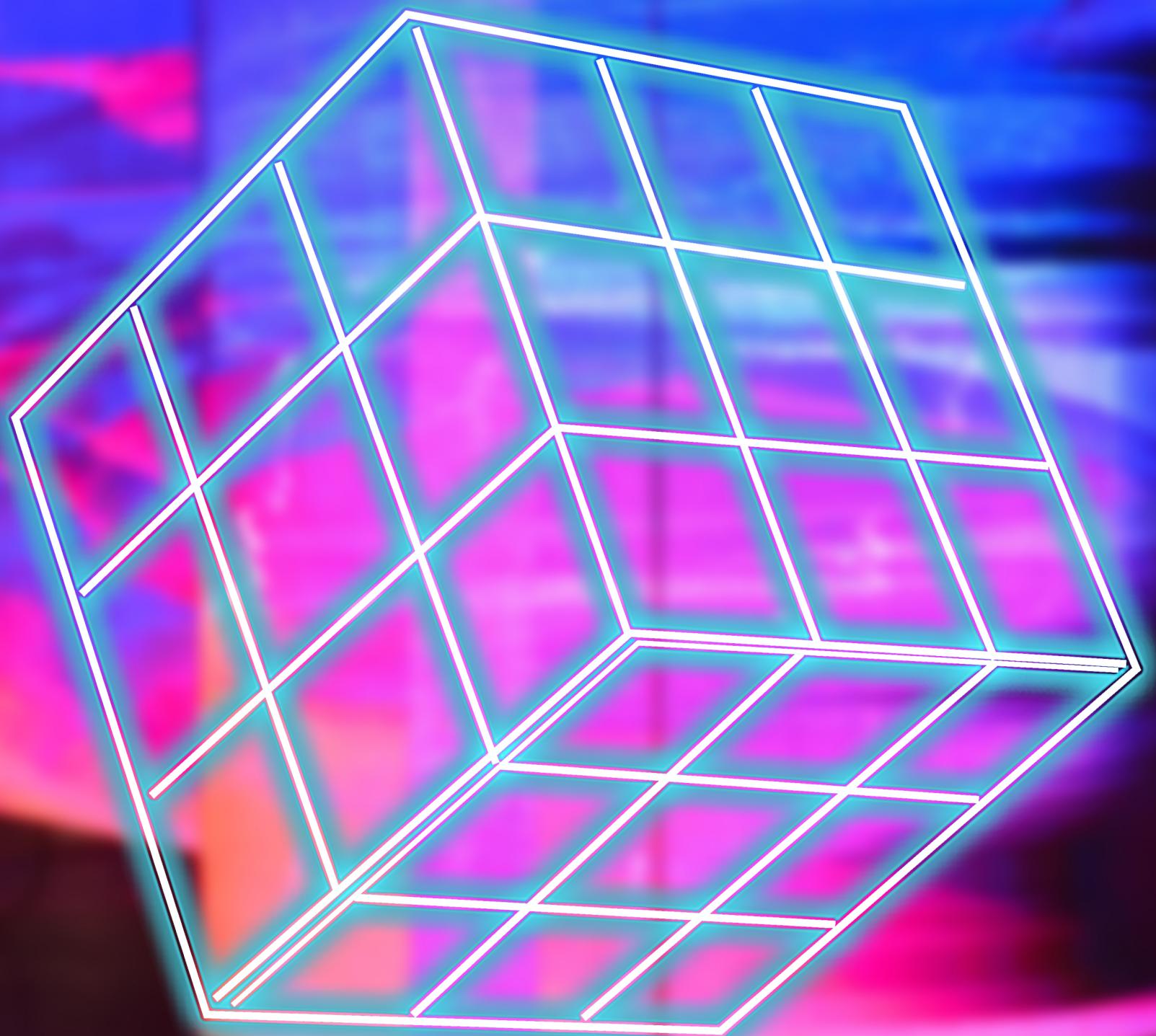


# SIERRA



*Imagination . Innovation . Inception*

August-December 2020

# Technoforum

*Let's learn, imagine, and build*

Technoforum is the tech society of Birla Institute of Applied Sciences. It aims to provide students with a platform to stand and thrive in a world full of technology. It is committed to helping every student to achieve more. Whether a beginner or an advanced learner, it brings opportunities for everyone to gain knowledge by organizing events, interactive sessions by foreign professors and industry experts, and by providing information about upcoming technologies. Technoforum brings different technology-related fields like AI, robotics, web development under the same roof. We engage every student's experiences, strengths, and various points of view to inform, challenge, and stretch our thinking. Its mission is to educate, inform, and encourage all emerging technology enthusiasts.

**To know more about Technoforum:**

**Official Website:** <https://www.techno.birlainstitute.co.in/>

**Official YouTube channel:**

<https://www.youtube.com/channel/UC0YSts-qfiKCGgH5RzVNY7A>

**Official email-id:** [techno\\_forum@birlainstitute.co.in](mailto:techno_forum@birlainstitute.co.in)



# Editors

Vaishnavi Bisht (CSE'18)

Harshit Pathak (CSE'18)

Amber Kumar (CSE'18)

# Cover Design

Vaishnavi Bisht (CSE'18)

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- 7. November Events**
- 8. December Events**
- 9. Google DSC Events**

# **Editors' Desk**

Technoforum, the technical society of BIAS, presents the inaugural issue of its magazine "Sierra".

Sierra is a biannual magazine outlining all the events and competitions conducted by the members of Technoforum. The theme of this edition revolves around three I's- Imagination, Innovation and Inception, these together constitute the world of technology.

The world faced a devastating set back due to the novel Covid-19, but technology made it flexible for us to adapt to its effects. Technology has evolved, from building AI technologies to check for a mask or how long you are touching your face to creating a virtual psychologist such as "Wysa".

Like every cloud has a silver lining, the members of Technoforum have successfully conducted various online events and competitions. The members came up with innovative approaches to continue with the events and competitions virtually. Appreciating the commendable efforts of all the members and faculty co-coordinators, Sierra aims to provide the glimpses of all the happenings of Technoforum.

## Director's Message



### Prof. Geetam Singh Tomar

Technoforum intends to organize innovative technical and scientific events in the field of computer science and electronics engineering. We are happy to inform you that Technoforum is going to publish its first inaugural issue of Sierra. This magazine aims at providing all the information possible and needed to the users within limited space and time. Every year, this magazine will get issued for both even and odd semesters.

We are planning to apply and get its ISSN number to commercialize this magazine so the whole world will get benefited with the latest knowledge coming from our BIAS campus. Birla Institute has a history of 40 years with Technoforum having a narrative of 13 years since its inspection in 2007.

In the face of this pandemic, our Technoforum team has triumphantly put together the first inaugural issue of Sierra. We invite your valuable comments and suggestions for improvement of this magazine and this institute.

A handwritten signature in black ink, appearing to read "G.S.T." followed by a stylized surname.

Prof. Geetam Singh Tomar  
Director, Birla Institute of Applied Sciences, Bhimtal, India



## Dr Bishwajeet Kumar Pandey

Welcome to the August-December 2020 Issue (Vol.1 No. 1) of Sierra. This year 2020 marks a milestone in the history of this publication because it is an inaugural issue. The magazine consists of all events organized after 13 August 2020, when our Odd semester class begins. From 2021, there will be two issues of Sierra both in Even Semester (Vol. 2, No. 1, 2021) and Odd Semester (Vol. 2, No. 2, 2021).

Technoforum encourages more practice-based events, with state-of-the-art content by senior students that eventually benefits the junior students by increasing their knowledge. This is equally informative and productive for students in enhancing their skills and thriving in their semester exams, thus improving our institute's ranking. The cover page of the magazine reflects the theme and goals of Technoforum for this edition. Though our institute has a long history and continues to improve with time, we cannot ignore the importance ascribed to the ranking exercises.

It is time for us to work hard to help this institute escalate the ranking scale by participating in the international conferences and SCI/Scopus Index-Journal and publishing research papers. My warm welcome to the new members of the BIAS. Together we would work towards making the Sierra a truly influential publication. I thank my director Prof G S Tomar, my colleague in Technoforum, ECE-Coordinator Prof. Saurav Joshi, CSE HoD Prof. Robin Singh and ECE HoD Prof S K Thakur, the entire BIAS faculty and Technoforum members for all their support.

A handwritten signature in blue ink that reads "Bishwajeet".

**Dr Bishwajeet Kumar Pandey,**  
**Head of International Liaison Committee and Ass. Professor @ Birla Institute of Applied Sciences, Bhimtal, India**



## Mr. Saurav Joshi

Technoforum was set up by a group of technology-focused students of the Birla Institute of Applied Sciences, Bhimtal, Uttarakhand, in 2007. One of its founding principles was to support the institute's endeavor of providing holistic education and developmental opportunities to its students. Since its inception, Technoforum has come a long way, evolving with the changing needs of times and has become a guiding force for many students and alumni.

This year the student members of the Technoforum have expended tremendous efforts, leading to remarkable success in the organisation of various events. This has provided the students with umpteen opportunities of interacting and competing with other students, thus making available to them opportunities for enhancing their skills and abilities. Dr Bishwajeet Pandey's tutelage, under the overall guidance of Director sir, has been the crucial contribution to the overwhelming success of Technoforum during this year. We thank them most earnestly for their patronage.

