

Peer Review

GANAK PATRA NO. 03 ● 2017

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From the HoD's desk



Prof. Dilip K Sen

I recall an interaction with one of my passed out students, a few years back. She had come back to the department to collect her 8th semester marks card. She was working with a company for about 8/9 months by then, which meant that she had crossed the initial honeymoon period of the first job with its immaculate work environs, the food courts and the seemingly friendly work culture of calling the boss with his first name. I generally make it a point to talk with such alumnus about their work which keeps me updated about the world outside. So I asked her "How is the work? Are you happy?" She replied like most others, typically in American connotation "It is good." I felt happy. A little later slowly she opened up and revealed about the mad-rat-race, the synthetic environment and the one up-man-ships culture everywhere. I tried to console her saying that this would be there everywhere in professional domain. She didn't seem convinced as she said "You know Sir, I do the work but the team-lead presents it as his own

contribution in all review meetings with the higher-ups and takes all the credit." I couldn't advice further. She also said that she is contemplating writing her GRE and plans to pursue higher studies. Time passed. I came to know that in the meanwhile, she got married and I presume that her further studies was consequently shelved.

I met her again nearly after four years. She had come to the department to get her transcripts attested as she was applying for her passport. This time I could notice that her body language had changed for the better – she was a confident smart lady. Routinely I asked her the same question again, also reminding about the complaint that she had earlier with her team lead. She gave me the good news first that she has been elevated as a team lead. Then with a mischievous grin she added "Sir I have learnt the tricks of the trade." To my query whether she is doing anything different she replied that "I am doing the same things that my predecessor did." This time I felt sad, really sad.

It left me wondering whether any of my students will ever standup and bring about a change in the mad-rat-race. Whether any of them would separate themselves from being a face in the crowd and be noticed? – be counted? I am optimistic, very optimistic and I am sure that one day someone would be the 'change' for bringing the change that they look for.

Kudos to the editorial team who toiled round the clock to bring out another issue of Ganak Patra, the platform for creative ventures and expression of thoughts. Those who have contributed in one form or the other deserve more than a pat. All of you stand out from the rest. My compliments to each one of you. Let the good tradition continue.

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THEN

It's already been over 3 years since people started hearing about self-driving cars. The concept of cars driving themselves seemed like something right out of a sci-fi movie. Then, people started thinking about how safe these cars would be. Think about it, would you trust a computer enough to drive you to places? This was a serious issue to be addressed by the manufacturer of the cars as well as well as legal authorities. Thus began the journey of rigorous testing and development of this technology. The first year of research that is, by 2015 we had cars which needed tech support within about 15 miles. Needless to say this wasn't very satisfactory.



The Car is Alive

Shreyas N

NOW

Two years later the leaders in self driving cars are Google and General Motors. They have shown tremendous improvements since their first prototype with cars being able to drive themselves over 500 miles before needing tech support. Automotive Companies like Tesla, Nissan and Delphi are not far behind. Of course, all this is the testing phase; you don't need to worry about crashing into a car and having no one to shout at unless of course you're a regular visitor at Mountain View! These cars have the option of disengagements as well, which is a Manual mode of sorts which allows the car to be controlled remotely or from inside. These are needed in case of any software or hardware failures or maybe just because feel like driving. Also, control with a joystick isn't completely implausible. You might need to brush up on your NFS skills a little! Google's fleet of these 'Self-Driving Smart Cars' drove over 630,000 miles with just 124 disengagements. Disengagements need not mean there was a failure; it just means that the company is trying out new tests. Tesla is already well established in making electric cars with complex AI's and is now using the real world information collected from their customers to improve their 'Autopilot' systems.

ARE WE THERE YET?

Unfortunately, the answer is no. We are still nowhere close to allowing these cars into crowded roads. But, looking at the pace with which this technology is improving, a vision of streets filled with driver-less cars is definitely a plausible future. Coming closer to home, these cars might be late to arrive in India for obvious reasons, but technology is surpassing all conventional barriers and it is an interesting idea that we may someday have driver-less Uber's and Ola's. The testing is only producing better results day by day and with the current brilliant minds that the world has, all that stands between this marvelous reality of an automatic and tech oriented world is time.

Aero India

2017



a report by *Vignesh Waran*

It was a day we will never forget. What could have been an usual Friday turned out to be a very special day for a group of 60 students. We were chosen by the college to witness Aero India 2017, possibly for the last time in Bengaluru. We were asked to assemble at the parking lot by 09:30, but the excitement brought us there well ahead of time. Every one being well equipped with caps and sun glasses to shield themselves from the blazing heat of the early summer, boarded the bus to Yelahanka Air-force base. On the way, we exchanged facts on various jets. Once there, we saw that the airshow had already begun! We crossed the security checks and immediately ran towards the run way to get a better view. We saw a pilot in the jet waving at the crowd before take off. He did some breathe taking stunts. he kept the crowd captivated. The



pilots of SuryaKiran were next to move us. Their co-ordinations got the crowd applauding. The various formations and timing and precision was a sight to behold. We were yearning for a more closer look, fighting for the binoculars while keenly observing the various acts. With heavy hearts we had to break for lunch promising to return with renewed energy.

After lunch, we learnt that there was a seminar held for all the college students about the Indian Air Force. A video was played that brought out the marvels of the Indian Air Force. This deeply touched our hearts and earned our respects. We were asked a few trivia questions which made us realize how little we actually knew of our Air Force.

As the saying goes, all good things must come to an end, we boarded the bus with a memory we would always come to cherish and to ensure that, we took pictures with our teachers for without them, this would have been just a dream.



eSports

competitive video gaming

The rise of

Steve Jerold

This might seem like a ridiculous topic but wait till you see what the “Virtual athletes” make later through the read. eSports might look like wasted effort to the ordinary person but on the contrary it is a very rewarding and captivating experience at the same time.

Well how did it come up and who plays It? To answer these questions I say eSports is the the byproduct of competitiveness in humans and the rise of technology around us. Even in the early days where we used to play on arcade machines we would challenge our friends to beat the high scores. This snowballed into larger well organized events like tournaments. By the time the 1990s came around, tournaments for arcade and console games had become increasingly common, with companies like Nintendo and Blockbuster sponsoring worldwide championships. Now who participates in these championships? There is a large population of people who assume that the players here are just the average

geek or nerd who detest physical strain and would rather play from their parents’ basement. Which was true for the early days but seems to be taking a shift in course in the early 2000’s. Studies have found that gamers are more social than non-gamers and are also more adept at multi-tasking.

