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Department of Mathematics
Anna University, Chennai
Math Computing Society

CRUX

The Readers Avenue

STARTUPS? US? WHY?

Till recently , graduating seniors had two choices: get a job or go to grad school. There is increasingly be a third option: to start your own startup. But how common will that be?

The most ambitious students will at this point be asking - Why wait till graduation? Why not start a startup while in college? For nearly everyone, the opinion of one's peers is the most powerful motivator of all - more powerful even than the nominal goal of most startup founders, getting rich. Starting a startup is so hard that it's a close call even for the ones that succeed. If you have doubts about a particular idea, you should just wait till you are absolutely certain. Starting a startup soon after college will make us a young founder by present standards. Stamina and working for long hours are the two most important things as far as startups are concerned. It is also better to operate cheaply and give your ideas time to evolve. Even more important than living cheaply is thinking cheaply. The best example is the popularity of Apple 2.The most important, obviously, while thinking of a startup is to work

Turn over to page 2....

Message from HOD

It gives me an immense pleasure that Math Computing Society (MCS) of Mathematics Department is releasing the magazine Crux as a information bulletin of the department activities. It not only reveals the achievements of the department, but also serves as a technical platform to bring out the hidden talents of the students.

Success is possible only if you keep yourselves updated with the ever changing, dynamic and competitive world. I am sure Crux would certainly reflect its array of wisdom through various articles, news and information incorporated in it. This is one of the opportunities for the students of Department of Mathematics to express their talents by equipping or mastering both technical and professional skills and achieve greater heights. This is a healthy way of giving students a chance to voice their concerns and share their creative and original thoughts. It plays an instrumental role in providing a greater exposure to the latest technology and keeps our students abreast with the developments emerging in the field of Computer Science and Mathematics.

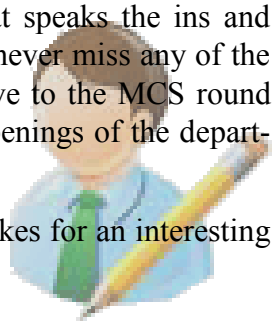
I owe my hearty appreciations to the staff advisor Dr.D.Arivudainambi, MCS Team members and student volunteers for their sincere efforts to release the magazine. I wish them all in every walk of all their future endeavors.

From The Editor's Desk …

Come every May, something leaves us exalted or sometimes evokes a gamut of reactions. Yes!.. The assessments and semester exams lined up ahead. For all those buddies who find the array of exams little snappy, take a break and look into your interest in this summer edition of Crux. This edition, features a wide variety of articles that spruces up the technical tinge of the magazine.

Data is growing in leaps and bounds and so is the technology. One followed by 17 zeroes is no longer a pain to manage with the advent of BIG DATA. Turn over to the pages 4 and 5 to enhance your knowledge on Big data.

What comes after graduation? Not about the default placements or higher education. Here we have an article that speaks the ins and outs of establishing your own Start up. Crux will never miss any of the groovy actions happening in the department. Move to the MCS round up page to keep yourself abreast with all the happenings of the department through MCS.



I sincerely hope that this month's edition makes for an interesting read. Happy Reading folks!..

OFF THE TRACK

The first emoticon is credited by Kevin Mackenzie in 1979, but was a rather simple -) and didn't really look like a face. 3 years later, :-)

*C# was first known as "Cool", a name which stood for "C like Object Oriented Language", but was later renamed to C# in July, 2000 to coincide with its release to the public. The C# name as it stands now was musically inspired.

*The name of the popular search engine 'Google' came from a misspelling of the word 'googol', which is a very large number (the number one followed by one hundred zeros to be exact).

***Amazing PIE** : PIE (The ratio of the circumference to the diameter of a circle) can't be expressed as a fraction, making it an irrational number. It never repeats and never ends when written as a decimal.

Continues from Page 1…

somewhere that has a lot of smart, young people. Another is to work for a company located in a startup hub. Irrespective of all this the best place to work, if we want to start a startup, is probably a startup. In this case we will either end up rich, in which case problem solved, or the startup will get bought, in which case it will start to suck to work there and it will be easy to leave, or most likely, the thing will blow up and we'll be free again. Starting startups is harder than we expect, but we're also capable of more than we expect, so they balance out.