**Mr. Saurav Joshi,  
Assistant Professor @ Birla Institute of Applied Sciences, Bhimtal, India**

## **Technoforum Student Co-Coordinators**

**Vaishnavi Bisht**  
CSE'18

**Siddharth Arora**  
ECE'18

**Harshit Pathak**  
CSE'18

**Prithvi Raj Tiwari**  
ECE'18

## **Technoforum Technical Committee**

**Aditi Sahni**  
CSE'18

**Aditya Joshi**  
CSE'18

**Aman Singh Bisht**  
ECE'18

**Anjali Sharma**  
CSE'18

**Deepesh Rawat**  
CSE'18

**Durgesh Pandey**  
ECE'18

**Harshit Negi**  
CSE'18

**Manas Tewari**  
CSE'18

**Nidhi Sah**  
CSE'18

**Sumit Chauhan**  
CSE'18

**Utkarsh Joshi**  
CSE'18

**Abhay Dumka**  
CSE'19

**Anuj Mehra**  
CSE'19

**Himadri Tripathi**  
ECE'19

**Karan Joshi**  
CSE'19

**Kunal Jha**  
ECE'19

**Manya Sah**  
ECE'19

**Saurav Kumar**  
CSE'19

**Shivani Joshi**  
CSE'19

**Som Rawat**  
CSE'19

**Tanmaya Singh**  
CSE'19

## **Technoforum Publicity Committee**

**Aditi Sahni**  
CSE'18

**Aditya Joshi**  
CSE'18

**Amber Kumar**  
CSE'18

**Nidhi Sah**  
CSE'18

**Shubhi Giri**  
CSE'18

**Sumit Chauhan**  
CSE'18

**Abhinav Ginti**  
CSE'19

**Anupam Joshi**  
CSE'19

**Avnish Singh**  
CSE'19

**Dhriti Pant**  
ECE'19

**Deepak Karki**  
ECE'19

**Karan Joshi**  
CSE'19

**Riyaz Ahmad**  
CSE'19

**Shalini Bhandari**  
CSE'19



# AUGUST EVENTS

## Dates

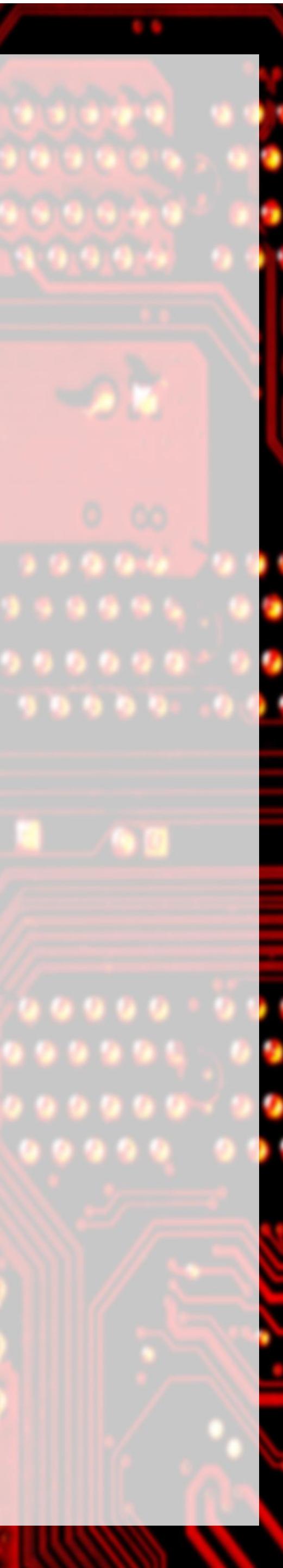
23 Aug 2020

29 Aug 2020

## Event Names

IPv4 Addressing and Subnetting

Be Your Own Boss





# IPv4 ADDRESSING AND SUBNETTING

On 23 August 2020, Dr Mohammad Kamrul Hasan of Universiti Kebangsaan Malaysia presented an online lecture on “IPv4 addressing and subnetting” using Cisco Webex platform.

**Lecture on**

**IPv4 Addressing and Sub netting**

**Presented By:**  
Dr. Mohammad Kamrul Hasan  
Senior Member IEEE, Certified Professional Technologist (P.Tech)  
Assistant Professor,  
Center for Cyber Security, FTSM, UKM  
Email: [mkhasan@ukm.edu.my](mailto:mkhasan@ukm.edu.my); WhatsApp: +60146318275

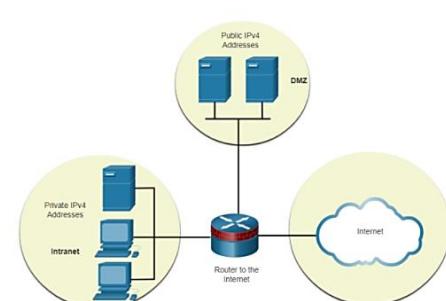
In this lecture he covered the following topics-

- IPv4 Address Structure
- IPv4 Unicast, Broadcast, and Multicast
- Types of IPv4 Addresses
- Network Segmentation
- Subnet an IPv4 Network
- Subnet a Slash 16 and a Slash 8 Prefix
- Subnet to Meet Requirements

## Subnet to Meet Requirements: Subnet Private versus Public IPv4 Address Space

Enterprise networks will have an:

- Intranet - A company's internal network typically using private IPv4 addresses.
- DMZ – A company's internet-facing servers. Devices in the DMZ use public IPv4 addresses.
- A company could use the 10.0.0.0/8 and subnet on the /16 or /24 network boundary.
- The DMZ devices would have to be configured with public IP addresses.



**DMZ** or **demilitarized zone** (sometimes referred to as a **perimeter network** or **screened subnet**) is a physical or logical **subnet** that contains and exposes an organization's external-facing services to an untrusted, usually larger, network such as the Internet.

cisco

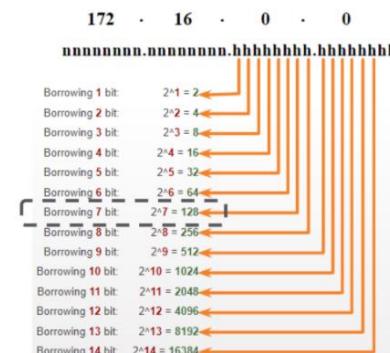
© 2016 Cisco and/or its affiliates. All rights reserved. Cisco Confidential 45

## Subnet Slash 16 and Slash 8 Prefix: Create 100 Subnets with a Slash 16 prefix

Consider a large enterprise that requires at least 100 subnets and has chosen the private address 172.16.0.0/16 as its internal network address.

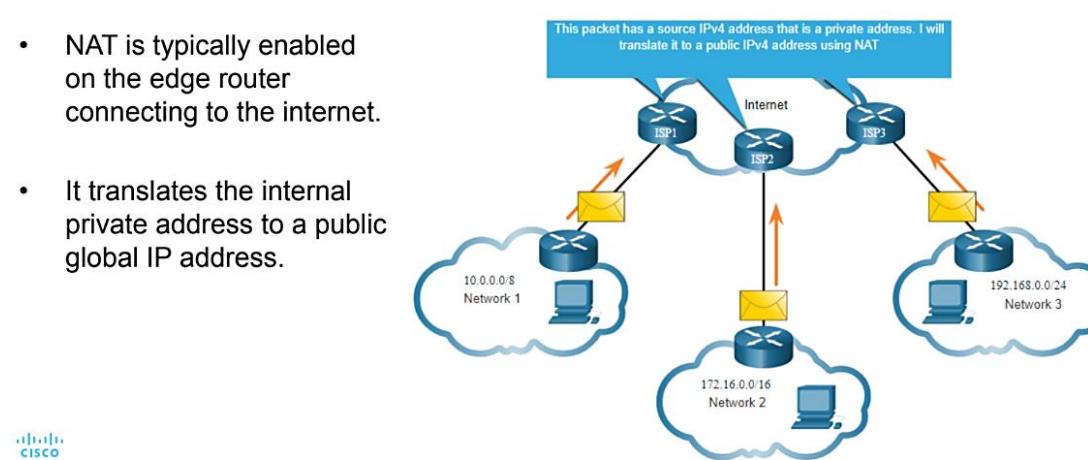
- The figure displays the number of subnets that can be created when borrowing bits from the third octet and the fourth octet.
- Notice there are now up to 14 host bits that can be borrowed (i.e., last two bits cannot be borrowed).

To satisfy the requirement of 100 subnets for the enterprise, 7 bits (i.e.,  $2^7 = 128$  subnets) would need to be borrowed (for a total of 128 subnets).



## Types of IPv4 Addresses: Routing to the Internet

- Network Address Translation (NAT) translates private IPv4 addresses to public IPv4 addresses.
- NAT is typically enabled on the edge router connecting to the internet.
- It translates the internal private address to a public global IP address.



