



## VIRTUAL INAUGURATION OF PHASE 1A BUILDINGS OF NIT ANDHRA PRADESH

-Tejaswini(611829)

National Institute of Technology, Andhra Pradesh is the 31st institution among the chain of NITs started by the Government of India, it has been established in the state of Andhra Pradesh in the academic year 2015 – 2016. And now a new campus is being established with 172.6 acres of land adjacent to Chennai-Kolkata Highway (NH-16) in the air-strip lands of Tadepalligudem.

It has completed the construction of phase - 1A and a virtual inauguration took place on 27th of October 2020.

Union minister of Education Dr Ramesh Pokhriyal, state education minister Adhimulapu Suresh, Governing board ChairPerson Ms. Mrudhula Ramesh, Director of Nit Andhra Pradesh CSP Rao were part of this occasion.

Shri Ramesh Pokhriyal Nishank ji virtually inaugurated the newly constructed buildings of NIT Andhra Pradesh under Phase-1A. In the Phase -1A, buildings are ready to use, by the students, faculty and staff are Dr.Sarvepalli Radhakrishnan Class Room Complex, Dr.A.P.J. Abdul Kalam Laboratory Complex, Boys Hostel, Girls Hostel, and Athidi Guest House.

of development which otherwise would not have been possible, he added. The virtual inauguration of the Phase 1A of NIT Andhra Pradesh unravels the incredible growth of this institute to the people and the state. He appreciated the NIT AP officials for the fast developments in campus infrastructure. The Minister highlighted that ever since the bifurcation of the state, the central government has made tireless efforts to retain the characteristic features of federalism.

While speaking at the inauguration, Mr. Suresh said that the NIT management has submitted a proposal for the construction of other structures, estimated at a cost of Rs 350 crore in the second phase, and appealed to Mr. Pokhriyal to sanction the amount.

Responding to Mr. Suresh's request, the Union Education Minister said the Government of India has sanctioned Rs 415 crore in the first phase for NIT AP, and assured to grant budget for taking up construction works under the second phase.

Director Professor Rao said that the incubation centres, industry-collaborative research centres, quarters for faculty and administrative staff, additional laboratories and classrooms will come up in the second phase on the campus. The Ministers praised the NIT management for constructing the academic building, hostels, laboratory, guesthouse and other structures for the institute and preparing the project report for the next phase of construction. The Director explained the achievements of the NIT, the introduction of new courses, placements and the industry-academic relationships being made by the institute's management.

Shri Pokhriyal ji congratulated, all the students of NIT Andhra Pradesh, teachers and all the people associated with the project for new buildings and future endeavors. He assured them that Government of India and Ministry of Education will always stand with them and support in all their initiatives.



Speaking on the occasion, the Minister of Education said that the main goal of any educational institution is to promote an excellence in teaching, research, and innovation through quality education and thereby to serve the society. He added that Higher education institutes located in rural areas have conjoint responsibility to improve the human capital and open up vistas to bring in sustainable economic growth.

The Minister stated that NIT Andhra Pradesh has got every potential to play a vital role in the development of the state of Andhra Pradesh. Hence this institution is dedicated to the Nation for the spurt growth of technical education and technocrats in the nation. NIT Andhra Pradesh is definitely going to give a facelift to Tadepalligudem by ushering in various avenues

## Congratulations

on your new job

**Vaishnavi Kulkarni - Publicis Sapient**

**Sharath Chandra - Blume Global**

**Anusha Bathineni - Blume Global**

**N. Sai Srikar - Accenture**

**T. Sai Anurag - Accenture**

A new job means a new goal, a new start, and a new world. May you enjoy this new segment of your life! Good luck.

## GATE PROBLEMS

1. The cut-off wavelength (in  $\mu\text{m}$ ) of light that can be used for intrinsic excitation of a semiconductor material of bandgap  $E=1.1\text{eV}$  is \_\_\_\_\_.

2. If the emitter resistance in a common emitter voltage amplifier is not bypassed it will

- (a) reduce both the voltage gain and the input impedance
- (b) reduce the voltage gain and increase the input impedance
- (c) increase the voltage gain and reduce the input impedance
- (d) increase both the voltage gain and input impedance

\*\*Solutions to the previous issue questions are included in the e-copy

## RIDDLES

- 1) What's at the head of an elephant and at the tail of a squirrel?
- 2) 2 people in front of 2 people. 2 people behind 2 people, and 2 people beside 2 people. How many people are there?
- 3) What speeds on a track but isn't in a race and has a whistle to announce its steady pace?
- 4) What was was, before was was?
- 5) I can be found on fingers, in toolboxes and in snails. What am I?
- 6) Where can you add 2 to 11 and get 1
- 7) Feed me and I live, yet give me a drink and I die. What am I?
- 8) What turns everything around but does not move?
- 9) You can hold it without using your hands or your arms. What is it?
- 10) How can you add eight 8's to get the number 1000?