The players are called competitive Esport athletes. Athletes?! Really? This thought might have crossed your mind I am sure, it has also sparked a large amount of controversy. Some of you might consider this to be a stretch of the term but take these points to mind, the players here go through rigorous mental and physical training to be at the top of their game over hundreds of other players who most likely are going through the same training as well. We see new medication in the market which is currently a booming industry purely for gamers, known as nootropics which is essentially a biohack for the brain which makes it function better and faster just to

increase the response time of a gamer by a few milliseconds. Yes milliseconds matter in video games. Before you jump up and say no drugs are bad we can reference this to how gatorade and protein drinks are used by athletes is similar to this. Providing this cognitive edge is taken advantage by many companies like nootrobox which have even started to sponsor eSports teams. There were also studies by scientists at the German Sports University that showed that esport professionals go through the same physical strains that of a normal athlete.

Now we dive into the numbers. No no not the boring kind. It's all about the money here. eSports is a global industry as of now with a predicted revenue of 1.1 billion us dollars in 2019. That's 2 years away. eSports is a compilation of many games such as Dota2, League Of Legends, Counter Strike, Call Of Duty, World Of Warcraft (yeah the one from big bang theory) and due to the boom of the smart phone industry there are games designed for them as well. Vainglory which very recently held its 2016 world championships had a total prize pool of \$120,000. As we can see this market is large and growing at a fast rate and player here have the opportunity to make it big. Take for example "The International" which is a five day Defense of the Ancients 2 (Dota 2) championship tournament. With up to 90 players from 22 countries, it's dwarfed by the Olympics in every respect save one: the prize money. The 16 teams competing will share in a prize pool of over \$20 million. The eventual champions will pocket almost \$9 million split between the team of five players, and even the lowest-

placing teams will still take home \$101,400 in consolation prize money. \$100,000 is roughly 68 Lakh Indian rupees, yeah that just happened. This is with an average of 35 to 45 minutes per game. There are also instances where players make way more money than the average Olympian. You might be thinking where do I sign up? Easy money right? Think again.

To get a basic sponsorship you'd need to be the best over 1000's of players and this is only achieved through years of playing the games and dissecting the game mechanics. We ourselves have gamers in our college with 4000 hours in game play which is equivalent to 170 days in game!. It might look simple at first but the amount of time and effort taken in is enormous.

We all have heard the saying "Choose a job you love and you will never have to work a day in your life." This statement is never truer than in this situation. We can see that the world is moving away from the regular repeated course it used to follow. Doing what you love and getting paid for it is true capitalism is what I say. The market does have its pros and cons. eSports is not mainstream yet. It will when your (a) 70 years old neighbor will know about it or (b) when eSports games will be broadcasted on main TV properties (which may happen faster than you think). There is also the concern of certain health issues but on the other hand it is growing at a rapid pace and winning the prize money will get you going places. We still may debate on whether eSports is a legitimate sport or not but that is for a later time. Games are all around us now a days, young or old everyone plays it at some point in their lives. It is you who decides how it effects your life.

The Rise



Alphy Elizabeth Joseph

The fall

What does it take for one of the most popular search engines of all time, a multi billion dollar company to sink to a point of such sheer desperation that it had to be sold at a value far lesser than what it was once worth? Well, let's delve into that shall we? Yahoo! might not have earned the cult status that Google did, I mean, you'd never hear anyone say "Just Yahoo! it", nonetheless, it was one of the biggest Internet companies in the world with nearly 650 million unique users visiting their website every month. Not too long ago, it overtook Google with a 79% profit on the revenue earned making it the highest among all Fortune 500 companies. Like all the game changing companies out there Yahoo also started as a time pass experiment for two Standford University students, (It's always one of them isn't it?) Jerry Yang and David Filo. In 1994 they created a website called "Jerry and David's guide to the world wide web" which was basically a directory that listed most of the websites on the Internet. After receiving a million hits they renamed the website to "Yahoo!" just because they liked the word and later decided it stood for "Yet Another Hierarchical Officious Oracle", you know, just so they could make sense of it. A few high profile acquisitions and skyrocketing of stocks later they realized they had struck gold. And so the glory days began.

Then what went so horribly wrong? The epilogue for the long sad story of Yahoo! is finally being written. Most people blame its "nice guy" founders. And that doesn't sell in our cut throat world. Unlike their competitors the duo took fewer risks. They passed up the offer to buy Google in 2002 (that's right!) and again Facebook in 2006. At the time these acquisitions looked like risky uneconomical moves. That's the whole point. Web companies need the unique power of founders to do unpopular things. Larry Page advocated for Google to buy the

money-losing video sharing site YouTube in 2006; Zuckerberg made what seemed like an outrageously overpriced bet on the photo sharing application Instagram in 2012. Well, we all know how they turned out! This is how tech companies survive—the ability to take risks. After Jerry Yang took over as CEO in 2007 he was either too nice or too unwilling to take risks. He could have let go of a great deal of employees and invested that money in technology and the smart phone revolution raging at the time.

Although his biggest slip in decisions was probably when he declined a major lifeline; Microsoft made a bid to purchase Yahoo! for \$45 billion in 2008 in an attempt to compete with Google. The founders believed that it was worth far more than what Microsoft was offering. Considering that they eventually sold to American telecommunications company Verizon for a mere \$4.8 billion(Life, huh?), it's safe to say that, that was a pretty boneheaded move. But you can't really blame them either for having faith in the company they toiled so hard to build. So the inevitable happened and Yahoo!'s financial and stock values began to decline.

In a final attempt to stop their plummet to rock bottom Yahoo! Hired Google executive Marissa Mayer as CEO in 2012 to turn things around. After a 4 year reign she failed to do so. Experts say she could have made Yahoo! a real player in social media but decided to invest in sites like Tumblr and Flickr instead which produced no revenue, mostly because Yahoo! at this point couldn't produce an environment for startups to thrive. Many such unsuccessful moves later, everyone gave up on Mayer as well. And that's how it all ended the way it has and all we can do is mourn the loss and hope that Verizon is not too cruel. Fingers Crossed!



TORRENTS

Pirate or Partake?

Shreyas N

The oncoming of the internet made the connectivity between different parts of the world, it also brought about the idea of sharing data. The 70's to 90's saw the rise of decentralization in filesharing. It started with the Bulletin Board System and saw the increased use of the term Shareware, then came Usenet or Newsgroups all of which made filesharing a much easier and a decentralized task.