Now let us look at the other side of the spectrum. What goes wrong with young founders is that they build stuff that looks like class projects. But what's wrong with class projects? Class projects are basically about implementation, which is the least of our problems in a startup. The main purpose of a startup is to refine the idea. That leads to our second difference: the way class projects are measured. Unlike school world, there is no reward for putting in a good effort. The customers judge us from where we are now and what features they need. The most important advantage 24 year old founders have over 20 year old founders is that they know what they're trying to avoid as the most important skill for any startup founder is a knack for understanding users and figuring out how to give them what they want. But this is something young founders will slowly learn, because experience is not something that can be learnt in a day, it comes only by making mistakes.

SO WHAT DO WE DO NOW?? STILL CONFUSED?? If you are smart enough it's easy to figure out that, inspite of a few minor hiccups, starting a startup while being in college is indeed a very healthy option. The underlying reason behind this is that, college offers us the one of the greatest advantages of starting a startup: "the wealth of co-founders".

—S.Sai Vidya, M.Sc. (IT) , 6th Semester

"I didn't see it then, but it turned out that getting fired from Apple was the best thing that could have ever happened to me. The heaviness of being successful was replaced by the lightness of being a beginner again, less sure about everything. It freed me to enter one of the most creative periods of my life."

- Steve Jobs

UNSOLVED MYSTERIES...

CLOUD COMPUTING, the long-held dream of computing as a utility, has the potential to transform a large part of the IT industry, making software even more attractive as a service. It is sold on demand, typically by the minute or the hour; it is elastic -- a user can have as much or as little of a service as they want at any given time; and the service is fully managed by the provider. But the rise of cloud brings with it some so far unanswerable questions.

Who really pays? This is a tangle in and of itself. IT departments pay for a lot of it, and a lot of it is put on corporate credit cards. As a result, the costs get buried within corporate budgets. But if the holder of the corporate credit card tied to a cloud account leaves the company, guess what? The subscription is jeopardized.

Is cloud really cheaper? There is a lot of evidence to establish that cloud often is not cheaper than buying on -premises software and systems when looking over a five -year horizon. Why? Companies keep paying monthly subscription fees for something they never own.

Who owns the data? The legal eagles are already puzzling over this. The cloud providers have been cagey about the actual physical location of the data — an important legal concern in some jurisdictions. And how long will cloud providers hold on to data after a contract ends? Is it a good or a bad thing if they do?

Is data actually safer in the cloud? Many reply positively saying it's actually safer to retain data with a cloud vendor that is certified with staff trained in security protocols and best practices. But is your data safer with your own corporate IT staff than it is with someone else's IT staff?

- S.Swetha 4th semester, M.Sc. (IT)

MACHINE LEARNING

How about your system being trained to segregate your emails? Ever thought of how Google displays related ads when we log into our Google account? Well, this is possible through machine learning! A machine trying to understand what its human counterparts expects from it - Doesn't this sound weird? Machine learning is the science of getting computers to act without being explicitly programmed.

In the past decade, machine learning has given us practical speech recognition, effective web search, and an improved understanding of the human genome. It is so pervasive that you probably use it dozens of times a day without knowing it.

"Experience is the mother of wisdom" – seems like it's applicable for machines too!

Some machine learning systems attempt to eliminate the need for human intuition in data analysis, while others adopt a collaborative approach. Based on the type of input, the machine may adopt different types of learning such as supervised learning, unsupervised learning, *transductive inference* or reinforcement learning.

Machine learning also has its share of cons. The accuracy in prediction is questionable. Google has recently announced a new machine learning engine to implement artificial intelligence. Once artificial intelligence becomes integrated into the cloud, it has tremendous potential to revolutionize the tech era. As of now, we will have to wait and watch what destiny has in store for machine learning.

-Vijetha Shree Chakravarthi.
4th Semester, M.Sc. (CS).

WHY BIG DATA ?

