



**NIT TRICHY**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

# bits & bytes

NEWSLETTER

FACULTY INTERVIEW

VORTEX

GIZMO TALK

CROSSWORD

PAPER PUBLISHED



**ISSUE 4. MARCH '15**

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**COMPSCI ROCKS**

## TEAM BITS AND BYTES

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Being in a Reputed Engineering Institute of the Nation we are expected to be comparatively extraordinary. Let us have a little brain snack and find out how things really work out in our lives. Try answering following questions. Can you name the five Wealthiest people in world? Can you name the last five winners of Ms. Universe? Can you name the last five People who won the Nobel Prize?

How did you do?

The point is, none of us even remember "The Headlines of yesterday".

Even though these people were the Best in their fields,

Applause Dies, Awards are Tarnished and Achievements Are Forgotten!!

Here's another quiz let's see how this goes. Can you name five teachers who influenced your journey through school? Can you name five friends who helped you get through difficult times? Try naming five people who taught you something worthwhile and who make you feel special.

Easier...right?

Clearly the People who make a difference in your life are not the ones with the most awards or most money. Life is full of ordinary people, who have made the world a better place for you!

Cherish them!

Hold Them Tight!

Perhaps sometimes it's Special to be Ordinary!

Sriram Suruliandi  
Editor



# MOMENTS WITH MR. KUNWAR SINGH ASSISTANT PROFESSOR

## **How did your professional journey began ?**

It started in AEC College, Agra where I completed my B.Tech in Mechanical Engineering. I completed my M.Tech from JNU and PhD from IIT Madras. I have been working here in NIT Trichy since 2006.

## **What is your area of expertise and why did you pick it ?**

My area of expertise is cryptography , Discrete Mathematics and Algorithms . I always loved solving mathematical problems and that is why I chose it .

## **What was your college experience during your under graduation?**

I was a very shy, mediocre student back in the college days. I used to play sports like cricket, volleyball but wasn't involved much in any cultural activities.

## **What changes have you observed in NITT as compared to previous years ?**

The facilities in our college have definitely improved as compared to the previous years because our director sir is very student friendly which is quite fruitful.

## **What is your level of interaction with the students ?**

I'm not a very open person so I don't approach students by myself . If the students approach me , then I won't hesitate to help my students.

## **Who is your Role Model ?**

My role models are the authors of Cryptography book whom I respect a lot and look up to .And also Sachin Tendulkar who is role model of millions including me .

## **What is your favourite topic of studies that you enjoy teaching and researching about ?**

Any subject or topic which is related to Logic and Mathematics catches my attention at once . I read various articles about them in books and internet .

## **What would you like to do in your free time?**

I like spending time with my daughters . I also watch Hindi movies and like listening to Kishore Kumar's songs .

## **How do you feel about current level of placements in CSE ?**

Number of placements is improving this year although placements was still good enough during my early years. A lot of people from our college are working with Facebook, Google and Microsoft. Many students are getting placed in the U.S and other foreign countries .

## **What was your life defining moment ?**

I came from a small village in Uttar Pradesh and passed from a Hindi Medium School . When I got selected for engineering, I was recognized by my entire village and relatives . That made me very happy and I cherish that moment till date .

## **What have u learnt from your students ?**

To be prepared to answer their doubts, with new talents coming year after year, I have to push myself more and more to be at par with them .

## **What is your Message for the students ?**

Work hard , make full use of your potential. Also participate in extra curricular but balance that with studies.