The music was not left behind. We all have heard of Napster which made people go crazy in the 90's. It allowed songs to be shared among scores of people at the click of a button. It also caused artists to lose business since people were getting songs for free on the internet. It used peer to peer system strictly for sharing mp3 files. But Napster's database was centrally located which eventually led to its demise, but Napster had already spread the idea of peer to peer sharing among the masses.

Thus, peer to peer sharing became a new fad and many new softwares came up with new uses with this technology including BitTorrent which was created by Bram Cohen in 2001.

What made BitTorrent great was that it put all the greatest properties of its predecessors and put it onto one easy to use platform. It used the concept of breaking files into smaller pieces and decentralized peer to peer distribution. After a few more years, several more advancements made it a mainstream technology and led to the creation of trackerless "Torrents". A new much smaller platform called utorrent was introduced which gained immense popularity and is used by millions across the world today.

Kickass Torrents, The Pirate Bay, RARBG, EZTV, Torrentz are some of the websites and many of you readers might have grown up using. Basically, torrents are powered by the number of people downloading and uploading a file. Seeders are stations which have completed the download and are powering your download. And leechers are the number of people still downloading the file. This mechanism was abstract to a non tech savvy user and made downloading at the click of a button as easy as searching for something on Google. Torrents saw

Torrents by their nature are just sharing the files on someone else's PC, but this loophole allowed people to pirate premium content of many business'. The Music/TV Show/Movie you downloaded yesterday was downloaded by millions of others which meant that the people who were making these TV Shows/Movies etc were potentially losing millions of customers. The legality of sharing Copyrighted Content and Products using torrents has been a hot topic for debate in the past few years with many celebrities going as far as calling torrent users "thieves". Over the past 10 years several people belonging to BitTorrent and its subsidiaries have been arrested for Copyright Infringement and it was for this reason that 2016 saw a hunt for torrent sites by legal authorities. Many big names in the business like KickAss Torrents, Torrentz etc were shut down with the charge of Copyright Infringement and in India's Copyright Act was also implemented aimed at the users who would download illegal content with a warning of upto 3 years in Jail.

CONCLUSION

Well Torrents have seen their ups and downs. The word torrent has become a very common term in the world which is a proof of its immense popularity. But is it dead? The answer is a resounding NO. Though many torrenting websites were shut down , many more are resurfacing in their place. Torrent downloads are still flourishing and it doesn't look like it will reduce anytime soon. The laws on downloading Copyrighted content however have become very strict, so as a peer I am obligated to ask you not to download such content. I'd like to end this article by asking you to go ahead and download using torrents , but also to do so responsibly.



A Sneak Peek Quantum Computing

Shreyas Y L

There is always a shortage of space when it comes to storage of data in the field of Computer Science. Code Optimisation, after a certain extent, doesn't help you much in improving the efficiency of storing large amounts of data. What we need is a computing system that can store more information using minimum amount of space. In other words, we require a system that stores more information in one bit, rather than just 0 or 1.

Welcome to the realm of Quantum Computing.

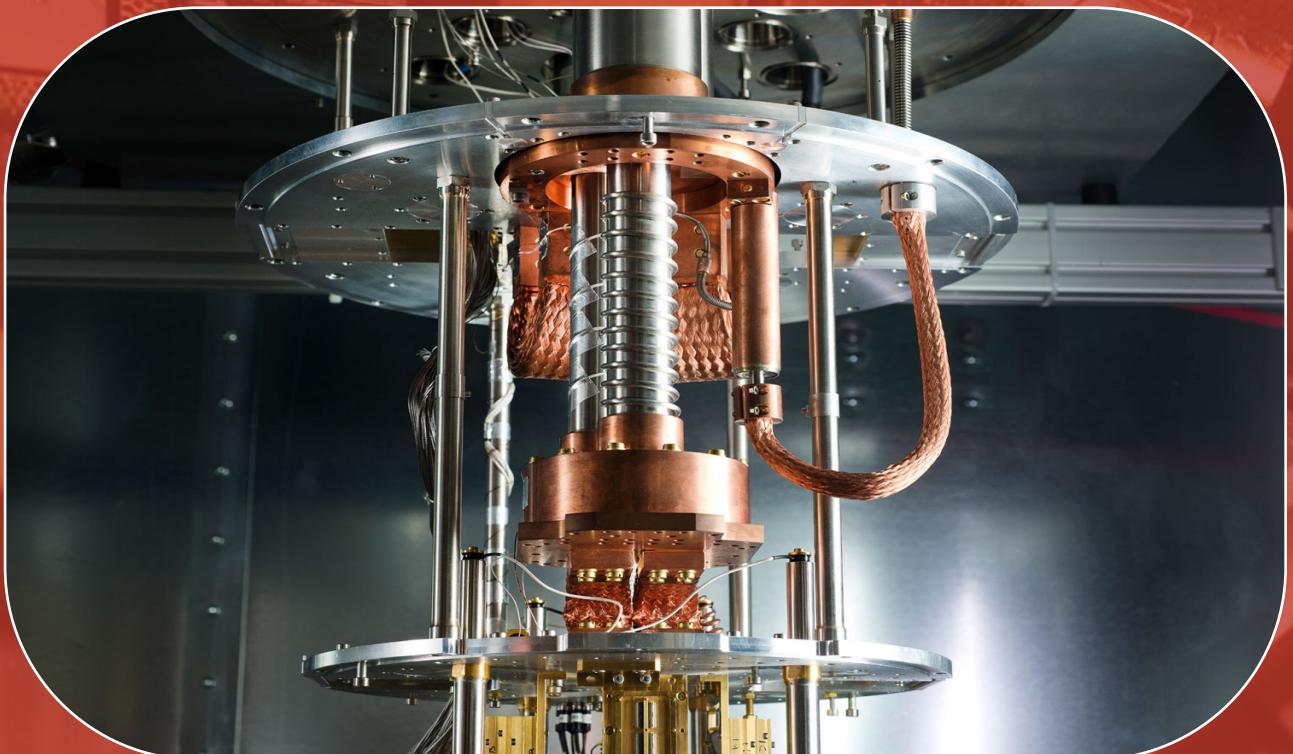
Let us have a brief look at some of the basic concepts that have changed the field of Quantum Computing from a hypothesis to a reality. In May 1981, renowned scientist Richard Feynman's lecture on how a Quantum System can not simulate a classic system efficiently and his idea of the basic model of a Quantum Computer that could possibly do the same, revolutionised the idea of Quantum Computing. Later in 1985, David Deutsch, at the University of Oxford, described a Quantum Computer by extending the definition of a Universal Turing Machine. Just like how a Universal Turing Machine can simulate any other Turing Machine, a Universal Quantum Computer can simulate any other set of Quantum Computers. This provided an insight towards how Quantum Computers are supposed to work and the efficiency of their operation. An important contribution was made by Tommaso Toffoli in 1981 when he first introduced the reversible Toffoli gate. The Toffoli gate is a device used for computation, having 3 bit input and output. If the first two bits are set, then the third bit is inverted. Else, all the bits stay the same way. In the year 1998, the first working 3 qubit(quantum bit) NMR(Nuclear Magnetic Resonance) computer was demonstrated. Recently, on January 24th 2017, D-Wave Systems Inc. has announced the commercial availability of their D-Wave 2000Q, a 2000 qubit Quantum Computer.