Humans are satisfied if everything is big from health to wealth. Every species counts on a data. Ever imagined how it would be when a single molecule maintains data? On this 'TECHNOMICS' maintaining a big data where a ONE followed by SEVENTEEN ZEROS takes more systematic implementation to maintain, retrieve and to analyse the data when required. Queries would be much like looping a rat around the well. The analysis of the older algorithms has led only "how to fix in the memory" and its total running time could only predict and allocate memory by getting and executing with some basic microinstruction. Systems interest in big data has given rise to a lot of recent interest in building systems to support queries and transactions over massive quantities of data. The older algorithms could not support us anymore.

As per 'BIG DATA' "OLD IS GOLD" does not support i.e. Everyday as the data kept on adding the running time of older algorithms could not support us more. The recent study reveals massive data leads to many challenges for computer scientists. We're recording petabytes of data every day.

It is so tough to manage all the data in organizations, schools and colleges of people all over the world. So this big data will help to provide an efficient user as how to manage the resources. So, we all have a great focus and massive jobs in handling big data.

All you students, are you exalting and worrying about a job? Until the species population decreases the job to handle big data won't lead to starvation. Get ready folks to handle handful of data!!!!

BIG DATA FLIP FLOPS LIFE...

Recently, a new "universal identification" program called "AADHAR" is taking shape in India. Aadhar is an ambitious Big Data project of the government aimed at becoming the world's largest bio-metric database by 2014, with a goal to capture millions of Indian identities which helps to deliver efficient public services .

Big data has changed the way we live. It has changed the way we vote. Big Data had an enormous impact in 2012 in the U.S. presidential election. President Barack Obama's campaign ran what has been referred to as the first Big Data-powered campaign.

Have you ever dreamt of an academic institution which ensures that students select the majors that are best suited for them and nudging them to take classes that increase their chances of successfully graduating??

Even the course materials are personalized for the students based on their interest. So now your heart feels satisfied and is happy that your life is made easier day by day. But what is your mind afraid of? Privacy and security? With all this data collection and analysis, privacy has rightly been a paramount concern with Big Data life.

Often individuals fear Big Data becoming the Big Brother (or Big Boss!) watching their every move and knowing the most intimate details about their life. Though Big Data is quickly becoming a vast goldmine for businesses and government, it attracts hackers and identity thieves. Throughout 2013 we are sure to see more and more impact of Big Data in other aspects of our daily lives, such as how we bank, watch TV and even stay safe.

So, BIG data has brought about BIG changes in the lives of BIG hearted homo-sapiens in no BIG time; on the other hand, if we don't keep a BIG eye on our privacy, then we are going to be BIG losers .!!

- S.Swetha 4th semester, M.Sc. (IT)

BIG DATA: Into the Future

There is a current upsurge in *datafication* — "taking information about all things under the sun and transforming it into a data format to make it quantified". Many experts predict that the next wave will be driven by technologies that fly under the banner of Big Data— data including Web pages, browsing habits, sensor signals, genomic information, cloud-based software services and Smartphone location trails, combined with clever software to make sense of it all. Proponents of this new technology say it is allowing us to see and measure things as never before.

The legal field, with its reputation for intense documentation and records management, has Big Data on the brain. There is currently an app called *RateDriver*, which is in the iTunes Store, which crunches data from thousands of law firm invoices and comes up with a billing rate. Having access to this kind of business intelligence can help firms get a better picture of their most valuable clients, making it possible to adjust resources to support the clients that benefit the firm the most. Lawyers can also tap into the wealth of case history to better understand the likelihood of winning a case, based on historical data.

In the American Society of Clinical Oncology project- *CancerLinQ*, almost all patients would, in effect, become part of a clinical study. The system would collect data that doctors routinely record in a patient's files, such as age, gender, medications and other illnesses, along with the patient's diagnosis, treatment and eventually the date of death. Once the outcome of a sufficient number of patients is pooled, doctors could tap the database for help in developing treatments for other patients. Consider a 77-year-old man with stage 3 colon cancer, heart failure and diabetes. Using the database we could see how the top three chemotherapy regimens for similar patients performed, and how age, heart failure and diabetes might have affected the treatment.