**Mohammad Kamrul Hasan** is currently working as a assistant professor at Center for Cyber Security, Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia (UKM), Malaysia. His research interest is in: Communication Engineering, Internet of Things, 5G, Vehicular Networks, smart grid networks, Microprocessor and Interfacing, and Cyber-Physical Security. He is a Senior Member of the Institute of Electrical and Electronics Engineers, USA. He has a strong motivation to contribute to a good working and social environment.

## BE YOUR OWN BOSS

On 29 August 2020, CA Nikheil Mehta presented an online lecture on “Entrepreneurship” and “how to be your own boss” using Cisco Webex platform. He discussed with the students about the different types of business risks, reasons why businesses fail and different case studies as well.

### Entrepreneurship

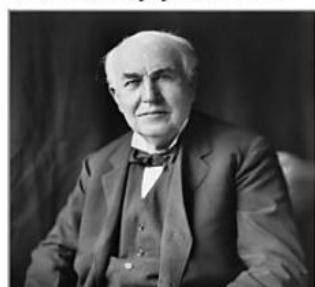
- The process of starting and operating your own business

### Entrepreneur

- A person who **risks** his own money for freedom, rather than exchanging his freedom for money
- A person trained in making people buy things they don't actually need
- the people who create, launch, organize and manage a new business and take the **risk** of business ownership

### An investment in knowledge always pays the best interest. “Benjamin Franklin”

- Why do we or should we read books?
- Knowledge and knowhow collected during lifetime
- Experience of many who failed multiple times to finally get something right
- Learn from the mistakes of others, you can't live long enough to make them all by yourselves



“  
I didn't fail 1,000  
times—the light bulb  
was an invention with  
1,000 steps.

Thomas A. Edison

CASE  
STUDY-2



# SEPTEMBER EVENTS

## Dates

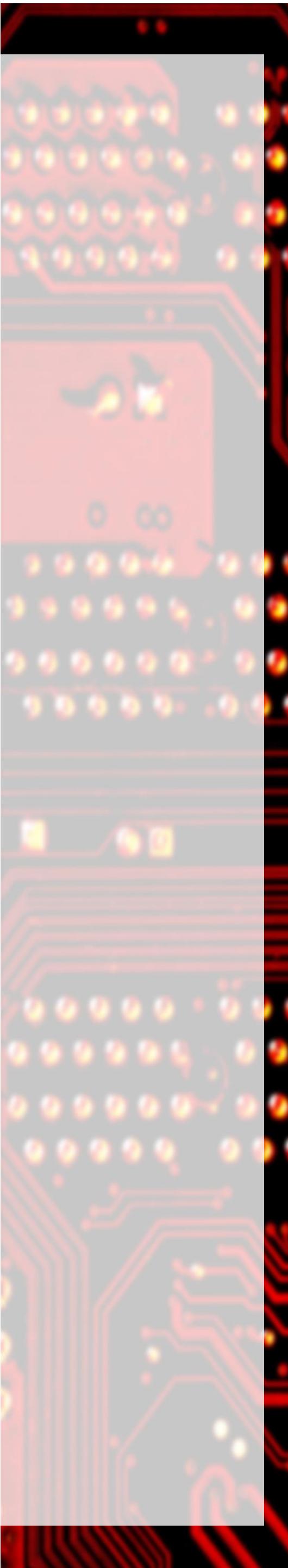
02 Sep 2020

10 Sep 2020

## Event Names

Cyber-Physical  
Systems and Cyber  
Ranges

Cloud Computing  
Technologies





# CYBER-PHYSICAL SYSTEMS AND CYBER RANGES

On 02 September 2020, Dr Shabeer Ahmad of Gran Sasso Science Institute, L'Aquila, Italy presented an online lecture on “Cyber physical systems” and “Cyber Ranges”. He also discussed scholarship opportunities for students to pursue Masters/PhD in Italy.

The slide has a blue header with the title "Water-Supply Cyber-Physical Systems". Below the title is the name "Shabeer AHMAD" and the email "shabeer.ahmad@gssi.it". The footer contains logos for CINI Cybersecurity National Lab, Gran Sasso Science Institute (GSSI), and Politecnico di Torino.

In this lecture he covered the following topics-

- Cyber-Physical Systems
- Cyber-Range
- Italian System of Education
- Scholarship Opportunities for Masters/PhD
- Golden Proposal

## Cyber Physical System (CPS)

6

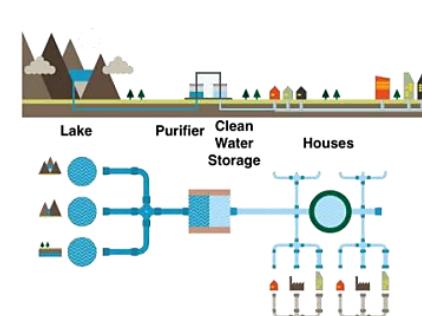
The term “cyber-physical systems” appeared in 2006 and became popular in 2010, first used by Helen Gill at the National Science Foundation in the US.

- *A CPS is a high-scale network system consisting of sensors, actuators, control processing units, and communication devices.*

## EVA – Emulator of Real Aqueduct

7

- EVA (Emulatore di Vero Acquedotto - Emulator of a Real Aqueduct) is a CPS representing a functioning model of a real Water Supply System (WSS).



## Cyber-Ranges

10

### ➤ Why do we need Cyber-Ranges

- Need to have a secure and isolated testbed for cybersecurity research;
- Training of cybersecurity experts;
- Design, development and testing of new cybersecurity tactics, techniques and procedures;
- Evaluation and Assessment of the defense capabilities of a system;

### ➤ Types of Cyber-Ranges :

- Virtual Cyber Ranges
- Physical Cyber Ranges
- Hybrid Cyber-Ranges

## PhD/Doctorate Scholarships

17

### ➤ University scholarship

**➤ Amount : 1100-1200 euros/month**

**➤ Number: 10-20 in every faculty**

**➤ Duration: 3 years**

### ➤ Scholarship offered by Research Institutes

**➤ Amount : 1200-1500 euros/month**

**➤ Number: 10-20 in every faculty**

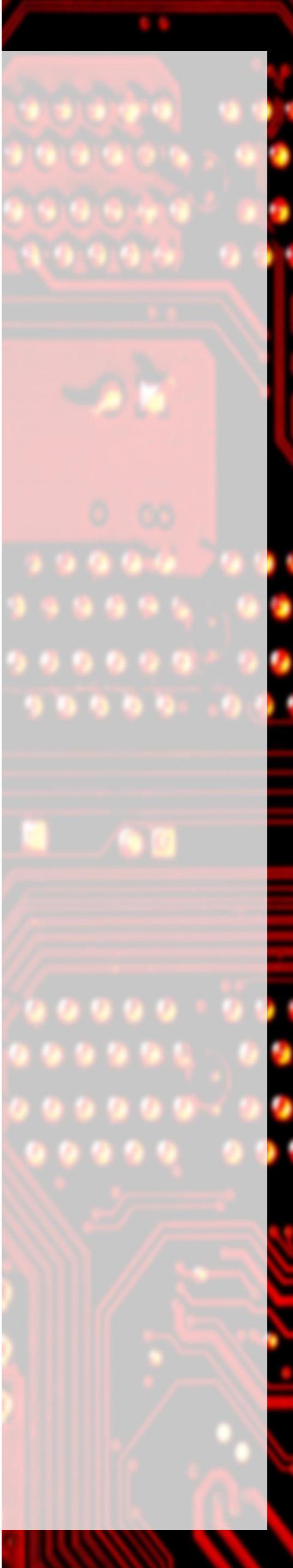
**➤ Duration: 3-4 years**



*Dr Shabeer Ahmad received his B.Eng. degree in ICT and Electronics engineering and M.Sc. degree (M.S) in Information & Control engineering (with summa cum laude) both from the University of L'Aquila, L'Aquila Italy. According to the Italian newspapers, he was the first foreigner (Asian) to graduate with a gold medal from an Italian uni-versity. In 2016, he became visiting research assistant in Shibaura Institute of Technology Tokyo and subsequently, he got a permanent position as a control-systems Engineer in one of the best Japanese Multinational TOSHIBA CORPORATION Tokyo, Japan before joining one of the top Italian research institutes, Gran-Sasso Science Institute (National Institute for Nuclear Physics) L'Aquila Italy- to continue his study of Doctor of Philosophy (PhD) in field of Cyber-Security and control systems. In 2018, he got the Young Scientist Award at the 4th International Conference on Green Computing and Engineering Technologies, August 2018 at Aalborg University, Denmark. His main areas of research interest are Linear and Nonlinear control systems, Cyber-security for the critical infrastructures, Hybrid Cyber-Ranges, Emulation of the Critical infrastructures with special emphasis on Water-supply System.*

# CLOUD COMPUTING TECHNOLOGIES

On 10 September 2020, Dr. Lubna Luxmi Dhirani of University of Limerick, Limerick, Ireland presented an online lecture on “Cloud Computing Technologies” using Cisco Webex platform. She also discussed about pursuing a career in cloud computing in Ireland and scholarship opportunities for students to pursue Masters/PhD in Ireland.



