to reach your goal. Just like Dany, be staunch towards your life-mission and make immediate goals that will lead to it.

"A bird sitting on a tree is never afraid of the branch breaking, because her trust is not on the branch but on its own wings".

2. Never lose vision

A person without vision is like an arrow with damaged feathers, even the arrow doesn't know where it might go. So set some goals for yourself and try your best to achieve them no matter how impossible they may seem. I read in the book called *The Secret*, that visualizing is the most important thing to make your goal real. **Always visualize what you want, who you want to be. Then set some near-future goals that would lead to the end result, your dream life becoming a reality.**

It quotes-"the only reason why people don't have what they want is because they are thinking more about what they don't want than what they do want." Focus more on the things you really want, doesn't matter how lunatic or impossible they may sound. Believe that you already have it, feel how it would feel like when you will have the things you desire. Remember that feeling and go on with life. The life you desire will present itself to you

3. Be a silly and happy kid

The essence of being a unicorn is to be a KID AT HEART. You should always be curious about everything, always feel the need to learn new things. Find new ways to look at the world around you and the problems you face. Let's take an example, look at minions how they enjoy the most stressful situations that happen to Gru! They enjoy every single second of the day doing crazy things, I mean really fart guns!!, Who thinks of that!

Never ever forget the things you did when you were a kid and keep on refreshing those memories in your mind. Jim Carrey; on-screen and off-screen he has an astounding sense of humor, even though he went through a rough patch he kept his childish behavior alive! Always cherish the silliest things in life, because those are the things that will make you smile in your darkest days.

4. Why so serious?

There's only one mantra to be happy in life, do everything whole-heartedly. Smile till your cheeks hurt; laugh till your eyes start tearing up. The best way to break free from the stressful everyday routine is to break the pattern, try something new every now and then. Dance, sing whatever makes your soul flutter with happiness, whenever possible, irrespective of age!

Just look at the world renowned comedian -MR.BEAN; on screen, he never took his life seriously, loved everything he did, would do whatever he liked and didn't care for what people might say. Made all of us realize to always find the sunny side up.

5. Think out of the box

To stand out, one must stand alone with a crazy idea in his/her brain. There are so many people in the world that had crazy ideas but no one supported them and belittled them. To state some real examples- Leonardo Da Vinci, Einstein, Bill Gates, Steve Jobs. Every single person was mocked for being unique and look how their creations propelled our civilization to another level.

The best example that everyone can relate to is Tony Stark. Who thinks of having an arc reactor as a heart! Those who do not think outside of the box are easily contained, as Olenna(GOT) said-"you are a Dragon, be a dragon"!

6. Hustle hard

A unicorn never gives up easily! Like superwoman says in her book how to be a Bawse (let's just say book is AMAZING! Ok, back to the matter at hand) "life is like a Nintendo Game, as you move up a level the harder it becomes for you to win." But the most important thing is that you never give up on what you believe in. Like she said life's a game with unli-

-mited villains to fight against which also gives you unlimited lessons to learn from and grow. Allow me to quote Queen Beyonce - "Imma keep running because a winner don't quit on themselves". Never doubt yourself and always try hard to do every little work with complete devotion and utmost respect.