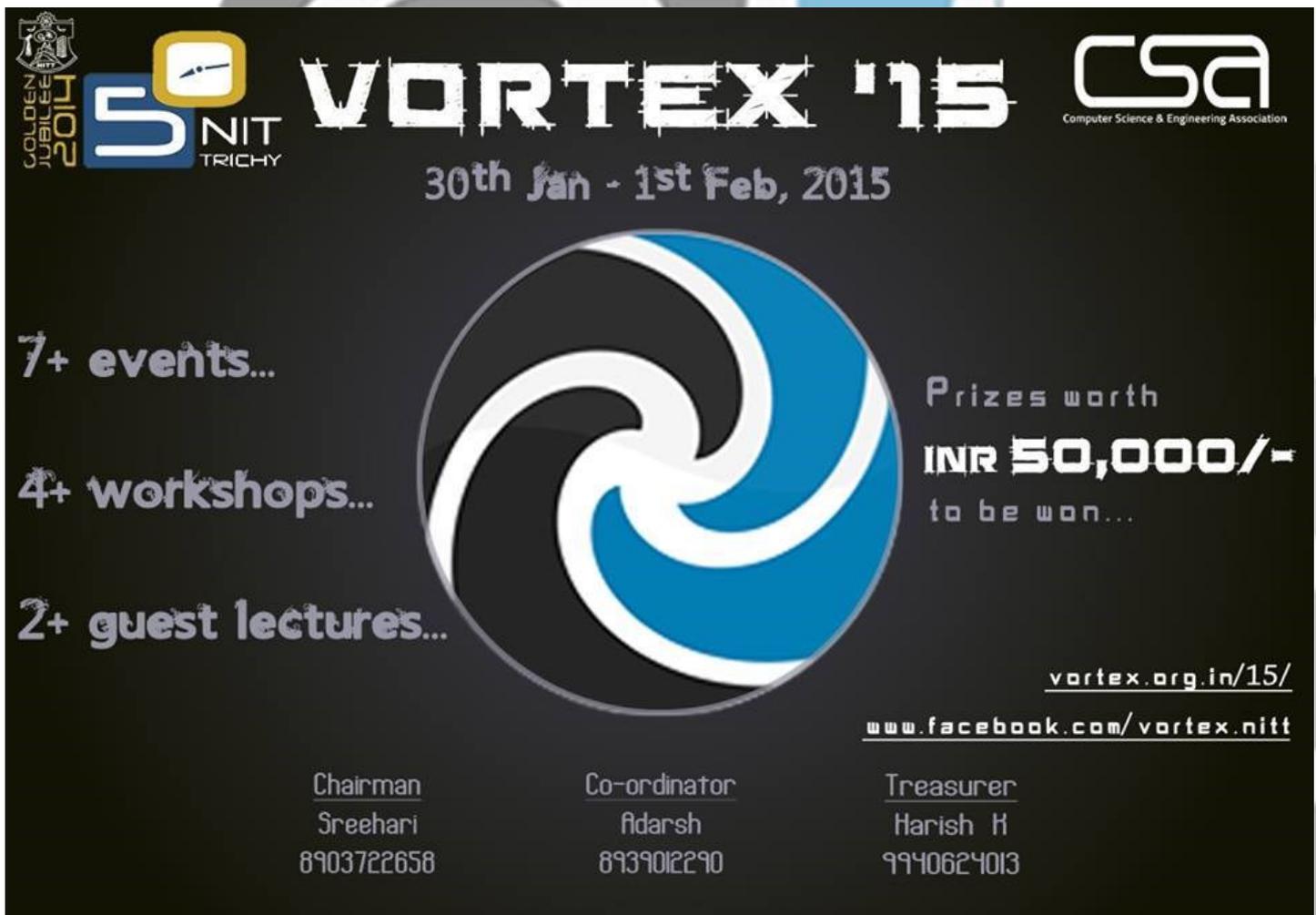
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# TECHNICAL Symposium

VORTEX'15

From the beginning of this semester, one word and thought kept the on their toes- Vortex. The amalgamation of technical brilliance, perspiration and effort, Vortex'15 was a tremendous success. This year saw over 600 students flocking in for the symposium from around 60 colleges across Tamil Nadu. A number that put Vortex on a pedestal was the whooping 2800+ likes that the Facebook page garnered. All credits go to the extensive on foot and online publicity efforts that were taken up this time. There were a plethora of events to keep the grey cells active and students engaged. Four workshops were conducted to help teach and further knowledge in exciting areas of work. Vortex also had the pleasure of having guest lectures by prominent people who have excelled in their fields of work.