## Cloud Computing Technologies

Dr. Lubna Luxmi Dhirani  
Post Doctoral Researcher  
Department of Electronic and Computer Engineering  
University of Limerick, Limerick, Ireland  
Researchgate: [Lubna\\_Dhirani](#) | LinkedIn: [lubna-luxmi-dhirani-19b3b99](#)  
Email: [l\\_chowdhry@hotmail.com](mailto:l_chowdhry@hotmail.com)



In this lecture she covered the following topics-

- What is Cloud Computing?
- Cloud Computing Features
- Cloud Computing Research Areas:
  - Cloud Computing Security
  - Cloud Computing and Internet of Things (IoT)
  - Cloud Computing QoS and Standardization
    - Frameworks and Toolkits
    - Cloud OMS
    - Cloud Federation and legal issues
- Cloud Economics
- Cloud Computing and IIoT
- Pursuing a career in Cloud Computing

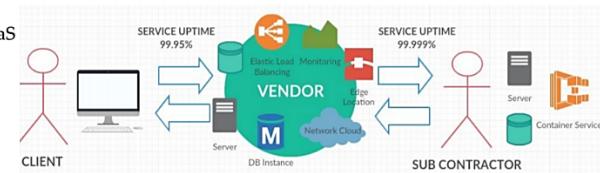
## Securing the Hybrid Cloud while preserving the Data Integrity and Service Level Agreements

- Scope of the project - Securing Hybrid Clouds
  - Existing Issues:
    - (i) Lack of visibility, transparency and control
    - (ii) Measuring & Monitoring the promised QoS
    - (iii) Data Integrity

### Scenario #1 One Client & One Subcontractor

#### • Research Issues:

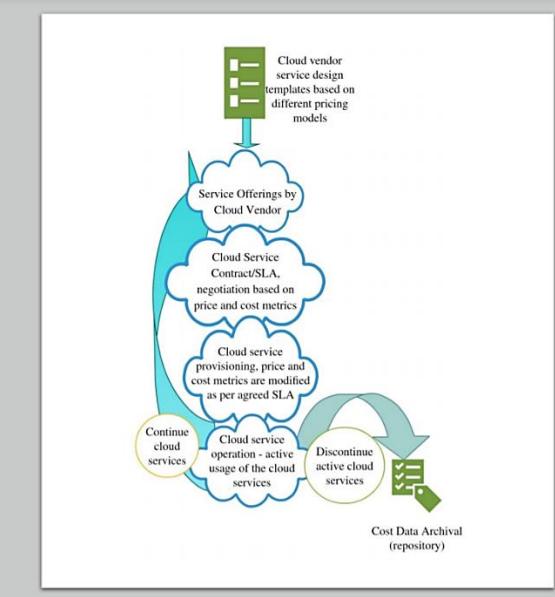
- Data Controller (Security, DGRC), DRaaS
- Third Party Privileges
- Availability, Monitoring & Outages
- Location, Force Majeure Clause
- EU Data Protection Laws
- Vendor Lock-In
- Scalability & Elasticity



## Cloud Cost Management and Pricing Models

- Cloud Costs
- Usage Metrics
  - Storage, Network, Compute, etc.
  - Each billed metric (reliability, uptime, scalability, etc.)
    - Each metric has multiple sub-metrics
- Pricing Model
  - Reserved, On-demand, On-Spot
  - Virtual Machine Instance (VMI) type
  - Billing period (monthly, bi-annually, annually)

**Published:** Dhirani, L., Newe, T., & Nizamani, S. (2018). Hybrid Cloud Computing QoS Glitches. In 2018 5th International Multi-Topic ICT Conference (IMTIC) (pp. 1-6). IEEE.



## An Example Assessing metrics and sub-metrics

- I have blanked out some of the content as it is subject to copyright – but if you are interested more into understanding the SLA metrics, I would recommend you reading the following:
  - Erl, T., Mahmood, Z. and Puttini, R., (2013) *Cloud Computing Concepts, Technology and architecture*: Prentice Hall.
  - Erl, T., Cope, R. and Naserpour, A., (2015) *Cloud computing design patterns*: Prentice-Hall.
  - Jouini, M., & Rabai, L. (2015). Mean Failure Cost Extension Model towards Security Threats Assessment: A Cloud Computing Case Study. *Journal Of Computers*, 10(3), 184-194. doi: 10.17706/jcp.10.3.184-194

Table 3.1: Generalized SLA Parameters				
QoS Metrics (Availability, Reliability, Performance, Scalability, Resiliency) [6]				
Availability Metrics				
• Availability (Time Periods): Downtime Year, Downtime Week, Downtime Month.				
Reliability Metrics				
Performance Metrics				
• Performance (Time Periods): Throughput, Latency, Response Time, Throughput, Throughput.				
Scalability Metrics				
• Scalability (Horizontal/Vertical): Storage Scalability (Horizontal/Vertical), Scalability (Horizontal/Vertical).				
Resiliency Metrics				
• Resiliency (Time Periods): Mean-Time-to-Switch (MTTS), Mean-Time-to-Recover (MTTR).				
Each parameter may comprise SLA details such as SLA description, measurement, method and frequency of collection, threshold levels, delivery model and availability for evaluating the SLA QoS.				
<b>ISTM</b>				
Metric	Description	Measurement	Threshold	
ISTM	Length of time required to initialize a new instance	date-time of instance up, date-time of start request	maximum, minimum, average, range, usage	
<b>SLA Penalty:</b>				
• Service Credits				
<b>Metrics triggered:</b>				
• Average response-time				
• Availability				



*Dr Lubna Luxmi Dhirani, is a Postdoctoral Researcher at University of Limerick, Ireland. She completed her PhD in “Cloud Computing” from the University of Limerick in 2019. PhD research project is based on designing a System for Securing the Hybrid Cloud in a tenant-vendor-third party situation. She has one MSc in Business Information Technology (2008) and B.Eng in Computer System Engineering (2006). She has worked as a lecturer for 3 years and taught various IT-based courses at SZABIST – United Arab Emirates Campus and ISRA University, Pakistan. She did her bachelor’s in computer systems engineering from Mehran University of Engineering & Technology, Pakistan. Her area of interests/specialties include: Cloud Computing, Standards (NIST, ISO, IEC, 3GPP, Six Sigma, etc.), Cloud/IS/IT alignment and IIoT Cybersecurity.*



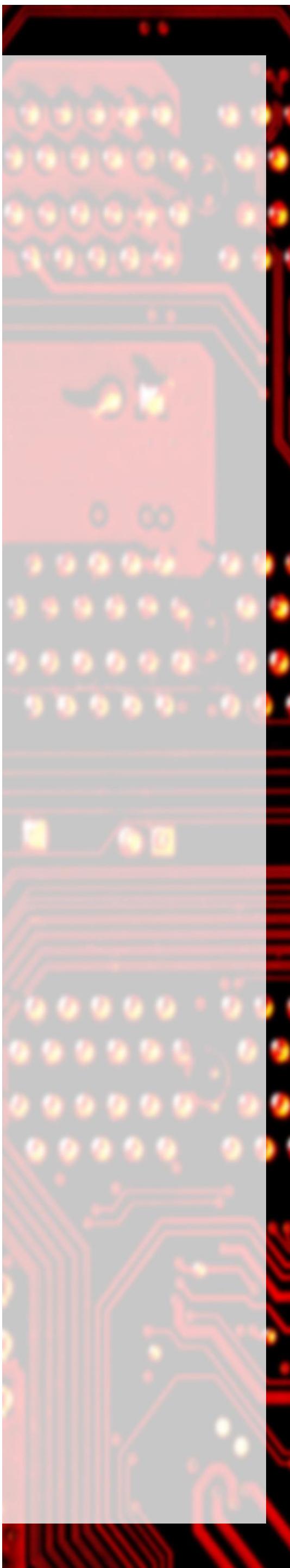
# OCTOBER EVENTS

Dates

Event Names

14 Oct 2020

Blu5 Group



## BLU5 GROUP

On 14 October 2020, Mr Antonio Varriale, Managing Director at Blu5 Labs Ltd presented an online lecture where he talked about Blu5 Labs Ltd, SEcube and SEdesk. He also discussed about the significance of exclusivity and addressing client needs for startups.