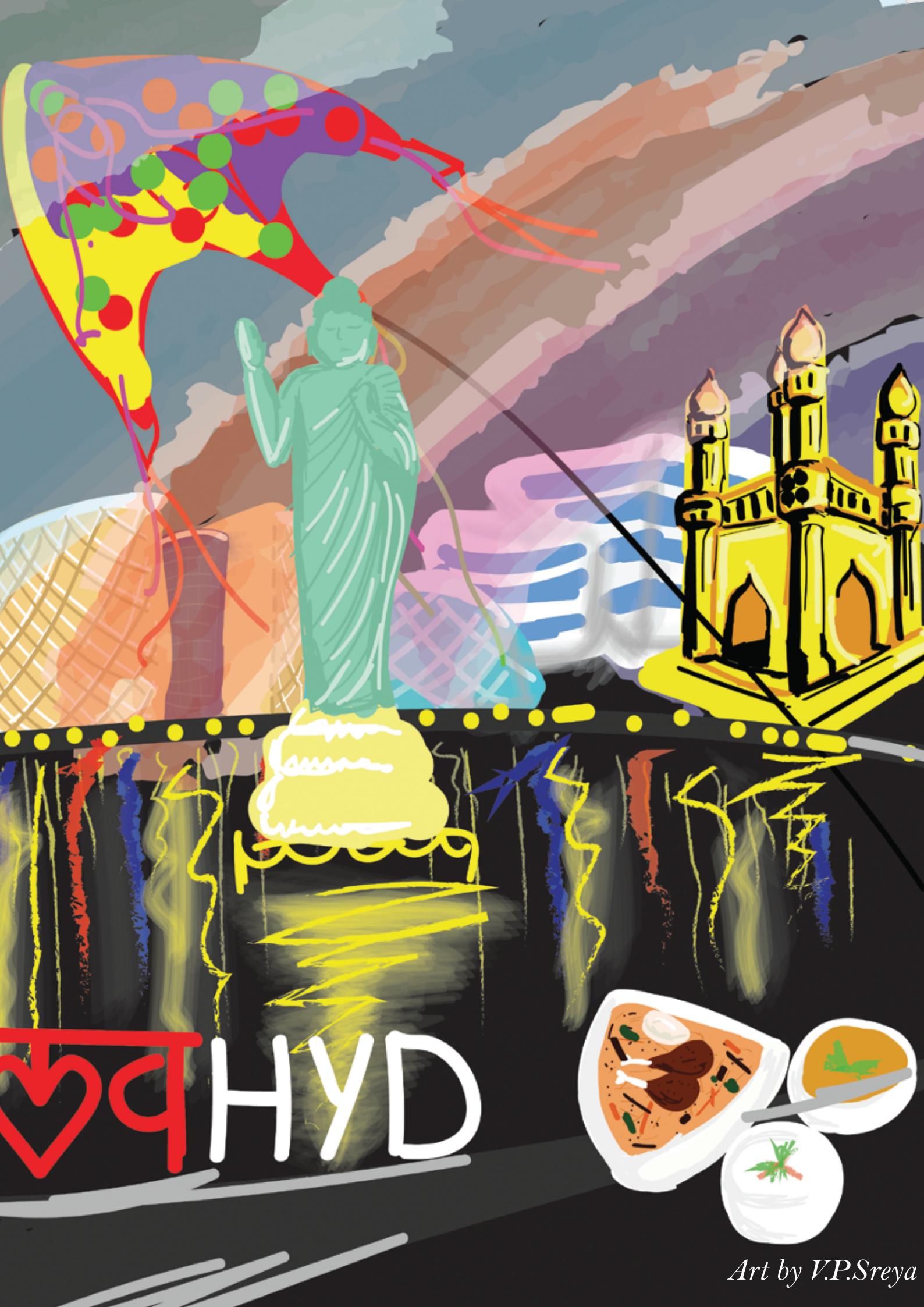
7. Be weird

Being weird may sound demented but that one chromosome which makes you weird is the only thing that sets you apart from everyone in the entire world. Whenever someone says-"dude/girl, your weird.." just know that being called weird is like being called limited edition, meaning you're something people don't see that often, remember that. Let me give you another example, BB ki vines, a common man who wanted to be a singer found YouTube and started making funny videos. With

his unique characters and complex storylines, he became famous.

He said in Ted talk that, when he was in his early stages of YouTube-fame, many people trolled him, friends discouraged him; but he knew his quirkiness connected to people. Look where his off-the charts funny videos got him, living his dream-life creating magic on and off stage.

Being weird may sound demented but that one chromosome which makes you weird is the only thing that sets you apart from everyone in the entire world



Art by V.P.Sreya

YOU NEED TO KNOW THESE.

The future has never been more perplex. In this rapid advancement of science and skill, you need to keep yourselves equipped to meet the needs of the growing demand. Sri Lakshmi Mam, CSE Dept., gives her insights on what areas students should be focusing in order to keep up with these demands

Every computer science student needs to focus on the following areas to meet the demands of the global market:

The next billion customers

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Usability

As IT touches the lives of more and more people, less and less of them will be "computer savvy", and less and less of them will view computing devices as something that needs to be learnt. Consequently, the products that will succeed will be the ones that are easy to use. And making something easy to use is rather difficult. It is a sub-discipline of co-

mputer science, and there is a lot of theory, and a bunch of well-defined algorithms and practices you can use to make things easy to use. The whole area is called HCI (Human Computer Interaction), and UCD (User Centered Design) is a part of it. It's an area that you must be familiar with.