### ANSWERS:

1. el 2. 4 3. train 4. is 5. nails 6. clock 7. fire 8. mirror 9. Your breath  
10. 888+88+8+8=1000

## BUILDING A BRAIN LIKE COMPUTER

-V.K.S.Koushal(611988)

Human Brain is the most powerful supercomputer ever. It carries out about one- thousand trillion logical operations per second. It's compact and uses power less than an electric bulb and has a potentially endless memory. It is one of the most complex systems that one can imagine. All these mind-boggling intricacies have driven our fascination with the brain and for centuries, humans have been trying to map and understand it. But most recently we have thrived towards replicating it.

### REPLICATING THE HUMAN BRAIN!!

**Yikes! Do u think its even possible but thrilling it is.**

### NEUROMORPHIC SYSTEMS:

It is a branch of engineering which is currently trying to imitate biological sensing and information processing nervous system.

**Why "Neuromorphic" computing has to be used when there's already a lot of development through "traditional computing"?**

We often talk about how traditional computing is reaching its limit. There's a threshold we can't move past without making some seriously significant changes in the way we structure computers. One of those exciting ways is making physical computers a little more like human brain. The trend of electronics has brought great change from the era when we used a mobile phone of 8 gigs and now that of 64 is a phenomenal growth. This incremental technological process we've all been participating in for years hinges on one key trend, called Moore's Law. This term was coined by Gordon Moore which implies that integrated circuits are the path to cheaper electronics. This law states that the transistors that can fit inside in an integrated circuit which will double in two years and their price will be halved. A single chip today consists of a billion of transistors and each transistor is about 14 nanometres which is smaller in size when compared to most of the human viruses. This is a very intriguing hunch followed by most of the technological companies and has been phenomenal over the years. Until recently when experts started claiming that this trend is slowing down and rolling double the chips is taking more than 2 years. So, to power the next wave of electronics, Neuromorphic computing is one of the promising options which is currently under laboratory stage.

**How Neuromorphic Computing more convalescent than traditional computing?**

All the traditional computers think in binary i.e., either 0 or 1 (more specifically yes or no). So, the code we use and the questions we ask computers must be structured in a very rigid manner. Instead of using an electric signal to mean one or zero, designers of these new chips want to make their computer's neurons talk to each other the way biological



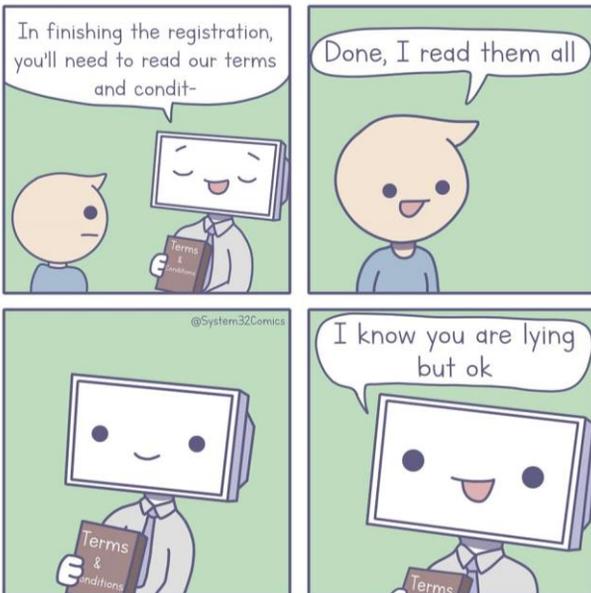
neurons do. To do this, you need a kind of precise electric current which flows across a synapse, or depending on the number and kind of ion, the receiving computer neuron is activated in some way giving you a lot more computational option rather than just basic yes or no. This ability to transmit a gradient of understanding from one neuron to another neuron and have them all more efficient than our normal computers – especially for complex tasks, our computers today aren't going to cut it. Another major variation of this Neuromorphic Computing is that they use different architecture in building the computers than our traditional computers. Today's traditional computers generally use Von-Neumann Architecture where processing unit and memory are separate and data moves between them, while in neuromorphic systems, computers are structured in such a way that both the storage and processing unit connected within these neurons are all communicating and learning together.