Concept and Working of a Quantum Computer:

Discussing the topic on a quantum level, it uses the superposition principle to compute the state of its qubits. Therefore at any given time, a qubit can have a value of either 0 or 1 or both 0 and 1 simultaneously. This considerably reduces the look up overhead during the event of solving iterative problems and frees the user from binary constraints. Since a quantum system is also different from a classical system, the constituent qubits may not be independent of each other. This

phenomenon is called quantum bit entanglement which is a direct result of the quantum entanglement. And all the qubits have a correlation with other qubits because of the entanglement phenomenon. This means that , if there are n qubits there are 2^n possible correlations between the qubits. Now since it is not possible to just write down all these 2^n possible combinations, a Quantum Computer is used to record all these correlations in such a way that they make sense.

Therefore, the basic idea is to increase the amount of information stored in one bit, since each bit is correlated to some other bit holding additional information by courtesy of the entanglement phenomenon. However, there is just one problem. The input given to a quantum computer can be entangled qubits in the state of superposition, the output produced by the Quantum Computing System is also of the same nature. Entangled qubits in the state of superposition. Which means that the output will change even before one can observe the same. Even though the output produced will never be able to describe the state of the qubits accurately, it is able to describe the manner in which the qubits behave as they are correlated to each other. This means more information in less number of units to store the information. This can be verified from various algorithms devised for Quantum Computing Systems like the Deutsch Josza algorithm. Since a Quantum Computing system has the capability to process large amounts of information faster than its classical counterpart, it can considerably reduce the storage space required for the same upto a significant level. There are talks of a powerful computing system such as this revolutionizing the Virtual Reality industry by 2050. It's ability can also be utilised in the field of



Let's talk Tax

Chandrajith K S

Goods and Services Tax, commonly referred to as GST is probably the most discussed financial reform until the recent demonetisation act because it is bound to have an indelible impact on the common man. Touted as India's biggest taxation reform yet, its benefits are aplenty. Before we understand GST we need to understand the current taxation regime of our country.

Currently taxes are divided into two sections: Direct and Indirect. GST will impact only the Indirect taxes. Direct taxes are taxes which cannot be shifted and it is paid directly to the government by some individual or company; income tax for example. Indirect taxes on the other hand can be shifted, before we see what this means we will look at the different types of indirect taxes.

Indirect taxes:

- a) Central Excise: Tax levied by the central government on the manufacture of goods.
- b) Sales tax:
 - i) Local Sales Tax: If a good is manufactured and sold in the same state then the tax levied on this good is known as Local sales tax or VAT(Value added tax).
 - ii) Central Sales Tax: If a good is manufactured in State A and sold in State B the tax levied on this good is the Central Sales Tax and it is paid to the Government of State A.
- c) Service Tax: Tax levied on services provided by some individual, company or Organization. Example: We all pay service tax when we dine at a restaurant. Now let us try to understand shifting of tax using the following scenario: Let us consider that a manufacturer manufactures a commodity for Rs. 100 at a tax rate of 10%. The Wholesaler pays Rs. 110 for this commodity out of which Rs. 10 is paid to the Government. The Wholesaler now sells this commodity to a Retailer for Rs. 150 at 10% tax. He receives Rs. 165 out of which Rs. 15 is the tax, but the Wholesaler has already paid Rs. 10 as tax so he will now pay Rs. 15 - Rs. 10 = Rs. 5 to the government. The Retailer now sells the commodity to the customer for Rs. 200 at 10% tax. He receives Rs. 220 out of which Rs. 20 is tax but since he has already paid Rs. 15 as tax to the wholesaler he now pays just Rs. 5 to the government. The total tax collected by the government over this commodity is Rs. 20 but this has not been paid by one person, the tax was shifted.

The above scenario was just an example to understand tax shifting. It is quite evident that the current taxation regime is highly convoluted. With the GST reform, all the indirect taxes will be subsumed under one tax: The Goods and Services Tax. GST has been introduced to ensure transparency and tackle the

fiscal (government revenue) deficit. We will now see its implications.

GST will be levied on two levels simultaneously, State GST and Central GST. Under the current taxation regime, tax is levied on the final output. Bloating of prices is observed because cascading of taxes takes place (tax on tax). If the manufacturer pays 10% tax on a commodity priced at Rs. 100, the wholesaler will now pay tax on the new amount i.e Rs. 110 and so on. Consequently the Consumer will have to pay tax on the cumulative price of the commodity hence explaining the bloating of prices of goods. In theory an exorbitant amount of revenue seems to be collected but this is not true because most of the tax is evaded.

Under the new regime, tax will be levied only on value addition rather than the final output. Tax will be levied only the activities performed in that stage that leads to increase in the value of the good. For example, Raw Cotton--> Cotton--> Yarn-->Cloth--> Trousers. The manufacturer will now pay tax on the cotton yarn. The wholesaler will pay tax on cost of cloth-cost of cotton yarn and so on. Therefore if the price of trousers were Rs. 200 and Cloth say Rs. 100 the consumer would have to pay a tax of Rs. 10 if the rate was 10% under the GST regime. In the current regime the consumer would have to pay tax on the final output so the tax levied would be Rs. 20 at the same rate. GST is therefore also called multi staged tax. Since the tax is monitored at every stage, tax evasion is also difficult.