Computer Science Fundamentals

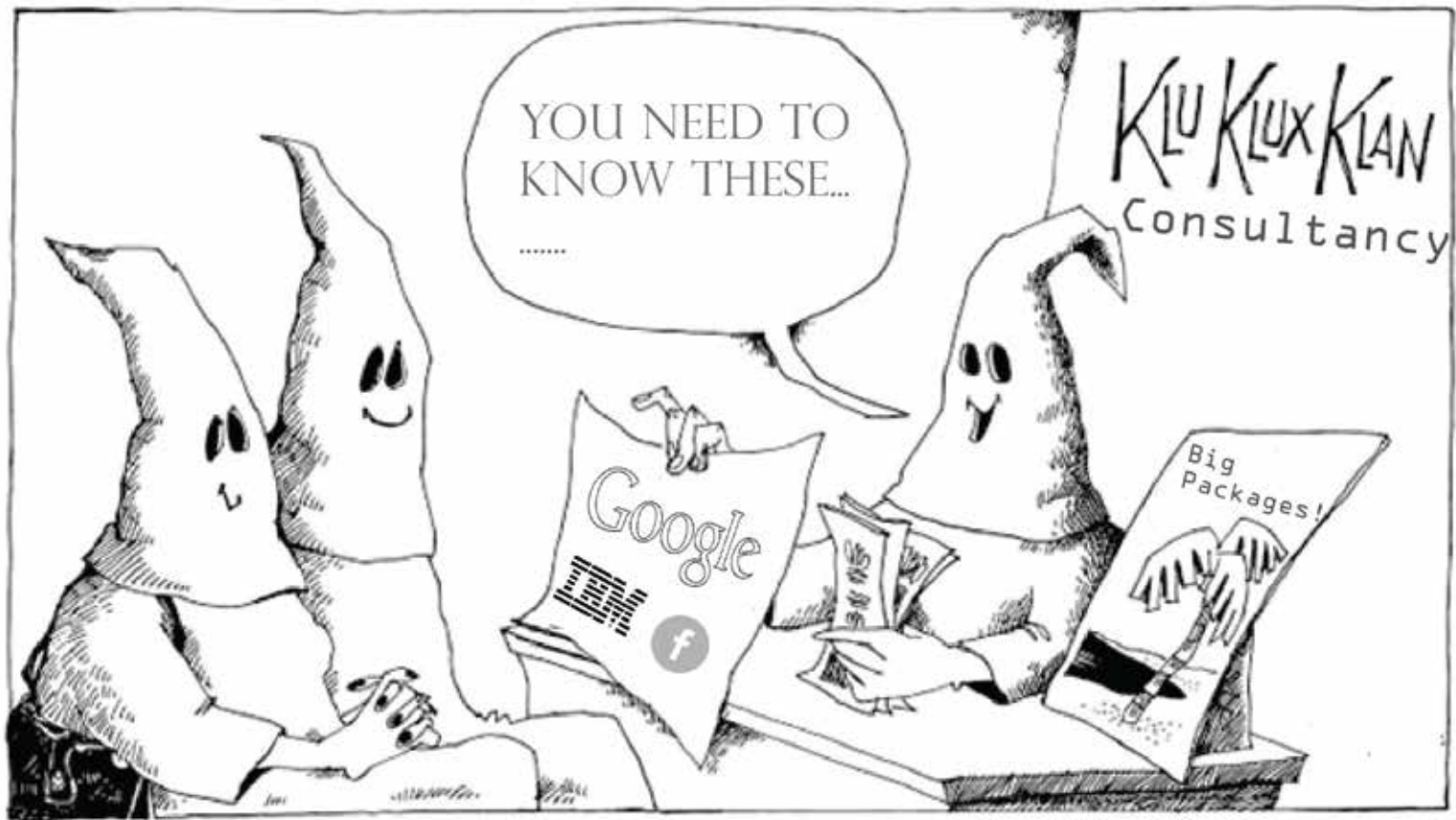
This will never go out of fashion, and yes, when I look at students coming out of our colleges, this appears to be a rather neglected area. Far too much emphasis on specific programming languages and specific "technologies" is a mistake. Whatever the future holds, you will be well served by knowing the basic theory of computer sciences. Learn data-structures and algorithms. If, after see-

ing an algorithm, your first thought is not about the complexity of the algorithm ($O(n)$, $O(\log n)$, etc.), then you need to hit your books again. If you've only learned Java and C#, and you don't really understand pointers, heaps, stacks, you will sooner or later be at a disadvantage. Understand the basics. And while you're at it, also learn mathematics and statistics.

Presentation skills

This is not a computer science skill, but this is one of the most important skills that computer science students are missing. You must treat presentation as equally important, or more important than your program, design, and algorithms. And you must spend as much time learning presentation (from books, in classes, and in practice) as you spent on

on programming languages, and computer science subjects. You should know how to write well. Not just papers and documents, but much more importantly, emails, and blog posts, and Facebook wall postings, and tweets. You must think about what the user/reader/client wants to know (instead of what you know and want to tell).



Economics

Scott Adams, the creator of Dilbert says: "When you have a working knowledge of economics, it's like having a mild super power." Basically, if you understand the fundamentals of economics, you can see and understand what drives people and technologies and success and failure a lot better

than people who do not understand it. I hate the fact that I was made to study economics in my computer science course. It seemed like a complete waste of my time. Now, looking back, I think it was probably the most important course.



“Gone” With The Tide

“I took the one less travelled and that made all the difference” says Robert Frost. Find out what one of our chief editors Rishabh Awasthi has to say about about going with the flow.



There is a common misconception that you must flow with the tide when the tide is against you. The problem here is that you take no control over the steering of your life, which ultimately leads you to a hopeless state. I was a firm believer of this misconception and thought it to be the smartest thing to do. It hit me hard when I started contemplating the very meaning of my life. It was then I realised that when you get stuck in the tide, that leads you to an ocean full of sharks, it becomes irrelevant to go with the flow and not fight to change the course of your destiny. Since then, I've always made conscious efforts to take charge of my life and not let other factors dictate the terms. In the content to follow, I've tried to impart the lessons I've learnt so far throughout the 'juggler' called life.

"Never forget that only the dead fish swims with the stream"

You are your best friend.

No matter how busy your life is, always find time and speak to yourself. Give Constant pep talks to yourself, this will help boost your confidence and will make you feel relevant in this mist called society. Beyond motivational self-talk, talking to yourself out loud in an instructional way can speed up cognitive abilities in relation to problem-solving and task performance. So, for example, when

you're searching for that item you just can't find at the grocery store, talking to yourself out loud may help you find it faster. This is because of the feedback hypothesis. Remember and respect the fact that you have started life alone and will end alone so, never feel inferior or get over odd under any circumstances.