The hope of this Neuromorphic systems is that they could transform general purpose computers from general purpose calculators into machines that can learn from experience and make decisions. We'd leap to a future where computers wouldn't just be able to crunch data at break neck speeds but could do that and process sensory data in real time.

### Some future applications:

These may include Combat Robots that can decide how to act in field, drones that could detect changes in the environment, and your car that takes you to a drive through for ice cream after being dumped . Basically these could power our future robots overloads. We don't have machines with sophisticated brain-like chips yet but they're on the horizon. So, get ready for a whole new meaning of the term "Brain power".

## TECHATOON



## Editors' Note

Hello readers!! We are back with the volume 3 issue 4 of THE ECE HERALD newsletter with some enthralling stuff. Hope you cherish our efforts.

Firstly, a notable article on building brain like a computer has been jotted down. A report on Virtual inauguration of buildings of NIT-AP has been penned. Striking articles like Star link and Boycott Chinese products get you engaging.

A detailed analysis of Shakti-India's first processor has been put forward which is worth reading.

A ground breaking article on Quantum Entanglement has been put forward. Some more interesting and creative stuff like Gate problems, Techatoon, Quizvid-20, Art works and Pic of the month add on its own elegance to the newsletter. All your recommendations will be considered and are always welcome. We are expecting an enthusiastic contribution to the newsletter, be it an article of your own interest or an artwork or any other interesting stuff.

We congratulate all the students of ECE who got placed in various companies.

For any queries, suggestions, articles or artworks feel free to contact us at [theecheherald@nitandhra.ac.in](mailto:theecheherald@nitandhra.ac.in).

Keep reading and keep contributing!!

Stay safe & Happy reading!!

REFERENCES: click on the following links:-



# SHAKTI-INDIA'S FIRST PROCESSOR

B.Y.C Vardhan Kumar(611808)

When you hear SHAKTI (India's First indigenous processor). A lot of questions might pop out in your head. What is SHAKTI Processor? Why is it special? How good is SHAKTI? Can it compete with INTEL, ARM or even Snapdragon, AMD or Raspberry pi's for that matter? Most of these questions are answered in this article.

SHAKTI is a processor development program, aimed at developing a class of processors. Currently, the embedded and Desktop class of processor is developed.

SHAKTI Processor uses RISC-V[Reduced Instruction Set Computing-V(Five)] instruction sets. In a way Intel processors use Intel's X86 ISA(Instruction Set Architecture) and ARM(Advanced RISC Machine) Processor uses ARM ISA.

## Why a new ISA?

Group of researchers from "University Of Berkeley" wanted an ISA for their project. Surprisingly they found literally none of them were catering to their needs. Let us understand why! If you take Intel's X86, it has almost 5000 instructions even without extensions. Even ARM has around 600 instructions. Also the architectures created during the early times were not future proof, rendering it difficult for current times. Also the royalty issues are problematic, even for educational purposes. So RISC-V started as a serious attempt at overcoming many of these issues. RISC-V instructions are open-sourced. Less complicated, usable for industry and academic projects. The ISA comes without royalties.

## Why is SHAKTI having so much impact?

RISC-V is a fifth generation architecture, created specifically to rectify the mistakes and the failures of the past four generations. It is also designed from both software and hardware perspective.



Though the main reason is because it's open source. In an era of cyber threats, the modern governments are tired of the back-doors in their products that sneakily steal the data. When it's an Open-source environment, we can verify the cleanliness of the implementation. The level of scrutiny is much higher, thus the impact.

## Why use SHAKTI RISC-V Processor?

### Cost-efficiency:

The obvious advantage would be its cost! The processor design is completely free and open-sourced. Thus the licensing cost is avoided.

### Open-Source and Easy Solutions:

When it is an open-source processor, Clean implementation is not the only advantage. It has a community of people working on it and experimenting on it.

### Fewer Instructions:

The total number of instructions is less than 200 instructions meaning the instruction card will fit right in your pocket. Fewer instructions also mean, we can create simpler architectures leading to cost-effectiveness and power-efficiency in processor implementation.

### Frozen architecture, Portable software:

SHAKTI has Frozen architecture. A frozen ISA means we can develop the software once and run it indefinitely on any RISC-V device. There is no need to rewrite the software code for every design.

### Scalability:

SHAKTI Processor is highly scalable i.e. it can run on low powered 32-bit embedded systems to 64-bit Out of Order cores. The design gives hooks to parameterize lots of processor design components.