But the latest leaps in data collection are raising new concerns about infringements on privacy — an issue so crucial that it could trump all others and upset the Big Data bandwagon. New professionals akin to algorithmists – with expertise in data science will emerge to review big data analysis and predictions. Lots of companies want to hire big data analysts, but there aren't nearly enough to go around. Big Data, they say, will open the door to making smarter decisions in every field from business and biology to public health and energy conservation.

There is a key and uniquely humane role to governing analytics that involves "intuition, common sense, and serendipity…the 'what is not', the empty space, the cracks in the sidewalk, the unspoken and not-yet-thought…It also suggests that we must use this tool with a generous degree of humility and humanity. Humans must indeed have the final say.

— A.Archana , M.Sc. (CS) , 8th Semester

MCS - Round Up

WORKSHOP ON FOSS

MCS organized its third workshop for the 3rd and the 4th years which was indeed an astounding experience for the gathering. The workshop on FOSS provided an insight into this state-of-the-art technology!

The workshop was conducted by the members of the CEG-Linux Users Group. It began with a brief introduction about FOSS followed by an exclusive hands-on-session on Ruby. For all those people who had a lot of misconceptions about Linux, this workshop was an eye-opener.

Finally there was a discussion on Ruby on Rails. To sum up, the 3 hour workshop was very informative, interactive and innovative! Kudos to MCS and CE-GLUG!

- S.Lavanya , 6 th Semester , M.Sc. (IT)

"Tweets"

Priyadharshini, M.Sc – 3rd yr : "The FOSS workshop was very inspiring. I never knew web development and DB projects can be made on the fly. The introduction to ruby was excellent."

R.Sukanya M.Sc -- 3rd yr : "The classes conducted by seniors were really useful. All the concepts were taught right from the basics. Tips on how to prepare for the interviews were very insightful. Thanks to our seniors! We were able to face our interviews and written test with confidence."

R.Aishwarya - 4th year : " The demonstration of the ruby commands in parallel with the explanation was amazing !!"

Vijetha Shree - 2nd year : "The C aptitude test was quite useful and gave us a good start to focus our interest towards programming"

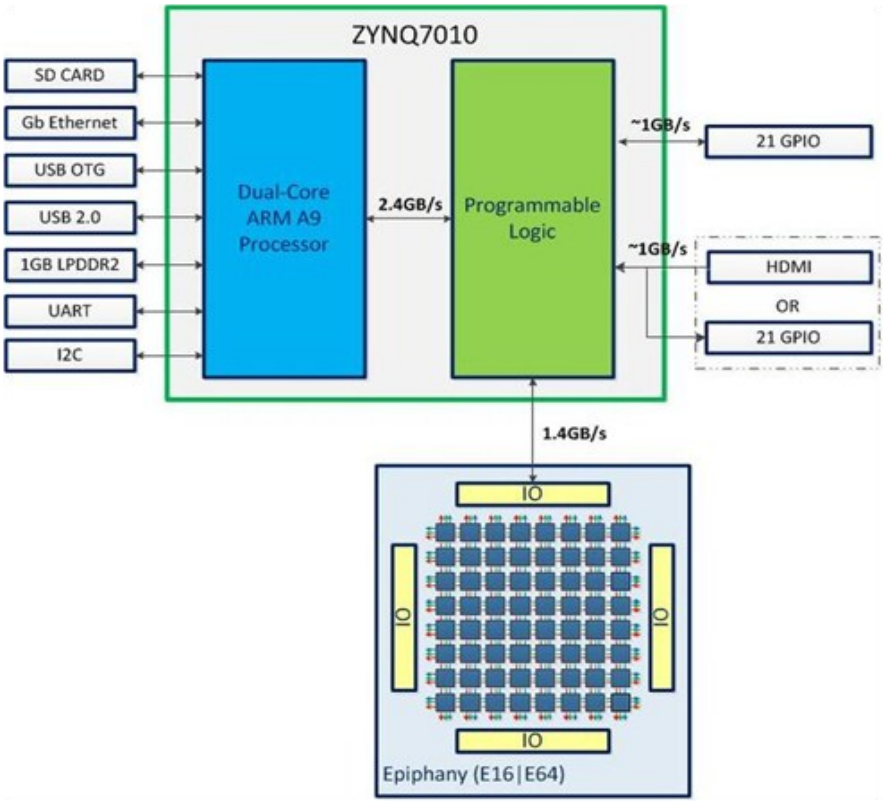
MILE STONES

Fuelled with zeal and enthusiasm, the new MCS team set the ball rolling within a short span of time since it assumed the position. The team'13 has shouldered many responsibilities till now to carry out various agendas.