Find meaning in life:

Think of your life as a projectile. An aimless projectile serves no purpose hence, spend some time trying to sort out what is important in your life and why is it important. What is it that you want to achieve in your life? What are your dreams? What makes you happy? Your meaning in life gives you purpose and sets the direction of how you want to

live your life. Without meaning, you will spend the rest of your life wandering aimlessly with no direction, focus, or purpose. Here I remember an excerpt from my friend's way of life, "It is when you have goals you start learning and acquiring all the relevant skills that are out there".

Make your life a ride to remember and say,"Ghosh!, that was a ride"

Make your life a ride to remember and say,"Ghosh!, that was a ride". "Take a leap and a net will appear", as said by a dear friend of mine is the reminder of the fact that it is often the first step that is harder to take, so always tell yourself that once you leap forward there will always be a net to keep you in safe havens. I remember how weak I felt in my knees and how butterflies caused turbulence in my stomach when I made my way to attend my first interview for an internship as an android developer. I knew very little back then and had self doubts

more than anything about android development thing else. It was then I leaped not knowing whether or not a net would appear, but now when I look back I would say, It was the best leap I ever took, that internship made me stretch my horizons and become more proficient as a developer. It is amazing how a simple choice could impact you in such an unprecedented way. So, don't be petrified by the fall just leap and a net will appear.

Accept you:

The only person who is going to create change in your life is you! and to create that change you have to like and accept the person you are. There will be times in your life where you will face rejection and there will be people who will not like you that much. Accepting who you are and loving yourself helps you move forward in your life. Putting yourself down all the time and wishing you could be better

will only lead you to a life of unhappiness and discontent. Find your courage, love yourself, and step out to do something crazy and unprecedented. Don't worry about what anyone thinks or whether it is the right thing to do, Remember this is just your brain playing a trick on you called 'Spot Light Effect'. In your heart if it feels right, act on it and go create the life you love.

Live in the moment:

As cliché as it sounds but living in the moment is a lesson that is easy to interpret but hard to implement. We sometimes become so consumed with all our problems and get discontent with the present that we miss the precious beauty of the moment. Remember we only have one life to live so, why not live it to the fullest and make every second count. Fight every small battle in your head at each second and you'll defeat 'Genghis Khan' like life problem. Appreciating and showing gratitude on a daily basis is experiencing happiness in the moment. Helping those in need brings joy and happiness to us. This is what living our life in the moment is all about – don't miss these moments because you are too busy focusing on your pursuit of happiness. Lastly, I would say that regression is

the biggest harm that you can inflict upon yourself. Always look at your life as a game of choices with an infinite set of possible paths. If you make a choice, stand by it and think practically so that if your choice is not bearing fruits then you can make a different choice and break the loop. Imbibe these experiences and extract lessons from them to always break away from the tide that has destruction written on it.

Remember, "If you feel insecure and weak to go against the tide then guess what? The rest of the world is too. Do not overestimate the competition and underestimate yourself. You are better than you think you are".





Art by V.P.Sreya

The Paradoxical Journey

“One helluva rollercoaster!”, is how Mr. Musk describes his college years. Manasi from 2nd year CSE describes her thoughts on her journey through college and how it leaves a mark in our lives. Read on if you want to find yourselves blushing like a newlywed bride.

What is engineering all about for a student? What is it that a student learns and takes with him in the course of 4 years? It is correctly said that engineers turn dreams into reality. Well! It does take time for engineers to realize the reality of turning their dreams into reality. Engineering is a gradual process of realizing what you think and what it actually is! Engineers are great survivors and carry the potential of changing t-

attendance percentage and few moments dreaming about how we could be Tatas or Birlas had the circumstances and fate cooperated or is it that the better is yet to come with us being the future Satya Nadella or Sundar Pichai. Not to forget the bus journeys. They add up to lot of exciting and cherishable memories. Also the time spent in canteen carry invaluable memories and very moment is carved into a m-

“Sometimes we find ourselves coping up so easily with everything, other times struggling with assignments, fighting with the memory”

he world. Don't you think great storms try to tear us apart against our journey of survival through 48 subjects and several labs. Every engineer has his own adventure throughout 4 years. Everyone is unique in their own way. It's a great time where we get to meet diverse people, inspiring fellow students, encouraging and cheerful faculty. Sometimes we find ourselves coping up so easily with everything, other times struggling with assignments, fighting with the

-emory In all, the 4-year course is not just a means of obtaining a degree, it's a precious time to explore and constantly be discovering yourselves. Despite learning pressure and constant demand of improvement, I am sure an engineer will admire these 4 years as the happiest moments of one's life-time and will remain as a special journey.

How To Nash Your Way Out Of Prison.

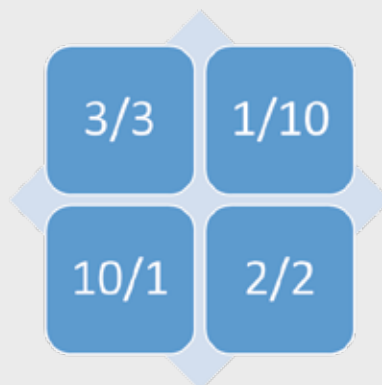
John Nash, father of Nash Equilibrium for which he was awarded Nobel Prize. Out of his many solutions and discoveries, one of the most significant ones was “Prisoner’s problem”, Vijay Murali Krishna, from CSE 3rd year describes what the problem is all about. Read on to know about one of the most famous problems in the history of mathematics.