**Shaping resilient IT**  
We navigate with our customers the stormy cyber seas

Blu5 Group

B<sup>5</sup>

In this lecture he covered the following topics-

- Industry footprints
- SElink
- SEdesk
- SEcube



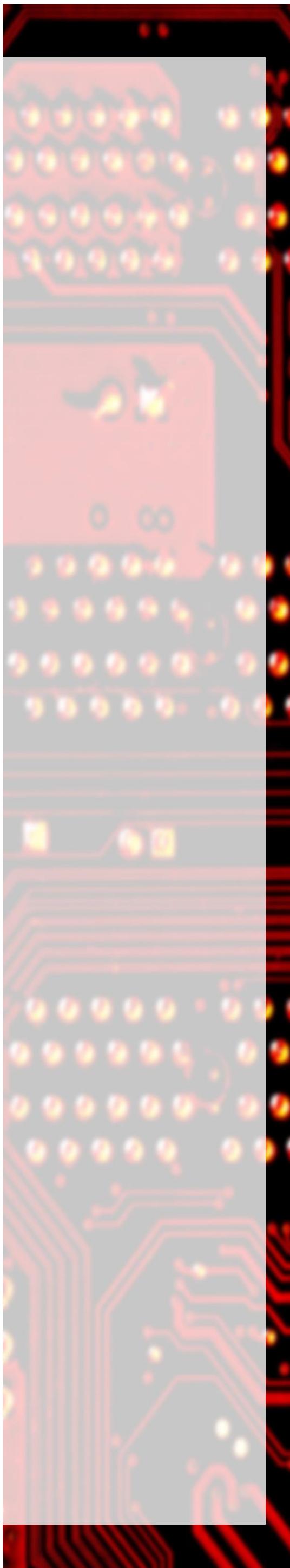
**Gov Mil & Space**  
Remote Control  
Nano-Satellites  
Critical Communications



**Finance & Banking**  
ATM & POS Enhancement  
Infrastructure Optimisation  
Security Enhancement  
Anti-phishing



**Critical Infrastructures**  
Remote Control  
Secure IoT  
Security Enhancement


**B<sup>5</sup>**

## D SEdesk™

The importance of connected data in Threat Intelligence



### Challenge

- Producing timely, actionable and relevant CTI products
- Dissemination of CTI to various stakeholders, and integration with other systems
- Privacy and legal implications in data sharing

### Solution

- Providing securing remote access and on-device isolation to third party critical applications.  
Bypassing typical limitations of VPN or other traditional networking tools

**B<sup>5</sup>**


**Mr Antonio Varriale** started his career as a System On Chip HW & SW developer at CSELT. He spent over 5 years in Telecom Italia Lab developing secure mobile platforms and services. Driven by a huge passion for innovation and creativity Antonio produced several patents in a few years. After completing a master in Business and Telecommunications he worked as an ICT and Security consultant for European and Asian companies. He moved to Blu5 View Pte Ltd to lead the Research & Development creating a great portfolio of HW/SW platforms including PipeComm® and the xSET™ range of security products. He has finally joined Blu5 Labs Ltd to head the Maltese company and create new technologies and solutions, including SECube™ (<https://www.secube.eu>), SEdesk™ (<https://www.sedesk.eu>) and SElink™ (<https://www.blu5group.com/selink>) in reply to the more and more challenging market requirements.



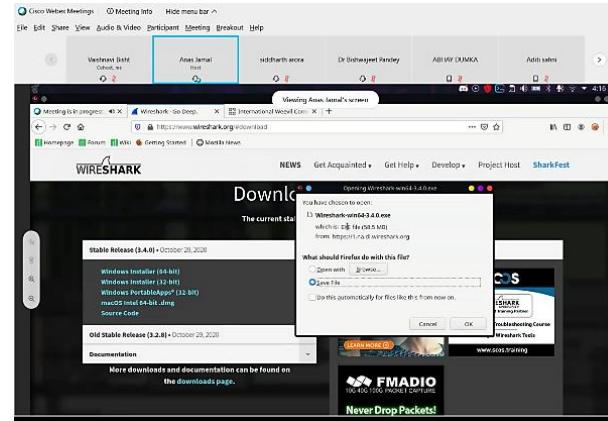
# NOVEMBER EVENTS

Dates	Event Names
02 Nov 2020	Webinar on Networking using Wireshark
03 Nov-07 Nov 2020	Brew the Code
08 Nov 2020	M.R.I - Mind Reviving Intellect
09 Nov 2020	Webinar on Smart Home Network using Cisco Packet Tracer
19 Nov 2020	Webinar on Introduction to AI and AI-Enabled Future
27 Nov 2020	Geek O'Pedia
29 Nov 2020	ESport X

# NETWORKING USING WIRESHARK

On November 02, 2020 Anas Jamal (CSE-18) hosted a webinar on “Networking using Wireshark”. This webinar was hosted via Cisco Webex meeting. In this webinar, he demonstrated:

## -- Installing and downloading Wireshark

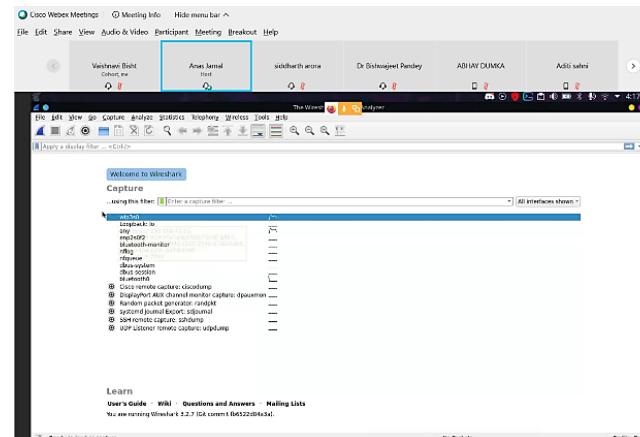


- Wireshark is the world's primary and extensively-used network protocol analyzer.

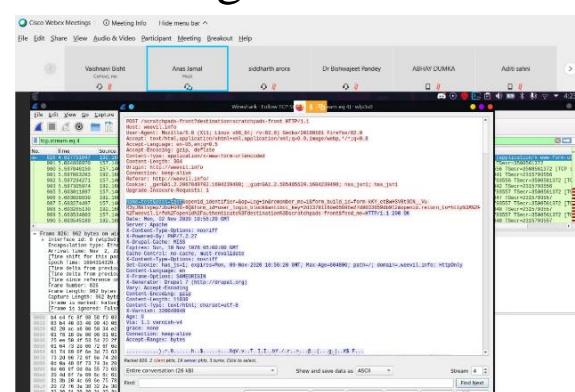
- Wireshark:  
<https://www.wireshark.org/>

- Webinar Link:  
<https://www.youtube.com/watch?v=g8tl0oFC33E>

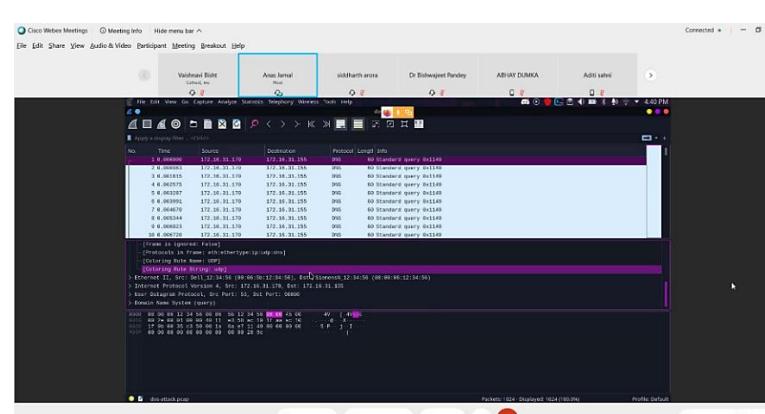
## -- Getting started with Wireshark



## -- Capturing packets using Wireshark



## -- Different types of filters used in packet filtering in Wireshark



This webinar is also available on the official YouTube channel of Technoforum.



## BREW THE CODE

“Brew the Code” was a five-day coding competition hosted by Harshit Pathak (CSE-18). This competition was conducted online, via the HackerRank platform. Participants were provided with different problem statements to solve each day. The purpose of this event was to encourage consistent coding practice among students. The theme of the competition was based on a famous saying among developers, “Coffee and Coding go hand in hand”. Since the best coffee is brewed and the best code is neatly typed so why not try brewing the code itself.

The competition had 5 unique levels:

Some other coding platforms:

- [HackerEarth](https://www.hackerearth.com)  
[www.hackerearth.com](https://www.hackerearth.com)
- [Codechef](https://www.codechef.com)  
[www.codechef.com](https://www.codechef.com)
- [SPOJ](https://www.spoj.com)  
[www.spoj.com](https://www.spoj.com)
- [Topcoder](https://www.topcoder.com)  
[www.topcoder.com](https://www.topcoder.com)

### Names of levels

Latte  
Cappuccino  
Mocha  
Macchiato  
Espresso

### Intricacy

Very Easy  
Easy  
Moderate  
Hard  
Very Hard

Finding the Equilibrium  
Recommended Time: 30 mins Points: 50 Test cases (2 samples)  
Coding Arrays Arrays and Strings Suffix Arrays  
Great Work! You are proving that you are an asset to the company. Your reputation is growing and one of the other interns asks you to help with their task. The task is to find an equilibrium point in a given array. An equilibrium point in an array is the index such that the sum of values at its right is equal to the sum of values at its left.  
You decide to help the other intern, who send the following statement  
Given an array of length n. Find the equilibrium point:  
The first line will be the value of n.  
The next n lines contain the value of the array.  
Input:  
7  
-7  
1  
5  
2  
-4  
3  
0  
Output: 3  
Index 3 is the equilibrium point.  
As arr[0]+arr[1]+arr[2] = arr[4]+arr[5]+arr[6]  
-7+1+5 = -4+3+0  
You are requested to write the code in the method "work". The inputs and outputs will be taken in the same method

### ■ Problem statement

All Tests > Completed > garimajeena1811@gmail.com > Summary  
garimajeena1811@gmail.com  
SUMMARY DETAILED TIMELINE  
QUESTION 1 Correct Answer Score 50 / 50  
# Complete the 'work' function below.  
def work():  
 # Write your code here  
 print(input())  
 l=[ ]  
 for i in range(n):  
 b.append(int(input()))  
 # sum=0  
 sum2=0  
 for i in range(0,n):  
 sum1+=b[i]  
 if sum1==sum2:  
 print(i)  
 break  
 sum2+=b[i]  
 if sum1!=sum2:  
 print(-1)  
if \_\_name\_\_ == '\_\_main\_\_':  
 work()  
Status: Test Completed - Evaluation Req'd.