Vortex was inaugurated by Mr. George Mathew, Managing Director Exeter Group—India Operations, who presented an inaugural address and also conducted a workshop for UG & PG students. He spoke about the changing landscape of technology, how hardware memory capacity to physical size is rising and how we should grasp the opportunity.



The poster features a central blue and white vortex logo. At the top left is the NIT Trichy 50th Golden Jubilee 2014 logo. At the top right is the CSA (Computer Science & Engineering Association) logo. The main title 'VORTEX '15' is in a large, stylized font, with the dates '30th Jan - 1st Feb, 2015' below it. On the left, it lists '7+ events...', '4+ workshops...', and '2+ guest lectures...'. On the right, it says 'Prizes worth INR 50,000/- to be won...'. At the bottom, it provides the website 'vortex.org.in/15/' and the Facebook page 'www.facebook.com/vortex.nitt'. The names and contact numbers of the Chairman, Co-ordinator, and Treasurer are listed at the very bottom.

**50** NIT TRICHY GOLDEN JUBILEE 2014

**VORTEX '15**

30th Jan - 1st Feb, 2015

**CSA**  
Computer Science & Engineering Association

**7+ events...**

**4+ workshops...**

**2+ guest lectures...**

Prizes worth  
**INR 50,000/-**  
to be won...

[vortex.org.in/15/](http://vortex.org.in/15/)  
[www.facebook.com/vortex.nitt](http://www.facebook.com/vortex.nitt)

|   |   |  |
|---|---|--|
| <u>Chairman</u><br>Sreehari<br>8903722658 | <u>Co-ordinator</u><br>Adarsh<br>8939012290 | <u>Treasurer</u><br>Harish H<br>9940624013 |
|---|---|--|

## Vortex in Numbers:

- Site Registrations : 1500
- Total Page-Views : 78,000 , 4000 unique visitors
- Facebook Page Reach : 8000

## Vortex'15 Sponsors:

- Cavin Kare
- Infoview
- Tata Global Beverages
- U n.i.q Technologies
- Glosap

## Vortex Workshops:

Across a series of disciplines, Vortex presented a myriad of workshops to help out take passions to the next step.

- Ruby on Rails—The reason behind giants like Twitter, Github, SlideShare, Groupon and Soundcloud. Ruby on Rails was used to design them all. Students may just about learnt how to build the next big thing.
- App Dev troubles? A snake can lend a hand. Python is of great help when you want to build an application in a jiff.
- QT—Unifying various frameworks and platforms and a boon for developers using languages like C++ and QML, QT is a unique workshop at this year's Vortex.
- Javascript—If you love playing games, you'll love to develop one too. Design your very own game using the simplest and the most familiar of tools.

Workshops this year witnessed a surge in participation with over 530 participants.

- The python workshop was held for 3 batches 220 students.
- 180 students took the ruby on rails 2 batches.

## Events:

- Codesurf—If you have a constant urge to keep cracking ACM-ICPC style problems, Codesurf is your contest. The event tested your skills in algorithms and data structures.

- Hunt the Code- An onsite event for a team of two, that'll push your thinking out of the box. Find the bugs, and for a change, find out the code that produced the ridiculous output. The contest is made of two rounds.
- Reverse Coding - You will be given a set of inputs and outputs. You need to write an intelligent code that accepts the input and produces the output given.
- Debugging - Given a code, you need to debug the code so that it produces the desired result (given).
- Clueless- If the very word Maths gives you an adrenaline rush, this event is for you. Based on Project Euler, all the problems are math based and require code to get the best possible solution.
- Hack the Shell- Hack the Shell is all about solving simple day to day tasks on your computer through the terminal.
- Triathlon- This contest is designed to test your mettle as a CS student. As the name suggests it is a three level two member team event. The first level consists of aptitude questions. The second level consists of Computer Science questions. The third and final round has a mixture of both.
- Vortex Main Quiz- Quizzes are always fun. The vortex main quiz is designed to test your technical quotient. You don't have to be a geek to crack this one.
- Pradarshan- It is a platform for you to showcase your papers, and let the judges decide, if you are really better than others. After submitting the paper, shortlisted teams have to deliver a presentation. The best paper wins.