We, as human beings, tend to make mistakes and break the rules quite often. While fellow humans might show some mercy, the law is unforgiving. Consider a hypothetical situation wherein you’ve been caught red-handed committing a crime. Since you were caught in the act, it qualifies as an open and shut case. Coincidentally, your not-so-loyal friend, Bob, also shares the same fate as you for committing the same crime at the same time. It is essential to

know that the two of you were not in this together. The law, doing what it does best, imposes a 2 year sentence on the two of you. Bored already? Here comes the twist in the tale. Soon after the judgement, the district attorney has an epiphany that you and your partner in crime were involved in a much bigger crime two years ago which was dismissed for unknown reasons. He now devises a plan to obtain a confession from either of you.

To eliminate any sort of ambiguity that could potentially creep in, I shall frame the plan in the form of bullet points followed by a matrix which are as follows:

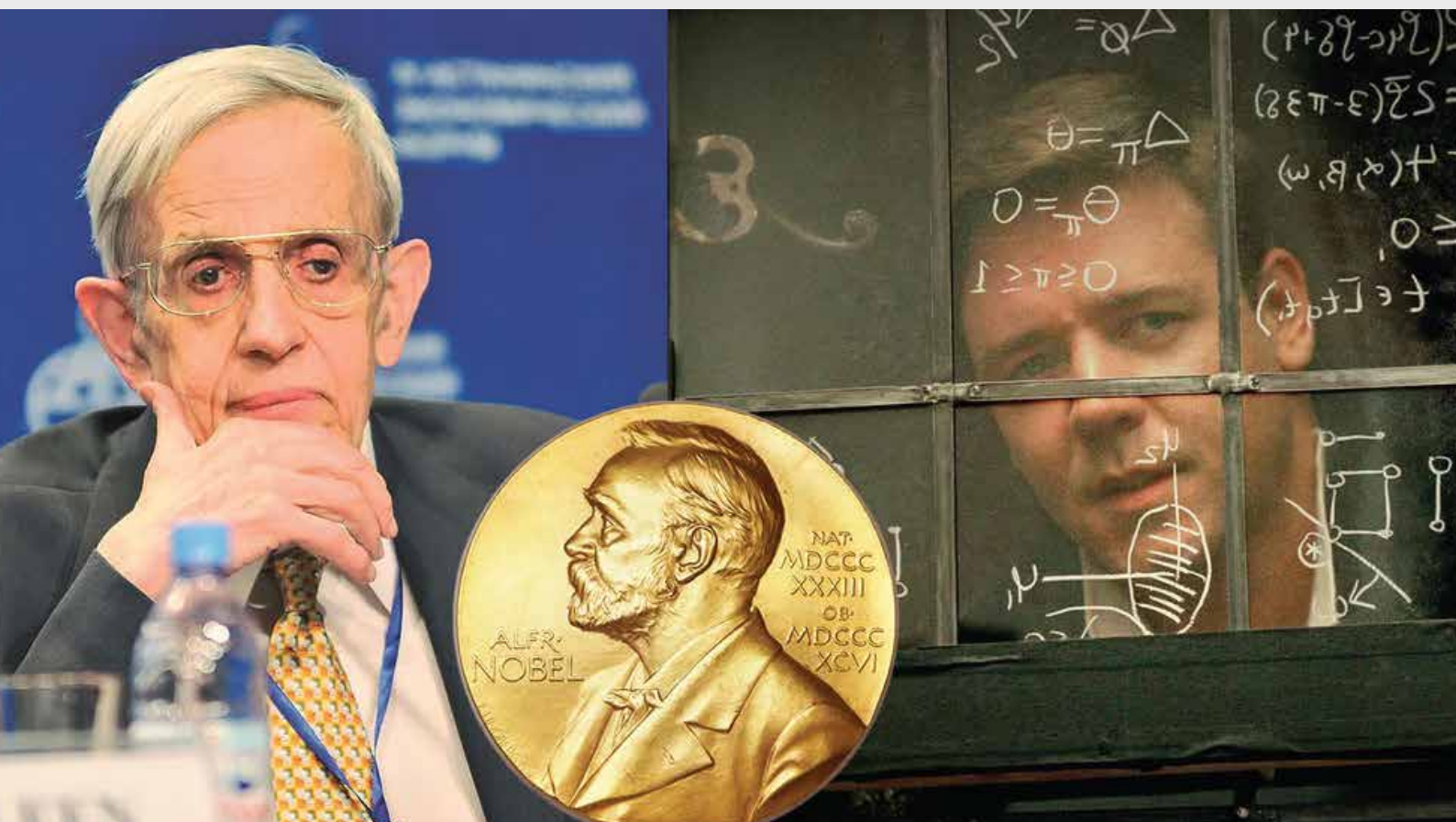
- A confession from both of you will see you both get out of prison in just 3 years.(3/3)
- If you confess and Bob denies, your term will go down to 1 year but Bob would have to stick around for a good 10 years.(1/10)
- If Bob confesses and you deny, your term will increase to 10 years while Bob would be out in a year and continue committing petty crimes and earning quick money.(10/1)
- If both of you deny, you’re both left with the original judgement of 2 years in prison.(2/2)



He also formulated the Nash equilibrium as a part of game theory. It refers to a stable state of a system involving the interaction of different participants, in which no participant can gain by a unilateral change of strategy if the strategies of the others remain unchanged. In layman's terms, it's a win-win situation in a stable environment. How is it any different from the optimal solution you ask? Simple. The optimal solution is actually quite unstable because the relationship you share with Bob is devoid of loyalty. Hence, the odds of you and Bob denying any sort of involvement with the crime is just not good enough, meaning that the worst case scenario for denial would be 10 years in prison. On the contrary, the worst case scenario for a confession is just 3 years which could further come down if you're good at community service. The optimal choice for either of you to pick, taking into account the other one's choices, is to confess.