### ■ Solution



A standard Aptitude test includes:

- Numerical Reasoning
- Verbal Reasoning
- Logical Reasoning
- Inductive Reasoning
- Diagrammatic Reasoning

## MIND REVIVING INTELLECT

“M.R.I - Mind Reviving Intellect” was an aptitude competition conducted by Anjali Sharma (CSE-18). Participants were to solve a total of 15 questions of 4 marks each. This competition was conducted online via Google Forms.

An aptitude test assesses whether students would implement the basics of education to real-life problem-solving situations. These tests evaluate the strongest and weakest areas of a student's understanding of each discipline and their inherent psychometric sense. For job providers, other than a student's academic record, experience and talent, the aptitude test scores act as a critical benchmark in considering a student's candidature.

The aim of conducting this competition was to get the students irrespective of their branches comfortable with the aptitude tests conducted for placements and internships.

8) All owls have night vision, and birds that have night vision aren't black. 4 points  
Which of the following statements must be true: \*

Black ravens don't have night vision.  
 All owls are not black.  
 Birds that are black lack night vision.  
 All of the above

9) Read the following information carefully and answer the question: If P x 4 points  
Q means P is the father of Q , P - Q means P is the sister of Q, P + Q  
means P is the mother of Q, . P ÷ Q means P is the brother of Q, In the  
expression, B + D x M ÷ N, how is M related to B : \*  
Son  
Daughter  
Granddaughter  
Grandson

11) If “\*” is called “+”, “/” is called “\*”, “-” is called “/”, “+” is called “-”, 40/20 4 points  
– 5 \* 10 + 5 = ? \*

170  
 160  
 150  
 175  
 None of these

12) If RADAR is coded as “\*?\*?#” and DOOR is coded as “?%##” then DAM 4 points  
will be coded as: \*

?%#  
 \*#/

13) When the time in the clock is 7.20 pm, then the angle between the 4 points  
hands of the clock is : \*

■ Some of the questions in M.R.I

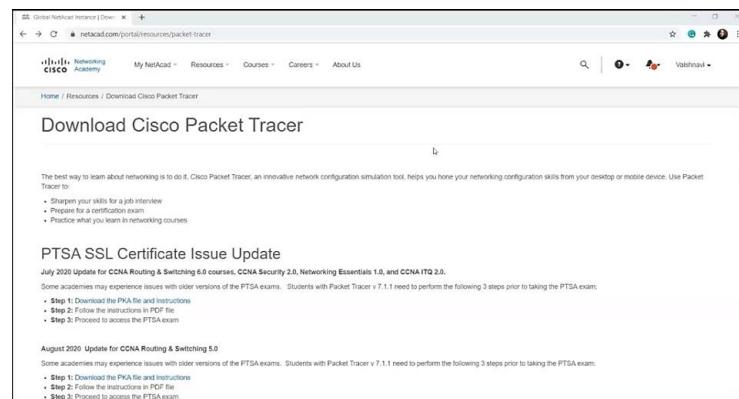


# SMART HOME NETWORK USING CISCO PACKET TRACER

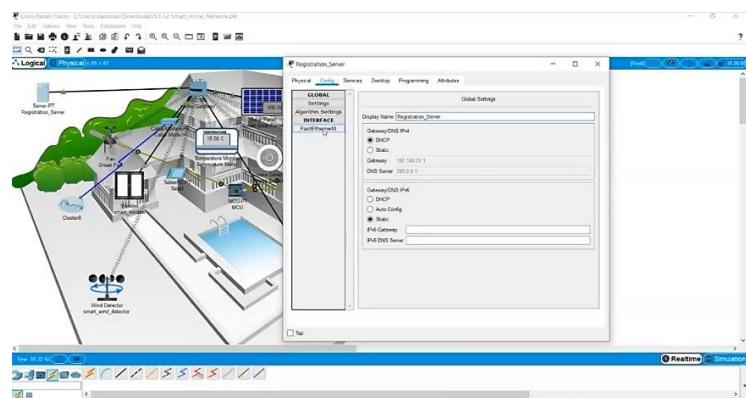
On November 09, 2020 Vaishnavi Bisht (CSE-18) hosted a webinar on “Smart home networking using Cisco Packet Tracer”. This webinar was hosted via Cisco Webex meeting. In this webinar, she demonstrated:

## -- Exploring wired and wireless IoT Devices

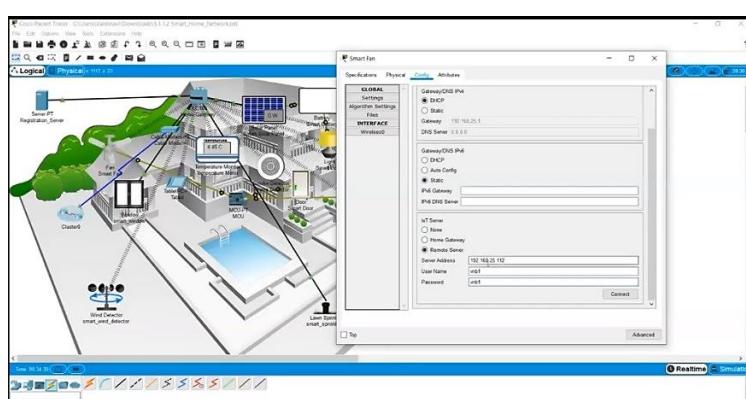
- Cisco Packet Tracer is a simulation tool designed by Cisco Systems. It is used for creation of different network topologies and configuration of different kinds of network and end devices.
- Cisco Networking Academy  
[www.netacad.com](http://www.netacad.com)



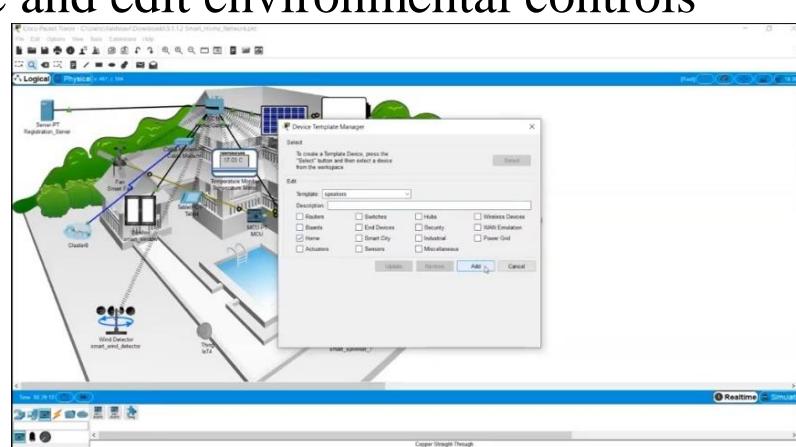
## -- Add the registration server to the network



## -- Register IoT devices to the registration server



## -- Explore and edit environmental controls





# INTRODUCTION TO AI AND AI-ENABLED FUTURE

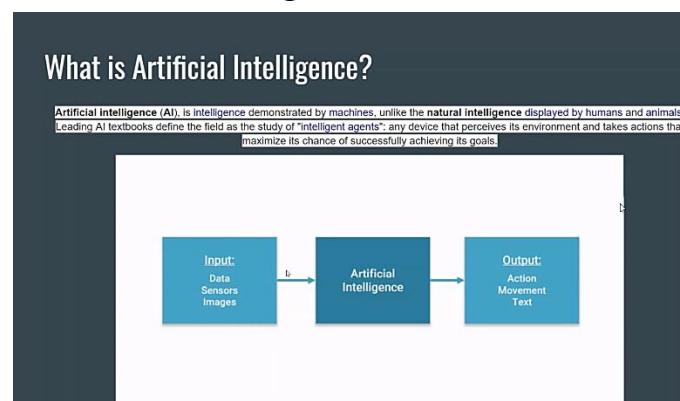
On November 19, 2020 Siddharth Arora (ECE-18) hosted a webinar on “Introduction to AI and AI-Enabled Future”. This webinar was hosted via Google Meet. In this webinar, he demonstrated:

## --What is Artificial Intelligence

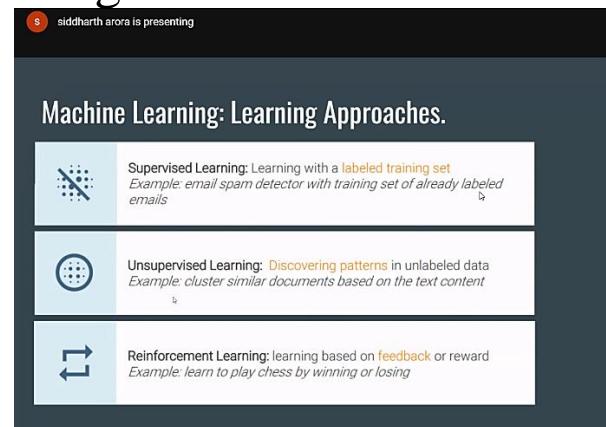
- The term “artificial intelligence” was coined by John McCarthy in 1955.