### Guest Lectures:

**Narasimha Karumanchi**: He is the author of several books like **Data Structures and Algorithms Made Easy**. His books are considered to be the Bible for placements. He has also started his own publication firm, Career Monk. He spoke about the various methods at which we have to approach interviews and the kind of practice we have to do for different companies. He also related his experiences with publishing coding books.

The valediction ceremony had a lecture by an alumni Mr. Kamalakannan, Technical Director, NIC, Chennai. He spoke about the facilities in NIC and the emerging trends in eGovernance.

Vortex'15 has set the bar high for the years to come and finished with flying colors. Kudos to all those who put in the time and effort to bring this symposium out.



# Proud Alumni Mr. VISHNU

## Who is Vishnu Venugopal?

A superficial answer to this question would be my resume. Native of Cochin in Kerala; graduated as a Production Engineer from NIT Trichy in 2009; worked for a short stint as a risk analyst in Aon Corporation; shifted career path, a project associate at IIT Madras; jobless for a while; Prime Minister's Rural development fellowship to work in Naxal affected areas, selection to IAS; currently serving as Sub Collector & Sub Divisional Magistrate at Cheranmahadevi, a remote division in Tirunelveli District.

"If your ship doesn't come in, swim out to it". This proverb holds good for me but with a small twist, when I swim I enjoy it and not let the desperation to reach the ship affect me. Extending a helping arm to those souls who do not know how to swim, I guess, defines me too.

## What does NITT mean to you?

Every individual derives an identity from institutions, both formal and informal. NIT Trichy for me is an identity that helped me discover myself in many ways. Professionally brand NITT has helped me at every stage. There was a sense of pre-assigned credibility associated with NITT which put a positive pressure to deliver quality results.

More important than professional excellence, NIT Trichy fostered in me the idea of India for the first time. Not many are lucky to have experienced the true cultural diversity of the country. In the IAS Academy, once again I was part of a pan India milieu, but not as vibrant and fresh like NITT. Friends for a lifetime happen only in college, and NITT gave me that in abundance.

If there is one department that promotes free thinking in the campus, it is Production Engineering. One has all the time in the world to himself and looking back it was great. To sum up, four years at NITT was a crazy adventure that left an indelible mark in me, for the good.

### **With a well-established job in the US, how did UPSC catch your attention?**

Civil service was not in the scheme of things when I quit my job. I had this desire to work in the development sector or maybe start my own NGO. In fact I did make a blueprint to start my own NGO in the education sector but it never saw the day of light. There was somewhere a frustration that I was not enjoying what I was doing coupled with a sense of not really contributing towards nation building. I had a deep interest in the politics and culture of India. The role government plays in nation building is unmatched by any other sector. The civil society or NGOs can at best support the honest efforts of the government. This realisation made me turn my attention towards UPSC. In the Indian context, Civil services are the backbone or steel frame of the government. With an opportunity to impact the lives of one sixth of humanity, working for the Government is perhaps the most challenging and exciting careers in the world. The scope and diversity of a career in the IAS is tremendous. Today I would stand by it; no other profession can influence the lives of a common man like an honest and efficient government official in the field.

### **What challenges did you face during your journey to become an IAS officer?**

To be honest, real challenges came, post selection into the IAS. This urge to be part of national development in whatever way possible motivated me to write the exam. The biggest challenge was to bust the myths surrounding the IAS that one had to be a topper right from school. I still remember when a neighbour made an innocuous comment “It’s your first attempt right, don’t go beyond 4 attempts. I know many who have spoiled their careers preparing for UPSC”. The implicit assumption that UPSC was a herculean task in the first attempt made me determined to choose new styles of preparation. That was the real challenge. From a technology background to understanding the history and politics of the nation and the world, it was a fascinating journey.