The state 3/3 in the (0, 0) position of the aforementioned matrix is the Nash Equilibrium in this situation. This is quite interesting because the theory has now forced us to rationally deduce that the two of you must attain the Nash Equilibrium state as opposed to the globally optimal state. Putting the convoluted facts and details aside, I believe it is safe to say that the Nash Equilibrium points to an optimal solution in situations which involve a plethora of assumptions. Considering how economics is a subject riddled with assumptions, the fact that the Nash Equilibrium has changed the course of economics comes as no surprise.

If you're intrigued by this amazing and unassailable theory, you could dive deep into the life of John Nash and his creations by watching 'A Beautiful Mind' which is a biography on his life or scour the Internet for articles on the same.



I Think..

Thoughts, ideas, beliefs and diversity is what has taken mankind forward. Rahul from 3rd year CSE writes on his thoughts on how beautiful the nature is how astonished he is with Mankind's achievement.

'Hey, children! Come here. Look, there is a train going', my grandma used to shout whenever a train passed by the track which was few yards away from the house. The tiny me and my brother used to run towards the window which gave us a good view to enjoy the magic of a huge immovable object moving on its own. One tradition which we followed as it passed by was to count the number of 'bogeys' that were attached to each train. Also, that was the first research we ever conducted and the result of it was the knowledge that a goods train carried more bogeys than a passenger train.

Those moments were buried in my memory but resurfaced when my friend asked me to write something for the magazine. As I thought of different topics I could write on, one thing stuck my mind that everyone miss to appreciate. It was 'engineering'. While unlocking my phone to type this, I thought of the reaction that an early man, or the first man to ever live, would give looking at it. I looked around with that perspective of an early man and wondered at the marvel of the accomplishments of humankind. I thought of how much people must have sacrificed to build what we are living in today. I thought of a time when people didn't have a language to communicate with others and now, I can see and talk to a person who is miles away. Oh, yes, we talk with non-living creatures nowadays.

All this started with the survival instinct of man to kill for food. He made a spade for killing his prey. That was, I think, the first time man made something which wasn't already present in nature. As acquiring food become easy, man started using his thoughts for other purposes. Survival wasn't enough, he started to live and worked towards living better. The so called development took off when he needed to build a shelter out of cave, he found nothing to put his ideas on so, he took the feathers of the bird, whose other parts he ate, and dipped it in its blood and started putting his ideas on a leaf.

Pen. Oh, yes, pen. It was an honour for me when I was officially promoted from using a pencil to pen for my class work in fifth grade. Apart from traveling in a train and plane, I always fantasised of using pen till then. Talking of plane, another fond memory got back. I was always in awe at the sight of huge object taking off into air and flying at a storming speed. Watching it on a television or theatre(other notable inventions of man), I felt that nothing can be larger than life than that. So, when I wanted to watch it in real, I literally harassed my dad till he agreed to take me there. When I reached the airport, I couldn't believe what I was looking at. The very thought that a man could build such structure and that it was actually present in front of me, I felt like I was stepping into future.

Wow! an exclamation came out of me without my knowledge when recollecting these memories. I never felt so proud for being born as a human. But then, to be mesmerised at these things I had to recollect the memories. I wasn't proud of mankind till I started writing this. That bothered me. We stopped being excited when writing with a pen or travelling in a train. We have taken them for granted. With another flash of thought, what bothered me more than that was that we have taken the nature, which gave us all these, for granted. The tree beside the railway track didn't get the same excitement from me like the train did. The plants near the airport didn't get the same feeling from me that the airport did.

'Ignorance is bliss' people quote. But not for this, not for the environment. We didn't just ignore it, but damaged it. I just realised that we have caused more harm to the environment in the name of development than for the cause of survival. While we exploited the resources and made our lives as comfortable as possible and trying to make it even more comfortable, we can't afford that comfort anymore. Standing at this point of time in human history with a glorifying past and promising future, we have the responsibility to care for the nature as much as we do for ourselves.

'Yes, it's our responsibility' you might be thinking. Just thinking. I wonder the number of times you might have thought of saving the nature. With the many campaigns and awareness programs being conducted, I am sure that thought has crossed your mind quite a few times. What did you do then? Nothing worth mentioning I suppose. I regret telling that I didn't do anything either. Thinking is just the inception. While it is essential, it isn't enough. I always believed ideas are immortal. But they exist only till mankind exists. The moment the last human on earth dies, everything belongs to the eternity. The books, the buildings, the systems, every-

'Ignorance is bliss', people quote. But not for this, not for the environment.



The
Princeton
Review®

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Interviewing the Interviewer.