### Conclusion:

While the well established Intel x86 and ARM architectures are unlikely to vanish in the near future, SHAKTI is up for rapid growth given the flexibility and the long life it has. With a lot of big names like Google, Qualcomm, NVIDIA, ALIBABA heavily investing and rallying behind the RISC-V. This might bring a revolution similar to what Linux caused in Operating systems and push the boundaries of innovation in processor technology

# BOYCOTT OF CHINESE PRODUCTS-THE REAL TRUTH

T. Sai Venkateswara Rao(611881)

Every year about 7 lakh crore rupees of business is done between India and China. In which exports to China include 1.5 lakh crores and imports from China includes 5.5 lakh crores, this implies that we are using more Chinese products than that of China using Indian products. This makes us think about boycotting the Chinese products and also because of the many issues we faced with China recently, one of the recent issues- Galwan valley incident.

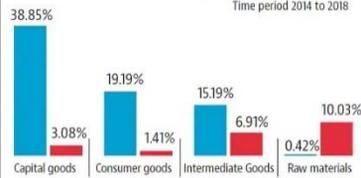
Now what we are thinking is, if we stop or decrease the imports from China which is called blanket ban then it will have a huge impact on GDP and economy of China as the decrease in import from India leads to a decrease in production, in turn, makes the people jobless and also it makes India to build manufacturing companies and increases economy of India. Now we will discuss the above issue with facts,

- ✓ China's GDP is 5 times more than India's GDP.
- ✓ As per reports in 2018, China is the topmost manufacturing output in the world by taking a 28.4% share while India is just 3%.
- ✓ Lots of companies will manufacture their required products or parts in China, for example, Apple-it is a company situated in the USA but most of the components assembled are manufactured in china.
- ✓ Every year products exported by China to the other countries in which India will export only 3% of the products. So by that 3% China will have no effect on its economy.
- ✓ And coming to imports China will import only 0.9% of the products it required from India so it nowhere affects China in imports.

And coming to India, it is importing about 16% of products from China which is a large number, in turn, it can affect India. If we ban now we need large manufacturing units to compensate that 16% as it takes much time to build manufacturing companies and it needs a lot of investment and needs training the personnel. And some things we cannot even prepare in the near future as it needs much

## China's importance in India's foreign trade

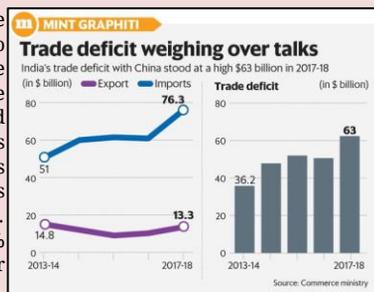
Average share of China in India's trade in last 5 years  
 ■ China's share in Indian imports ■ China's share in Indian Exports  
 Time period 2014 to 2018



technology to design the products for example chips in mobile phones are prepared by MediaTek, AMD and Qualcomm companies and these companies invest lots of money in the research and development for the output product and got the patent rights to manufacture chips, not only chips, processor companies like intel and MediaTek(American) and companies offering displays like LG and Samsung (South Korea) and batteries are manufactured by Sony and Panasonic (Japanese) and these all companies manufacture their products in China because there are lots of consumers in China and lower import duties on the customer, as they are manufacturing it.

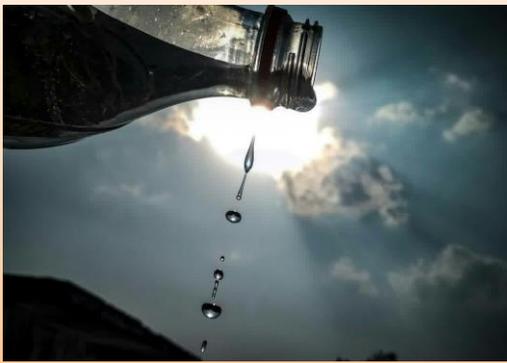
And also China can reach the technical requirements to manufacture the products. The land, labor, and water were available in cheap in China and also Chinese govt gives the loans for less interest and quickly gives the permissions to build factories which is quite opposite in India. We can think like importing 16% of the products from other countries but we cannot get the products as cheap as we get from China. And from the past few years as we will have high taxes if we import completely built units so we are importing parts and assembling it in India.

All the smartphone factories you are seeing in India are just assembling centers, not manufacturing units. The solution to this is, firstly we should balance the trade deficit(the amount by which the cost of a country's imports exceeds the value of its exports.) as we are importing more products from China we should increase exports to China. And the government should invest more on the r&d side and increase the quality of education to improve technology.