- 4 parts of AI-enabled future:
  - AI-enhanced organization
  - Autonomous everything
  - Pervasive knowledge
  - Enhancing human experience

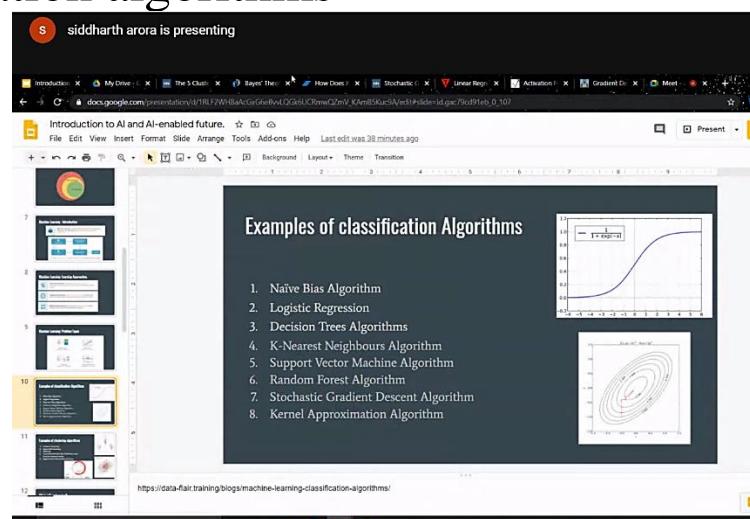
- Webinar Link:  
<https://www.youtube.com/watch?v=MOvWVpEZ0pU>



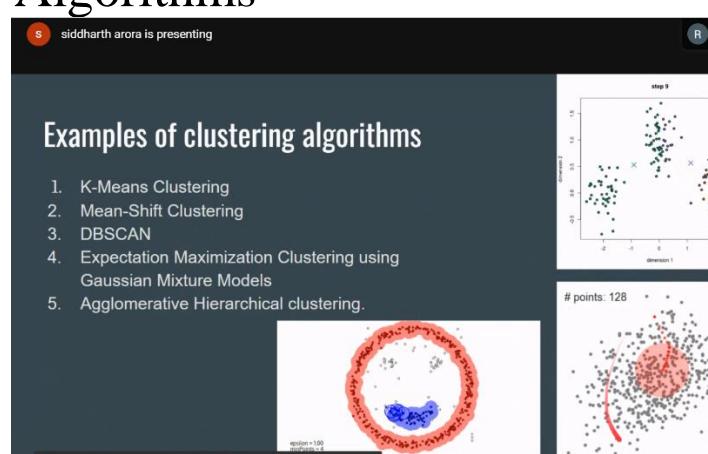
## --Machine Learning

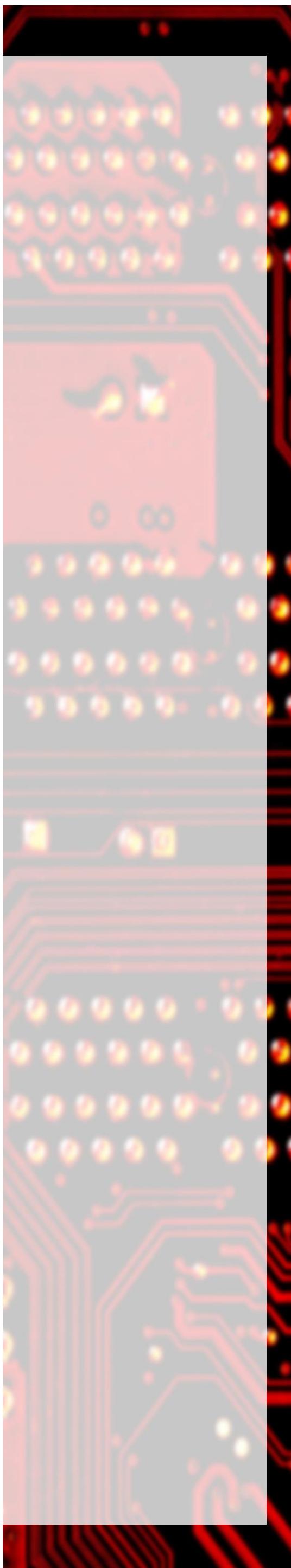


## --Classification algorithms



## --Clustering Algorithms





## GEEK O'PEDIA

“Geek O’Pedia” was a general knowledge technology-based quiz competition conducted by Manya Sah (ECE-19) and Anuj Mehra (CSE-19). Participants were to solve 21 questions in 30 minutes. This competition was conducted online via the ClassMarker platform. The competition covered questions from numerous technical topics. It aimed at encouraging students to expand their technical lore in a fun and engaging method.

6.What was the first mobile game?

Ans.Tetris

7.Which among the following was the first online shopping app?

Ans. Amazon

8.Which programming language is used in free fire?

Ans.Python

9.When was instragram launched?

Ans.6 oct 2010

10.How much did the first 5mb hard drive weigh?

Ans.907.185kg

11.Before being known as PayPal , the company went by the name?

Ans.Confinity

12.Which of these companies invented Ethernet networking?

Ans.Xerox

13.Which was the 1st operator to launch 4g?

Ans.Teliasonera

14.Who was the first Youtuber?

Ans.Jawed Karim

15.Which company sells the most cell phones?

Ans.Samsung

16.Spotify was made by which country?

Ans.Sweden

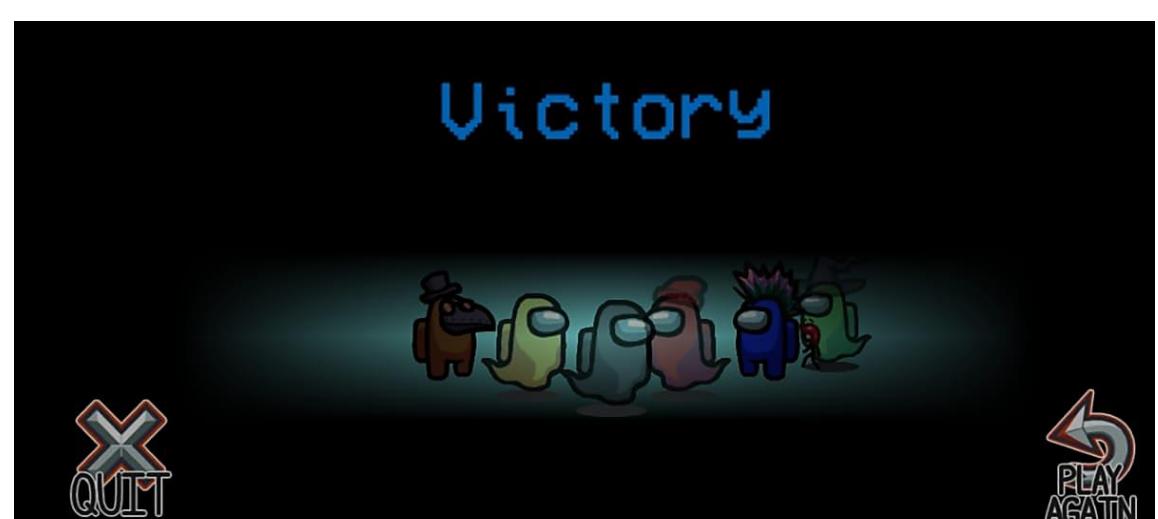
17.Which Apple device was launched in 2001?

Ans. Ipod

■ Some of the questions in Geek O’Pedia

# ESPORT X

“ESport X” was an online gaming event conducted by Manas Tewari (CSE-18), Aditya Joshi (CSE-18), Prithvi Raj Tiwari (ECE-18), Harshit Negi (CSE-18), Som Rawat (CSE-19). The game hosted was “Among Us”. It is a virtual multiplayer social-deduction game developed and published by “Innersloth” (American game studio). The participants got randomly divided into 2-different groups. This game consisted of two rounds moreover the collective score from both rounds determined the top 3 winners.