MR.JV Krishna Mohan is currently serving as the Head HR for Reddy Labs, his past experiences include working with talent acquisition at GVK Bio, Accenture, AT&T & ITC. Since we realised that the magazine was already loaded with too many articles our Chief Editor, Anurag Jayanthi from CSE 3rd year approached Mr.Krishna Mohan for an interview and he was generous enough to give one. Read on to find answers to some commonly asked questions and what HRs look forward to.

What do organization expect from a fresher who joins them straight out of the college?

Functional Knowledge. It is expected that a fresher amply demonstrates functional knowledge.

There are three aspects of what a company expect from a fresher:

1. Functional knowledge
2. Learning agility
3. Right attitude.

Can you shed some more light on the three aspects that you highlighted about?

1. Functional knowledge: -

Functional knowledge is the basic differentiator/denominator amongst freshers. Good functional knowledge gives freshers a head start which means he has that much more time to soak in other aspects of the job than the rest.

2. Learning Agility:-

Learning agility is the ability or willingness to learn from all kinds of experience and use those effectively in different roles that he/she shall play in the organization.

3. Right Attitude:-

While the above two helps the fresher succeed on the job, right attitude determines how successful a career that one will have and the inverse is also equally true – it is the softer aspects like ability to work in complex environments, time management, stakeholder management helps navigate one's way in the corporate jungle.

What advice do you want to give to someone who is a potential job earner in the next one year?

Have your sight fixed on your target and your feet firmly grounded.

Please elaborate sir.

One should be absolutely clear of the career choice they are making. Wrong choice results in not only in dissatisfaction to an individual but also, it eats up organizational resources, both monetary and non monetary.

Have your feet firmly grounded because having modest/realistic expectation makes life easier for everybody around you.

Okay and what advice would you give to freshers on CV/Resume preparation?

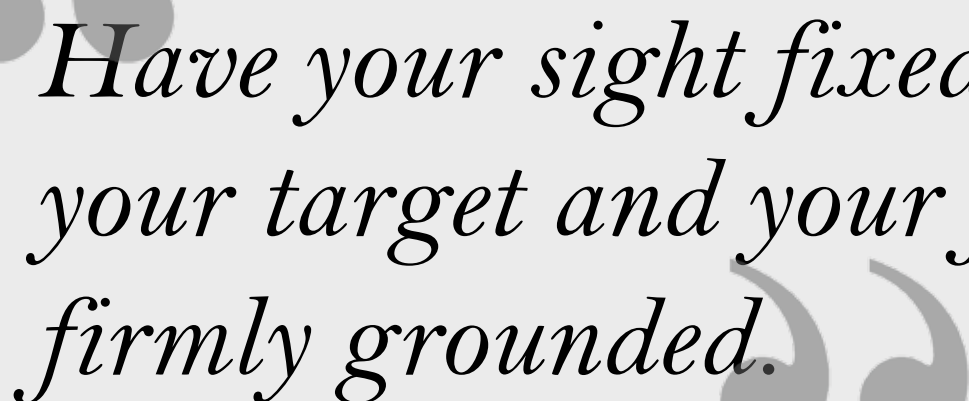
Prepare your CV/resume yourself. Understand and think what you want the other person to know about you and put that on your resume. Your resume speaks on your behalf. 80% of the questions asked in the interview are based on what you put on the CV.

Any suggestions you want to give on how to answer in an interview?

Be confident of what you speak and speak what you are confident about. It is not wrong to say I do not know when you do not know that to dodge the question. Honesty is a good virtue to have.

Supposing a student has an option of Higher education and a corporate job, which would be wiser to choose?

Your question is not specific, it comes down to an individual's perspective and financial capabilities at the end of the day. But what I would say is, learning should be a continuous process to stay relevant. Irrespective of your degree, once you join a job you need to keep on learning to remain updated in the industry. Upskilling is the only way to stay relevant.



*Have your sight fixed on
your target and your feet
firmly grounded.*

Up, Up & Above.

Hima Bindu from CSE 3rd year plans on travelling abroad for higher studies as she believes abroad study can truly widen one's horizon. Read on further to find out what she thinks about foreign education and why you should go for it.

As they say everything must come to an end at the right time, the supreme commodity of a student is education. One of the exemplary conclusions a student can gift him/herself is with a post graduation degree abroad.

Though India is one of the best places to educate yourself, the opportunities and choices you get to choose are less when compared to few foreign countries. Universities worldwide have seen a constant rise in the number of Indian students matriculate for a degree away from their home country.

The main reason behind their vintage is the fact that the Indian job market appreciates a degree from a top international university more compared to an Indian's Bachelor's or Master's degree. Every country on this planet is well known for something or the other. Among which some countries excel in few fields of education which cannot be matched with any other nation.

The whip of studying abroad broadens the way of thinking through encountering different cultures and traditions thereby allowing roaming all over the world and adopting their practices effortlessly. Choosing the right institution plays an important role when enrolling in a study abroad program as education is the center piece of any study abroad trip. This expedition gives a possibility to undergo different styles of education mystifying them before.

While studying abroad, the host university/institution grants you an opportunity to immerse yourself in a completely new language. Once this program is done a new perspective on culture, language skills and willingness in you is developed, for which a stack of opportunities are awaiting for you everywhere you go. Personal progress is said to be a major factor in this study abroad program which blooms an independent nature in you.