We will now look at IGST(Integrated Goods and Services Tax). With the abolition of Central Sales Tax it would now be discouraging for a manufacturer to sell his goods in another state but that is not the reality. For example, a manufacturer in Delhi will now receive the SGST(State GST) if he sells his commodity in say, Karnataka (He/She would earlier receive the Central Sales Tax) . Hence GST is a destination based tax. IGST also serves the purpose of monitoring interstate trade. The introduction of GST will hence make the entire country a level playing field even for business as the tax is uniform (both CGST and SGST are levied simultaneously).

All GST pertinent decisions including the rate of GST will be taken by the GST council which consists of the following members:

a) Finance Minister of the Union who will also serve as the chairman of the council.

b) Minister of State for Revenue.

c) Finance Minister of the States. We will finally look at the GST rate structure:

1) Standard rate of GST will be 18%.

2) The GST rate on Ultra luxuries and Sinned goods (Tobacco and alcohol) will be 28%.

3) The GST rate on food grains (Essential commodities) will be 0%.

4) Items of common consumption: 5%.

5) Heavy consumer goods such as washing machines and refrigerators at 28% with rider(i.e transportation charges included,a seperate 28% will not be levied on transportation charges).

GIT CHEAT SHEET

Git is the free and open source distributed version control system that's responsible for everything GitHub related that happens locally on your computer. This cheat sheet features the most important and commonly used Git commands for easy reference.

INSTALLATION & GUI'S

With platform specific installers for Git, GitHub also provides the ease of staying up-to-date with the latest releases of the command line tool while providing a graphical user interface for day-to-day interaction, review, and repository synchronization.

GitHub for Windows

<https://windows.github.com>

GitHub for Mac

<https://mac.github.com>

For Linux and Solaris platforms, the latest release is available on the official Git web site.

Git for All Platforms

<http://git-scm.com>

SETUP

Configuring user information used across all local repositories

git config --global user.name "[firstname lastname]"

set a name that is identifiable for credit when reviewing version history

git config --global user.email "[valid-email]"

set an email address that will be associated with each history marker

git config --global color.ui auto

set automatic command line coloring for Git for easy reviewing

STAGE & SNAPSHOT

Working with snapshots and the Git staging area

git status

show modified files in working directory, staged for your next commit

git add [file]

add a file as it looks now to your next commit (stage)

git reset [file]

unstage a file while retaining the changes in working directory

git diff

diff of what is changed but not staged

git diff --staged

diff of what is staged but not yet committed

git commit -m "[descriptive message]"

commit your staged content as a new commit snapshot

BRANCH & MERGE

Isolating work in branches, changing context, and integrating changes

git branch

list your branches. a * will appear next to the currently active branch

git branch [branch-name]

create a new branch at the current commit

git checkout

switch to another branch and check it out into your working directory

git merge [branch]

merge the specified branch's history into the current one

git log

show all commits in the current branch's history

SETUP & INIT

Configuring user information, initializing and cloning repositories

git init

initialize an existing directory as a Git repository

git clone [url]

retrieve an entire repository from a hosted location via URL



INSPECT & COMPARE

Examining logs, diffs and object information

`git log`

show the commit history for the currently active branch

`git log branchB..branchA`

show the commits on branchA that are not on branchB

`git log --follow [file]`

show the commits that changed file, even across renames

`git diff branchB...branchA`

show the diff of what is in branchA that is not in branchB

`git show [SHA]`

show any object in Git in human-readable format

SHARE & UPDATE

Retrieving updates from another repository and updating local repos

`git remote add [alias] [url]`

add a git URL as an alias

`git fetch [alias]`

fetch down all the branches from that Git remote

`git merge [alias]/[branch]`

merge a remote branch into your current branch to bring it up to date

`git push [alias] [branch]`

Transmit local branch commits to the remote repository branch

`git pull`

fetch and merge any commits from the tracking remote branch

TRACKING PATH CHANGES

Versioning file removes and path changes

`git rm [file]`

delete the file from project and stage the removal for commit

`git mv [existing-path] [new-path]`

change an existing file path and stage the move

`git log --stat -M`

show all commit logs with indication of any paths that moved

REWRITE HISTORY

Rewriting branches, updating commits and clearing history

`git rebase [branch]`

apply any commits of current branch ahead of specified one

`git reset --hard [commit]`

clear staging area, rewrite working tree from specified commit

IGNORING PATTERNS

Preventing unintentional staging or committing of files

`logs/ *.notes pattern*/`

Save a file with desired patterns as .gitignore with either direct string matches or wildcard globs.

`git config --global core.excludesfile [file]`

system wide ignore pattern for all local repositories

TEMPORARY COMMITS

Temporarily store modified, tracked files in order to change branches

`git stash`

Save modified and staged changes

`git stash list`

list stack-order of stashed file changes

`git stash pop`

write working from top of stash stack

`git stash drop`

discard the changes from top of stash stack

GitHub Education

Teach and learn better, together. GitHub is free for students and teachers. Discounts available for other educational uses.

✉ education@github.com

☞ education.github.com

The Day the Internet stood still

Mayank Metha D

Buckminster Fuller had once quoted “Humanity is acquiring all the right technology for all the wrong reasons.” With advance in computer technology, the evil in the field has also advanced. Internet was developed for the people to learn and communicate. Ever wondered what will happen if there was an Internet blackout? Sounds like a scene from Mr.Robot or The Die Hard Series or like a task in Watchdogs. Well, partial Internet blackout did happen. 2016 witnessed a large amount of record breaking cyber attacks which were fictions a few years back.

So, what exactly happened?

On October 21st 2016, a quarter of the Internet was taken down. This was an action of cyber attack on DNS provider named Dyn. This was no ordinary cyber attack as the biggest online services like Amazon.com, BBC, Electronic Arts, GitHub, Netflix, PlayStation Network, PayPal, Spotify, Starbucks, Twitter, Visa, Xbox Live and many others were the victims of this attack. This cyber attack has a generic name called Distributed Denial of Service (DDoS). In simple nontechnical terms assume an intersection of some roads where one road takes the traffic away from the intersection while other gets traffic towards this intersection. Computer Networks have a similar issue. When multiple devices or network send

message to a single device, the receiving device is unable to process all the messages at the same time. This leads to jamming of the network. Such a network jam makes the specific service unavailable. This is DDoS. The DDoS that took place on Dyn was caused by a Trojan called Mirai.

Mirai (Japanese meaning future) is a simple Trojan. The reason for specifying this Trojan is because of the record it created. 1 Tbps of traffic on the network of the victim was a world record traffic generated by Mirai. It exploits the basic ideas to generate an attack. Let's not get into more technical details of Mirai. The simplicity and power of Mirai was what interested me.