The team members with their innovative ideas took initiative to post the question bank on the MCS website. This indeed is a huge relief for all the students as they don't have to rely on their seniors anymore for the yesteryear question papers. MCS could successfully carry out this task within a stipulated time frame!!

The team organized an exclusive session for the 3rd years wherein seniors shared their valuable experience with the juniors regarding their internship. They also enlightened them further by conducting classes on C, C++, Java, Data structures and Algorithms and by distributing various study materials through blogs and groups. The MCS Team conducted a C Aptitude Test for the 2nd year students. This was a kind of skill test which helped the juniors to feel the taste of programming.

MCS organized a workshop on FOSS for the 3rd and the 4th years which was much appreciated by the gathering for the meticulous conduct of the event. There was an exclusive hands-on-session on Ruby followed by a discussion on Ruby on Rails. The workshop was very edifying and enlightening! It is certain that such kind of events will leave an indelible print in the minds of each and every student of the Department of Mathematics. The MCS team will reach the pinnacle of glory by mentoring more and more students and shaping every individual as a consummate personality.



PARALLELLA - A 99$ SUPER COMPUTER

The world has gone digital. The size of the data stored in the internet is getting countless. The total amount of global data has grown upto 2.7 zettabytes. With current processing power of the computers we are able to process the data to a very great extent. But what would happen after a period of 10 years? We really need supercomputers with high performance processors to process such a large amount of data. The supercomputers should not only have high performance processor, but also they should be highly scalable (distributed) and have parallel computing capabilities.

Does the current system have such capabilities? Yes. But they are so expensive that a normal person cannot afford it. Here we have an open source kickstarter project named Parallella from Adapteve, a semiconductor industry.

Parallella is a 99$ computer with high performance parallel computing capability. The computer is powered by 700MHz Dual-core ARM A9 CPU with 1GB RAM capable of running Ubuntu Linux v11 OS. The device also has number of IO ports including USB2.0, MicroSD card slot, Ethernet and HDMI. The main difference from Parallella and other computing device is its *unique Epiphany Multicore Accelerator (16 or 64 cores)* which will be used to scale or parallelize the application or program. Parallella with Epiphany Multicore Accelerator 16core costs 99$ and the Parallella with 64core costs 199$.

Each of the cores in the Epiphany Multicore Accelerator is clocked at 700 MHz. So theoretically the 64 core Epiphany Multicore Accelerator is capable of running at 45 GHz (64 CPU cores * 700MHz) which is unimaginable for even current generation desktop CPUs. We can gain such a great performance only if we are efficiently using all the 64 cores of the Epiphany Multicore Accelerator simultaneously. The application or program which we run on Parallella should be written in such a way that it is scalable across multiple cores in the CPU for maximum resource utilization. Some of the real time applications like internet stream analytics, real-time market analytics, share market analysis and other fields of data mining and data warehouse technologies requires very high computing power can be built in a device like Parallella to get maximum efficiency. Parallella along with distributed and parallel computing frameworks like Hadoop and S4 will be a great platform in developing parallel and distributed data mining algorithms or even parallelizing existing serial algorithms.

—T.S.Raghavender , M.Sc. (IT) , 8th Semester

Website Pick

The United States Air Force Research Laboratory has completed what it calls the 'Condor Cluster', a supercomputer made entirely of PlayStation 3 consoles , made of 1,760 PlayStation 3 processors and 168 general purpose processors, the Condor Cluster provides extreme power for it's relatively low cost.

MCS MOMENTS

- Photo Collage By K.P.Mythili, M.Sc. (CS), 8th Semester

TECHTOON