Students who study abroad display diversity and show that they aren't afraid to seek out new challenges or put themselves through difficult situations. Most importantly, students who have studied abroad show just how committed they are to their education. Graduate schools regularly look for candidates who will bring a unique aspect to their university.

Students who have studied abroad have shown that they have the curiosity and educational acumen to be a leader in graduate school. This trip will be the best life experience to many students to discover themselves. This agenda will help you improve stoic nature which is most expected in the corporate society and will start developing an amiable mindset. The beneficial factors of this study-abroad trip can be achieved when you walk in a positive path, neglecting the odds.

Infinite Chocolate?

One out of infinity, infinity out of one, zero, none or everything. Apoorva from CSE 3rd year writes on a mathematical paradox “Infinity chocolate”. Read on to take a trip through Willy Wonka’s chocolate factory.

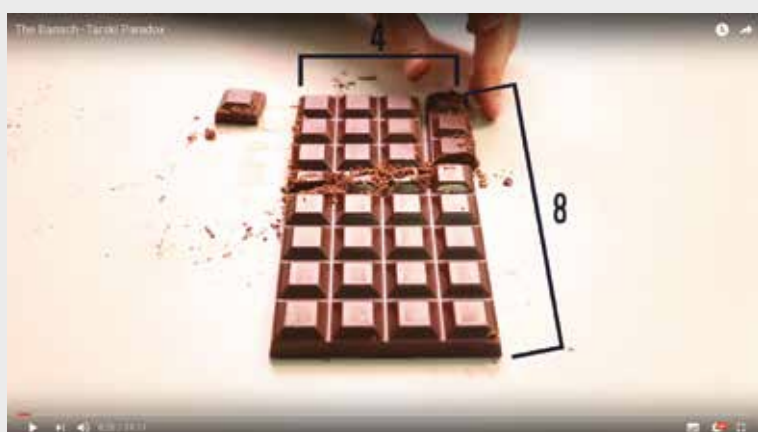
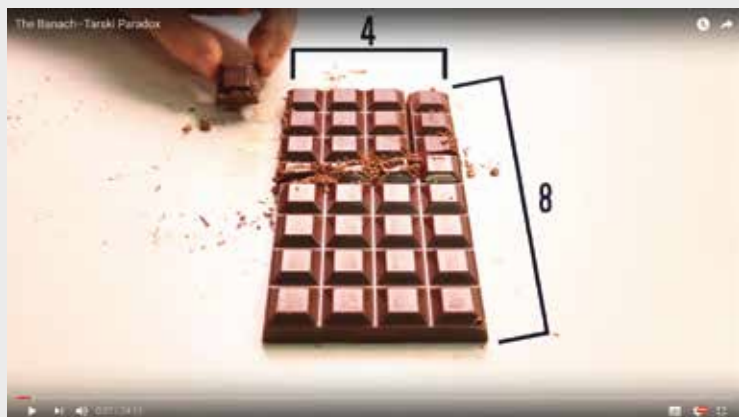
Ever wondered whether you could produce all the chocolate you wished for with just one bar of it!?

Here is a funny implication of this paradox which I believe would melt your mind and take you back to the World, we as kids have always fantasized about.

Based on a paper published in 1924, Stefan Banach and Alfred Tarski gave a construction of such a paradoxical decomposition. To understand it better let us imagine a solid ball in 3-dimensional space which can be split into a finite number of non-overlapping pieces, which can then be put back together in a different way to yield two identical copies of the original ball.



Consider a chocolate bar of 4x8 size. It could be cut in the following manner and rearranged so as to provide of a chocolate bar of the same 4x8 dimension with an extra 1x1 unit produced.



Interesting right!? But what about the law of conservation of mass and energy? Well, this theory is not possible in our physical world. In reality, the final bar is a bit smaller than the actual bar and is short of a 1×1 cube. The cuts make the chocolate bar appear smaller. Each square along this cut is shorter than that of the original bar, but it makes it hard to notice right away.

The mathematical version of the paradox uses the concept of an immeasurable set. Every object in real life is measurable, because it is the set of a finite number of atoms taking up a finite amount of space. Mathematically, even when finite becomes infinite, you still usually have measurable sets. You really have to try very hard in order to create an immeasurable set.

The reason the Banach–Tarski theorem is called a paradox is that it contradicts basic geometric intuition. "Doubling the ball" by dividing it into parts and moving them around by rotations and translations, without any stretching, bending, or adding new points, seems to be impossible, since all these operations ought, intuitively speaking, to preserve the volume.

The intuition that such operations preserve volumes is not mathematically absurd and it is even included in the formal definition of volumes. However, this is not applicable here because in this case it is impossible to define the volumes of the considered subsets, as they are chosen with such a large porosity. Reassembling them reproduces a volume, which happens to be different from the volume at the start.

Unlike most theorems in geometry, the proof of this result depends in a critical way on the choice of axioms for set theory. It can be proven using the axiom of choice, which allows for the construction of non-measurable sets, i.e., collections of points that do not have a volume in the ordinary sense, and whose construction requires an uncountable number of choices.

As far as it may be considered impossible in reality, wouldn't it be just great to produce all you wanted from just a single unit?



Art by V.P.Sreya