After reading about it on Kaspersky, Checkpoint and other tech related blogs, I was able to get hold of 6 strains of this Trojan. Going through the code, I did try to learn the working of the Trojan and analyse it. It targeted the Linux OS and IoT devices. Linux OS was converted to servers and IoT devices like webcams, CCTV, routers were made to report to the servers. Effected IoT devices also send messages to victims at same time. I too did try to use the server attack part of the code on my own system and try to find the other devices that were attack. This Trojan also showed me that however secure we think the computer is, there is still a drawback that can be exploited to create havoc.

A famous dialog from Spiderman goes, “With great power comes great responsibility”, technology is powerful but use it responsibly. Don't use technology to disrupt others' work or other criminal ways.

The Internet is flooded with data of various kinds. The one most important one being personal data which attracts the likes of hackers. Users of the Internet are fully confident about their privacy being secured. But considering that no system can achieve ideality in all respects, we have to accept the fact that a back door is possible to encroach the privacy even in the most secured environments. Lets analyse this deeply.

A famous controversy broke out between Apple and the US Federal Bureau of Investigation(FBI) after the infamous San Bernardino attacks on December 2,2015. The iPhone used by one of the shooter was recovered. This was a huge breakthrough for the case considering the amount of information that can be retrieved from a terrorist. A severe problem arose as it was naturally password protected. The FBI reached out Apple for assistance, but they had a different story to tell.

Apple, like any other company have policies that gave the highest priority to the user's personal information. Unlocking a phone tells a huge flaw in the trust gained by its customers as if there was a possibility of at least one of them being unlocked, privacy and security of user information will become baseless. Lets remember that the phone under consideration was not just anyone's phone, but a terrorist's.

Imagine the threats that can be removed with the information gathered from it.

As usual, when there is a controversy to resolve, the court interferes. Both sides debated heavily, with Law enforcement authorities (FBI) say that encryption used by the likes of Apple makes it harder for them to solve cases. Technology firms have kicked back, saying that encryption is key to protecting user data from hackers.

The case went on and ultimately the FBI won convincing everyone that it appeared to be the best of a bad situation. Reports suggested that a third party outside Apple did the job well, but as expected, Apple never confirmed it. Since then, there have been many requests from law enforcement agencies across the country for Apple to help unlock other iPhones.

So the we question we started with still stays. Governments appear to be above privacy, which goes without saying that its by far, the best for its people.

Government and Data Privacy

Pradeep J S

Poetry

MERI ZAMEEN, MERA DESH

Garv ho mujhe jab zubaan pe tera naam aaye..
beintehaa khushi ho jab koi kahe ki main tera hissa hun..
Teri zameen kisi jannat se kam nahi..
nachu mai teri baarish main..
Khoon bahe toh teri mitti main mile..
dum toote toh teri hi zameen pe dum toote..
Agar milna ho mitti main mujhe, toh tera naam leke tere hi mitti main milu..
Holi ke rangon se sajau tumhein..
raavan ke jalne ke aag se roshini laun tere aangan main..
Inquilab ho jau tere ishq main..
maru main aur amar tu ho jaye...

Kiran M. Savalgi

SPARKS

Some people have a spark at first shot.
What's a spark you wonder?
Ask me and I shall tell you.
It's when she knows exactly which song you are trying to remember.
It's when she knows which meme you are referring to even when you aren't sure.
It's when she cracks a better joke when yours fails,
just so that you both can continue laughing together.
It's when she knows your emotions even when you wanna hide them.
It's when she improves your comebacks just so that you can be smoother the next time.
It's when she knows exactly which "the one with the" whenever you mention a scene.
And that's when you know she is your firework.

Subrajyothi Sen

STRANGERS

A stranger needn't be someone you've never met.
It can be someone you used to know really well.
It can be someone who didn't mind being in their pjs in front of you.
It can be someone who had planned a trip to Spain with you.
It can be someone who wanted to explore all the food streets with you.
Mom was right. Sometimes.
We should be careful of strangers.
Coz some promises are never kept.
Some trips are never taken.
And unfortunately some things are never forgotten.

Subrajyothi Sen



The man who raised his daughters right

Alphy Elizabeth Joseph

Dangal : we've all watched the movie, been in awe of Khan's acting prowess and were inflated with patriotism a week after, but this isn't meant to be a movie review; I just thought the man who inspired it ought to be talked about.

Mahavir Singh Phogat was in the perfect setting to be a domineering patriarch. He hailed from a small town in Haryana and amidst its festering tradition of female infanticide became the father of four girls. Any other man would be worried about making the money to marry them off. He probably was too, but had better plans for them before that. What made this man think so differently from those around him? While most men sneer at their daughters for not making the roti round enough, Phogat used his position as their father to push them into doing strenuous exercise. He was just as bit as strict and dominating as the next person but he used it to help his daughters make a name for themselves in wrestling, a sport considered inappropriate for women.

He fought all odds and faced all the ridicule; he didn't care what other people thought. We see the injustice women face every day and brush it off saying these things happen in "small towns". But we should probably remember that there are also people like him in these towns and many others who consider their girls as important as boys and believe that treating them as equals his how you raise them "right".

Who is Mr. Pratap?

Shashank S

Mr Pratap is a quiet man.

Or so I assumed because he never talked to anyone. This in itself wasn't that surprising, nobody really talks to each other on a bus ride. When everybody on the bus was busy Mr Pratap always seemed peaceful in his own little space. Mr Pratap didn't carry a newspaper like the gentleman beside him, he didn't have earphones plugged in like the girl two seats ahead. He didn't even nap, like the guy three seats back. There's a hint of a smile on his face as he looks out the window. Everyday is a different view. Mr Pratap enjoys the view, everyday.

Mr Pratap always gets on one stop after me. The bus is relatively empty so he gets to pick his place. He always picks the same place, right in front of the door, window side. He has a traveller's pass, which he promptly shows to the conductor. The conductor recognizes Mr Pratap, greets him. He doesn't have to show the pass but Mr Pratap does it anyway.

Mr Pratap always carries an attache. A small one. He keeps it on his lap, his arms neatly folded over them. He wears spectacles, two pieces of glass suspended over his nose. He always dresses smartly. Pressed black trousers, a bluish grey shirt, dark chocolate waistcoat. He always dresses the same. Hair neatly combed and remarkably still even with the wind from the window. Mr Pratap, it would seem, uses hair gel.