REFERENCES: click on the following links:-





**MEGHANA(611756)**



**THISHITHA(611925)**

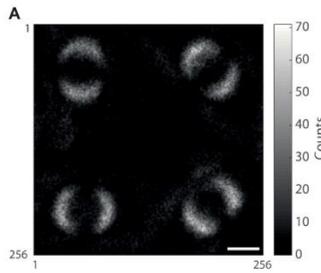
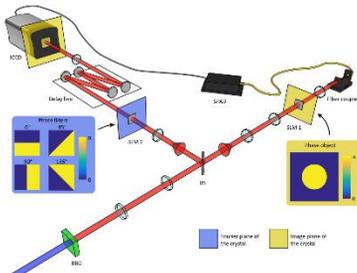
**Quantum Entanglement**

-G.Bhava Charan(661922)

The phenomenon that Einstein referred to as the ‘spooky action at a distance’ is now termed as Quantum Entanglement. This is a phenomenon where the states of two or more quantum particles are entangled. By entangled, we mean that the change made to one particle affects the other in the same way.

This is independent of the distance between them and happens at the same time disregarding the maximum possible speed information can travel (i.e. faster than speed of light). Hence the name ,‘spooky action at distance’.

Just like the black hole, this was a phenomenon which was theoretical and didn't have a visual proof that it existed. Unlike a black hole that is huge and far apart, quantum entanglement is not observed on a macro scale and was difficult to be captured.



Scientists today have managed to capture an image of two photons that were entangled. They were sharing their physical state – for a brief time. The experiment involved four images of the photons taken at the same time but at different places.

Physicists split a bunch of entangled photons and ran one into liquid crystal material known as beta-barium borate and the other was let to pass straight without any disturbance. The beam that has passed through the borate crystal will experience a phase shift. The same phase shift was observed in the beam of light that did not pass through the crystal. This result proved that both the beam of lights were entangled.

There is an interesting paradox that occurs in the case of entangled quantum particles. When the measurement is made on either of the particles, it collapses the state of the entire entangled system. This collapsing of the system happens instantaneously (i.e. before any information about the measurement could reach the other particle). In Copenhagen interpretation, the result of a spin measurement on one particle is a collapse into a state in which each particle has a particular spin. The result is taken to be random, with each having a probability of 50%. However, the spins are found to be anti-correlated. This means the random outcome of measurement made on the first particle is transmitted to the other particle also. Quantum entanglement has been observed in many particles. It has been demonstrated experimentally in photons, neutrinos, electrons, molecules like buckyball, and even small diamonds. This scientific phenomenon is used and researched on in the field of communication, computation and quantum radar.

**ART WORKS**



**Meghana(611756)**



**Inisha(611712)**

**HAPPY BIRTHDAY**

- Karthik Kalidhas – 12<sup>th</sup> November
- Akula Revanth – 15<sup>th</sup> November
- Sowmya – 16<sup>th</sup> November
- Samradh Sharma – 18<sup>th</sup> November
- N Sai Srikar – 26<sup>th</sup> November
- Karisma Panda – 4<sup>th</sup> December
- Venkata Sai Vardhan Bandaru – 4<sup>th</sup> December

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**1. Instantaneous phase**

$$\phi_1(t) = 2\pi f_c t + \beta_1 \sin 2\pi f_1 t + \beta_2 \sin 2\pi f_2 t$$

**Instantaneous frequency**

$$\begin{aligned} f_1(t) &= \frac{1}{2\pi} \frac{d\phi_1(t)}{dt} \\ &= f_c + \beta_1 f_1 \cos 2\pi f_1 t + \beta_2 f_2 \cos 2\pi f_2 t \end{aligned}$$

**Instantaneous frequency deviation**

$$= \beta_1 f_1 \cos 2\pi f_1 t + \beta_2 f_2 \cos 2\pi f_2 t$$

**Therefore, maximum value of frequency deviation**

$$= \beta_1 f_1 + \beta_2 f_2$$

**Ans. (a)**

$$\begin{aligned} 2. f_c(TE_{21}) &= \frac{c}{2} \sqrt{\left(\frac{2}{a}\right)^2 + \left(\frac{1}{b}\right)^2} \\ &= \frac{3 \times 10^{10}}{2} \sqrt{\left(\frac{2}{5}\right)^2 + \left(\frac{1}{3}\right)^2} \\ &= 1.5 \times 10^{10} \sqrt{0.16 + 0.111} \\ &= 7.81 \text{ GHz} = 7810 \text{ MHz} \end{aligned}$$

**Ans. (7810)**