### **What role does technology play in your work?**

As a Sub Collector I am in charge of roughly half of a district. In sheer numbers this would translate to 225 villages with a total area of around 3,000 square kilometres. Just to put this in perspective, the Republic of Singapore is only 716 square kilometres. The challenge of managing this large territorial jurisdiction and deliver governments services in a transparent, efficient, accountable and democratic manner is a mammoth task. Technology diffusion into government to citizen interface and between government agencies is still in a primitive stage owing to various constraints.

A piece of legislation or a law takes time to translate into action, but the impact of technology is immediate and quantifiable. Data analytics and evidence based decision making which are businesses by itself in the corporate sector is yet to influence the functioning of government in a major way. With initiatives in good governance such as e-District and Digital India, definitely technology will play a pivotal role in the days to come in the government.

### **What role can NITT CSE students play in the government?**

As I previously mentioned, technology holds the key to restructure the way government functions in the years to come. So far the change management efforts have been initiated by pooling in the intellectual capital within the government system. Unlike the strong linkage academia has with industry, there is no channel where in which the academia talent pool is tapped for improving the governance framework of the country.

If a third year student can come up with innovative ideas as an intern for Goldman Sachs or Google then why not for the government too. A team of intelligent, smart and committed NITT students could come out with interesting technology solutions for the problems government face in the heat and dust of rural countryside. There could even be a permanent student run E- governance lab where actual field studies can be tried on technologies developed by students. Internships with IAS officers are also a possibility. Collaborative efforts are the need of the hour. Cloud computing, mobile apps, GIS, data analytics, it's time these buzzwords become part of the government too. Colleges are undoubtedly the hotbeds of innovation.

### **As someone who has been in our shoes, any message or advice for us juniors?**

When you look back after a few years into your college life it should have been the craziest adventure you have ever had. Take the path your heart suggests. True purpose of education is to make great minds and not careers. I wouldn't advice anything with respect to your careers; it has been taken care of the moment you stepped into the portals of NIT Trichy. Innovators, CEOs, artists, bureaucrats whatever you become in your career make sure your thoughts and actions make the world a better place to live.

# PROJECT ARA



Electronic devices are not designed to last. Every time we throw an electronic device its usually because of one component, the rest of the device works perfectly fine but we still throw it away. Hence electronic streams are the fastest growing waste streams.

All of us have heard about LEGO. It is a popular line of construction toys, which consists of colorful interlocking bricks. These blocks can be used to build anything you want the way you want it. How cool would it be if we could do this with our phones. A modular smartphone is a smartphone made using different components that can be independently upgraded or replaced. This aims to reduce electronic waste, lower repair costs and increase user comfort.

These phones are made of detachable blocks, and all these blocks are connected to a base. The components have pins through which electrical signals pass through and two small screws lock everything in place. Right now there is a war to make the thinnest smartphone in the world. Google is attacking the very idea of smart phones as we know it with Project ARA. It would be the latest phone you would ever need to buy as you would be able to swap everything from the camera to the display to the battery to always have the right phone you want.

Project ARA is an initiative by google to develop open hardware platform to create modular smart phones. The project was originally headed by The Advanced Technologies And Projects team. For the ATAP and Google the goal is to build a device that will make the smartphone accessible to the people who can't afford iPhone and galaxy S5s.

The idea behind Project ARA is that you can basically build your own phone. Google provides an endoskeleton which holds a whole bunch of hot-swappable modules that act like a miniature network, adding up to a complete device. You can pull them out and replace them with other modules anytime you want.

Project ARA has a lot of potential. It may soon provide smartphones to people who don't have them. It may let us pick the display size we want, the memory we want and the battery we need-instead of forcing us to pay for components we might not otherwise ever use.