I know Mr Pratap. I sit in the seat behind him. I once peeked at his attache. It was an old fashioned leather attache, with a name tag. Mr Pratap. I found it weird because it said "Mr Pratap". He turned a bit, smiled at me. I smile back. Mr Pratap liked me, he is my friend now.

Mr Pratap travels everyday, Monday to Friday. I don't know about the weekends because I don't commute on weekends. He never misses the bus, never takes a day off. Every morning he takes the seat in front of me, but before he does that he always smiles at me. We don't talk, Mr Pratap and I. Our conversations begin, is comprised of and end at that particular moment. The smile.

Today is Monday. Mr Pratap didn't get on the bus.

Photography



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John Rahul R



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Digital Art



Akhil Sudhakaran

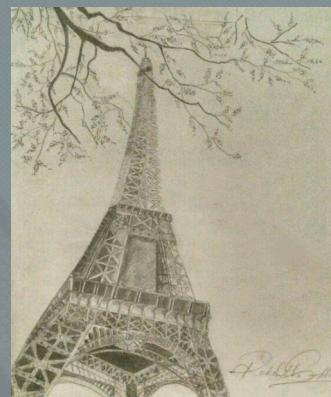
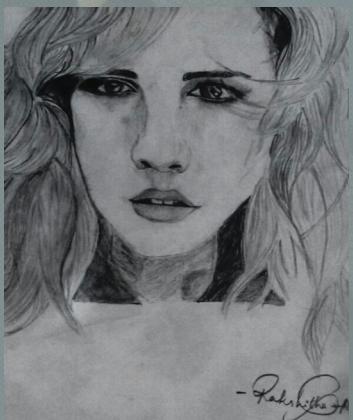


Painting

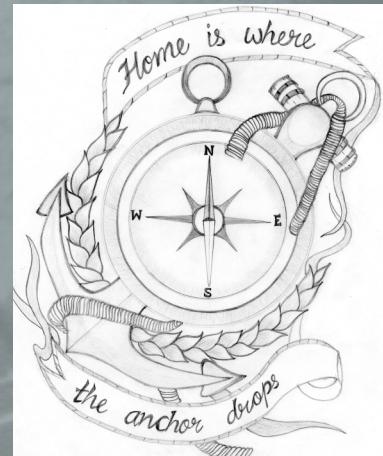
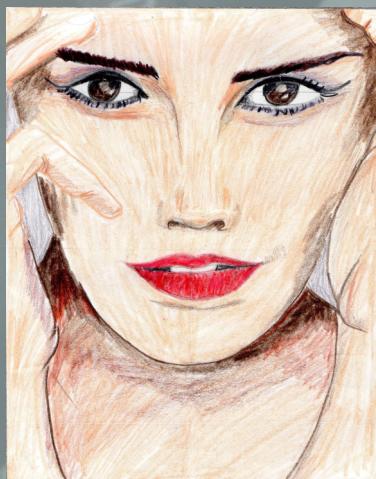


Kumar Abhishek

Sketches



Rakshitha Gupta



Subhrajyoti Sen

Alphy Joseph

Chaya Devi



Kavana M V

Hall of Fame

- students speak



Karan Saxena

I am currently working on my Undergraduate Thesis at the Machine and Language Learning (MALL) Lab, IISc, under Dr. Partha Pratim Talukdar. I was Student Research Fellow at Reconfigurable and Intelligent Systems Engineering (RISE) Lab, IIT-M, during Fall '16, under Dr. V. Kamakoti and mentored by Prasanna Karthik V., where I worked on 'Anomalous Behaviour Detection in Large Scale Internet Flow Datasets' to find how the Internet Traffic is affected by the "competitive cooperation" between the Internet Service Providers (ISPs) at the Autonomous System (AS) level and designed ways to detect unwanted intentional dropping of the packets. Also, I was Google Summer of Code (GSOC) student during Summer '16 where I worked for Python Software Foundation (PSF) - Italian Mars Society (IMS) on their project European MaRs Analog Station (ERAS).

I was fortunate to have worked as an intern on a radiotherapy project in the Tomography Lab, IISc. It is a technique for displaying a representation of a cross section of a human body or other solid object using X-rays or ultrasound. I got to read a lot of research papers and got to work with Professor Rajan Kanhiroan, one of the most elite professors of IISc from whom I gained immense knowledge.

Devipriya Sarkar



Shreya Prabhu

I am a Grace Hopper Celebration India 2016 scholarship recipient, a scholarship given by Anita Borg Institute and ACM India to attend the largest gathering of women technologists. GHCI focuses on the career, research and entrepreneurial interests of women in computing and technology. I am currently pursuing Microsoft Professional Program for Data Science Track on a scholarship by Codess Microsoft awarded to only 10 women worldwide. I am also an active member of international communities like Systers and InsightSTEM which promote women in technology. I always try to keep myself adept with the latest tools and tech.

We published our first paper, "Parallel, Distributed and Grid Computing", at the Fourth International Conference IEEE, 2016. We were guided and mentored by Dr Savita Choudhary. It all started when Jubin and I participated in Papyrus and we understood the basics of how to publish a technical paper. Savita Madam guided us to solve the problems in web-app and write the research paper. Our paper covered development of auto extraction and display in the website using dynamic web menu.



Abhijith Singh, Jubin Mathew, Rakshit Kitchloo



I am a part of the college badminton team. Last year we won the VTU North Zone Badminton tournament held at BMSCE Bangalore. We went onwards and were placed Runners-up at the VTU Inter Zonal Badminton tournament, Bellary. Later, we represented our university in the South Zone Inter University games at sivakasi, Tamil Nadu and made it to the third round.

Ipsita Nath

I began my internship at the Machine and Language(MALL) Lab, in the Computational Data Sciences Department, IISc, in January 2017. I was given client - server related work of interfacing a huge Machine Learning system run primarily from command line onto a web based dashboard called Never Ending Language Learning (NELL). NELL is a semantic ML system developed by a research team at Carnegie Mellon University. The professor organizes reading groups every week. That was the best part of the internship for me. The learning I received in these sessions was amazing.