If your phone is getting a bit too slow then you can just replace the block that affects the speed. Or if something breaks you can replace it with a new one or update it with the latest version. You can support the blocks you want the brands you like or even develop your own block.

It is useful for the demographic society as each age group can have their own choice of components. For example, people interested in taking good photos can have a special camera. Elder people can have good speakers. It is basically an idea of having your own components instead of buying what is available. For example, at present we say iPhone camera is better but we may have a phone with a lower pixel. But with ARA this maybe possible.

Google says the phone is designed to be used by six billion people. A consumer could potentially just buy a body with a processor, a small battery and just enough storage to get started. Google wants Project ARA to lower the entry barrier for phone hardware manufacturers so there could be hundreds of thousands of developers instead of the current handful of big manufacturers.

One of the problems in ARA maybe be the power management. The individual parts consume more power than a system-on-chip solution. Google's way to alleviate this is by providing higher power batteries that have fewer charge cycles .

How wonderful would it be to choose the camera I want, the keyboard I want. It is similar to the way Desktop assembling changed the whole market. An assembled Desktop costs about a fifth of the branded ones. It will also be an incentive for all to know about the phone.

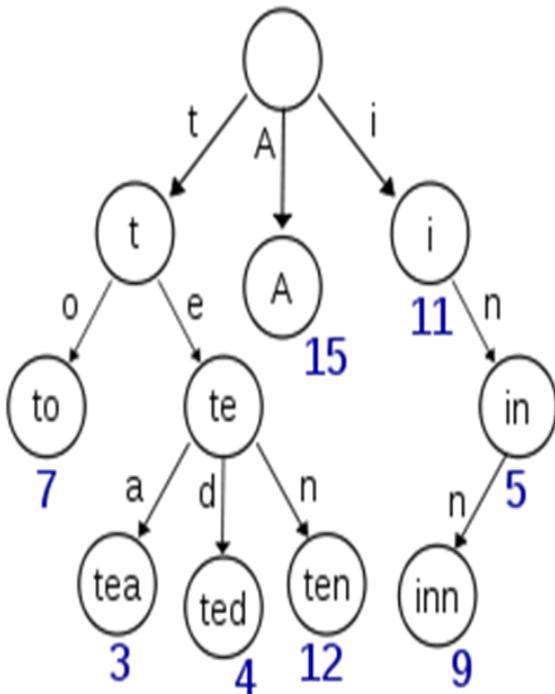
No longer u would be proud to hold an iPhone-you would say phone built by me.!!! We understand that the development at current is in a phase called "Spiral 2".

Let us hope this turns out real very soon.

# TRIE DATA STRUCTURE

There are many algorithms and data structures to index and search strings inside a text, some of them are included in the standard libraries, but not all of them; the trie data structure is a good example of one that isn't.

Let "word" be a single string and let "dictionary" be a large set of words. If we have a dictionary, and we need to know if a single word is inside of the dictionary the Trie are a data structure that can help us.



The question now arises, "Why use tries if set <string> and hash tables can do the same?" There are two main reasons:

- The Trie Data Structure can insert and find strings in  $O(L)$  time (where  $L$  represent the length of a single word). This is much faster than set , but is it a bit faster than a hash table.
- The set <string> and the hash tables can only find in a dictionary words that match exactly with the single word that we are finding; the trie allow us to find words that have a single character different, a prefix in common, a character missing, etc.

Trie is efficient for information re"trie"val. This is why it is named thus. Trie brings down the complexity considerably. However the penalty is on trie storage requirements. The Tries can be implemented in many ways, some of them can be used to find a set of words in the dictionary where every word can be a little different than the target word, and other implementations of the Tries can provide us with only words that match exactly with the target word. The search algorithm involves the following steps:

1. For each character in the string, see if there is a child node with that character as the content.
2. If that character does not exist, return false.
3. If that character exist, repeat step 1.
4. Do the above steps until the end of string is reached.
5. When end of string is reached and if the marker (Not Leaf) of the current Node is set to false, return true, else return false.





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