Abhijith C



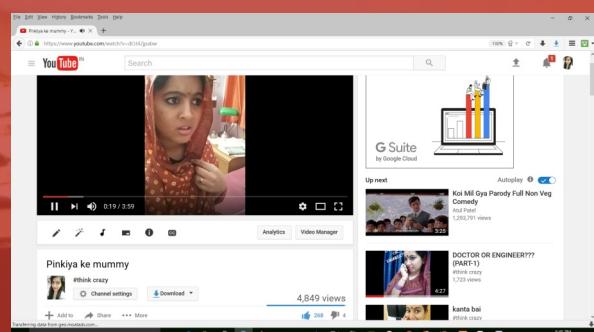
Chaya Devi

I was a skeptic about yoga competitions in the beginning, no doubt about it. Nevertheless, I officially signed up for the Open State Level Yoga Championship 2016 under the Karnataka South Zone Yoga Association, Lions Club International. The experience of the training and the competition was transformative to say the least. I entered a skeptic and left a champion, bagging Second place in the competition.

I am a third year undergraduate student and a hobbyist YouTuber. I have been fairly successful on the social media with my videos, especially the ones featuring my acts depicting the stereotypical Bihari people. A few of my videos have gone on to reach thousands of eyeballs. I have also been instrumental in setting up an NGO, Abhikalpana, as its co-founder.

Youtube channel: #think crazy

<https://www.youtube.com/channel/UCnk1P6KgKykBkLhbMj6ocMg>



Shambhavi Chaudhary

Editor's Choice

Designated Survivor - TV Series

What Would you do if you were suddenly the President Of the United States.

The Man From Earth - Movie

What would a man who lived from the beginning of time be like?

California Burrito - Food Joint

Like a Mexican Burrito Subway!!!

musicforprogramming.net - Website

Music Mixes to help concentrate while you code away.

Witness For The Prosecution - Movie

An adaptation of a book by the Queen Of Murder Mysteries, Agatha Cristie.

medium.com - Website

Share your story with a network of thinkers.

Series Guide - App

A must for all TV Series Buffs out there.

devrant.io - Website

Connect with other programmers and rant about your code issues.

thenewboston.com - Website

One of the best sites to learn differnt coding languages with fun videos.

Donnie Darko - Movie

A psychological thriller with time travel and a great plot.

Billions - TV Show

U. S. attorney vs hedge fund king. It's a mad mixture of drama and fast action.

alternativeto.net - Website

Find alternatives to any software which you want to use.

Outlast - Game

An amazing Horror game sure to scare you out of your pants. Check out the Part 2 once you're done with this.

Arivu

Bringing computers to children

The 15th of September is the birthday of Sir Mokshagundum Visvesvaraya. It is celebrated as Engineer's Day to acknowledge the legacy the great man has left behind for us to build upon. This Engineer's Day we at Sir M Visvesvaraya Institute Of Technology took a small step towards educating school students from Hunasamaranahalli Government School about the rudimentary concepts of Engineering. The program was called 'ARIVU', a computer awareness program for rural students. We had a free flowing conversation with Chandrajith K S, one of the volunteers in the program.

"52 students were present and each of them were provided with a notepad and a pen in order to make notes pertaining to the program", starts off Chandrajith, visibly excited to share his experience. "The students were then briefed about the meaning and importance of science and engineering in our daily lives and also the differences between them by Mrs. S. K Uma. They were keen and interactive during the session."

What role did the students of Sir MVIT play in ARIVU?

"The session held by the students of Sir MVIT ascertained them with the basics of engineering and various branches involved. Our presence further enhanced the interactive and amicable atmosphere. The students answered with zeal and impressed all of us present at the venue."

He adds that the students were even given hands on training...

They were directed to march into our labs for some hands on experience with some of the software that are commonly used. Dr. Bhanu Prakash took up the responsibility of endowing the students with basic knowledge regarding Microsoft Word, Excel and Powerpoint. The students were quite vociferous, clearly making their presence felt.

What were the computer based tasks taught to the children?

"The students were taught to draft letters, change fonts, color of text and a lot more using Microsoft Word. They were also taught to maintain and compute the marks and average of a group of

students using Microsoft Excel and preparation of slides, transitions and even presentations using Microsoft PowerPoint. They were taught to search the internet using Google. For this, the baton was passed to Dr. Suma Swamy who took the responsibility with fervor."

And what were the students' reactions? How did they find the event? Were there any activities planned for them?

"Well after the highly interactive sessions came a confusing moment for the students- a specially designed puzzle. The students were expected to find answers corresponding to respective questions from a matrix of characters. This was a surprise and predicament for the students as they were just expecting a day out. A couple of students were then awarded for excellent performances in the puzzle round."

The day's program came to end with heartwarming smiles on the faces of all the children which gave everyone involved a great sense of happiness and satisfaction.

He signs off saying,"There are at least a few hearts in there in which a curiosity for engineering has been ignited."



Farewell, Batch of 2017

There is a particular sadness in saying goodbye. A feeling of nostalgia, of separation. Although we know its not lasting, we most probably will meet them sooner rather than later, it has a ring of formal finality to it. And saying goodbye to whole bunch of people just compounds the effect.

This will be the last year we can still relish the quiet enjoyment of rebuttal when teachers tell us to act our age, be a role model to the younger students: we are not yet the seniors. There is a higher section of people who can take the responsibility to lead the juniors. In many ways they are our first line of defence against the broader reality of the world. We follow along in their footsteps, learning from their mistakes.

A college experience would be forever incomplete if all our interactions were limited to the classroom. In fact, the seniors play probably the most inclusive and expansive role in the overall development of a student. They have gone through what we will go through, hence they are wise in their experience. They are approachable as our own brothers and sisters, at a level a teacher can never reach. They are quite literally the first aspect of college to be introduced to us, on the first bus ride or in the campus.

We were fortunate enough to have quite an active set of students as our immediate seniors. The clubs in the college reached new heights under their leadership. The sheer scope of extra-curricular activities, coding, debates, music, singing, dance, and sports, kept us fully engaged and sometimes quite distracted from our academic pursuits. We were introduced to events, connections, new technologies and better resources. The textbooks and notes passed down proved invaluable during the last minute exam preparations. We received the inside scoop on lecturers and college affairs, a Marauder's Map for navigating the college. And yes, as role models we could not have asked for a better set of people. They were always ready to help us out, from proof-reading our Letters of Recommendation to suggesting the best weekend hackathon to attend.

So goodbye, dear seniors. You did a mighty fine job here inside the campus. The outside world is, afterall, just another campus that you will be entering as freshmen. Go out there and break some eggs. We will be following close on your tails. And next year when we enter the big beautiful world as graduates, guess who (again) has to deal with us? That's right. This is a GOODBYE, sure, but a very short-lived one. We will meet again.

Farewell.

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