## ■ Snapshots of the event



# DECEMBER EVENTS

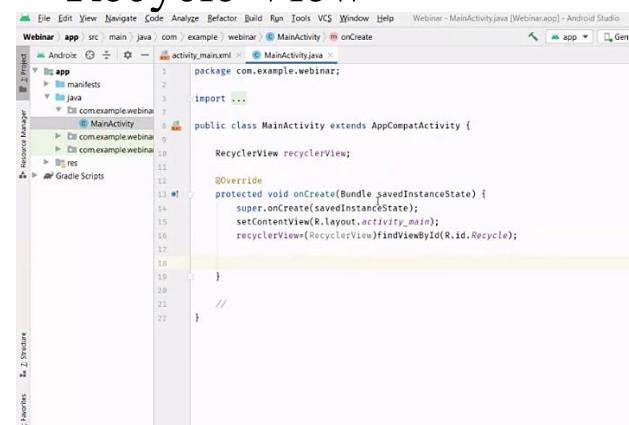
Dates	Event Names
02 Dec 2020	Webinar on Android Development
04 Dec 2020	Webinar on Need of Green Computing
06 Dec 2020	The Insightful: Data Science Quiz
10 Dec 2020	World of Output
11 Dec 2020	Let us C
13 Dec 2020	ESport X
15 Dec 2020	Webinar on Web Development
19 Dec 2020	Debug Your Soul



# ANDROID DEVELOPMENT

On December 02, 2020 Saurav Kumar (CSE-19) hosted a webinar on “Android Development”. This webinar was hosted via Google Meet. In this webinar, he demonstrated:

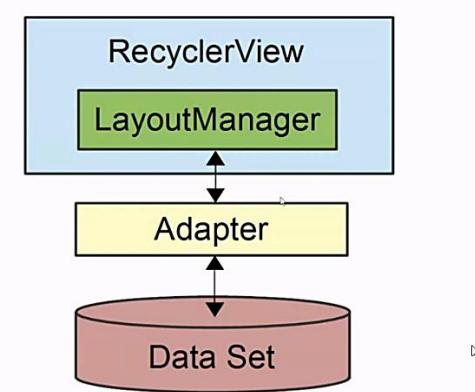
## -- Recycle View



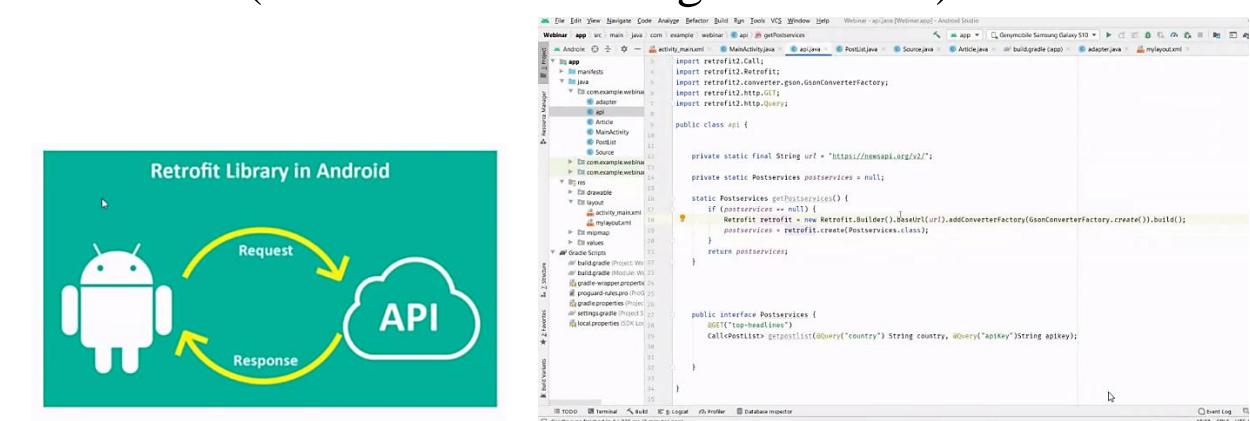
```

public class MainActivity extends AppCompatActivity {
    RecyclerView recyclerView;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        recyclerView=findViewById(R.id.recycle);
    }
}

```



## -- Retrofit (Used for networking in android)



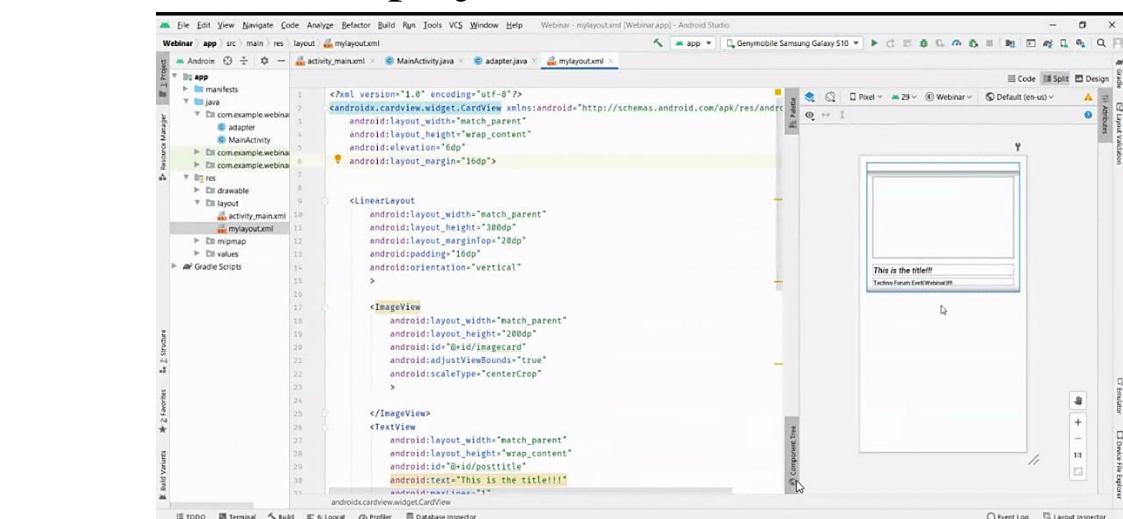
```

private static final String url = "https://newsapi.org/v2/";
private static Postservices postservices = null;
static Postservices getpostservices() {
    if (postservices == null) {
        Retrofit retrofit = new Retrofit.Builder().baseUrl(url).addConverterFactory(GsonConverterFactory.create()).build();
        postservices = retrofit.create(Postservices.class);
    }
    return postservices;
}

public interface Postservices {
    @GET("top-headlines")
    Call<Postlist> getpostlist(@Query("country") String country, @Query("apiKey") String apikey);
}

```

## -- Webview (For projection of the website into the app)



```

<androidx.cardview.widget.CardView xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="300dp"
    android:layout_marginTop="20dp"
    android:padding="10dp"
    android:layout_margin="16dp">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="300dp"
        android:layout_marginTop="20dp"
        android:padding="10dp"
        android:orientation="vertical">

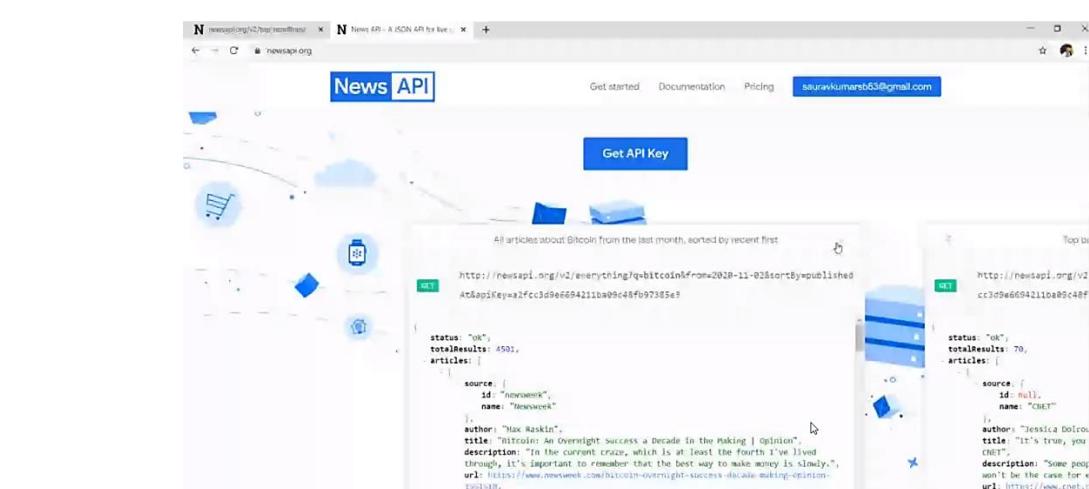
        <ImageView
            android:layout_width="match_parent"
            android:layout_height="200dp"
            android:id="@+id/imagecard"
            android:adjustViewBounds="true"
            android:scaleType="centerCrop"
            >

        </ImageView>
        <TextView
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:id="@+id/posttitle"
            android:text="This is the title!!!"
            android:fontFamily="sans-serif-normal"
            android:gravity="center"
            android:padding="10dp"
            android:textColor="#000000"
            android:textSize="18sp"
            android:typeface="normal"
            >

        </TextView>
    </LinearLayout>

```

## -- APIs



The screenshot shows the News API homepage with a search bar for 'Bitcoin'. Below it, a JSON response is displayed for a search query related to Bitcoin.

```

{
  "status": "ok",
  "totalResults": 4501,
  "articles": [
    {
      "source": {
        "id": "newswatch",
        "name": "newswatch"
      },
      "author": "Max Raskin",
      "title": "Bitcoin: An Overnight Success | Opinion",
      "description": "In the current craze, which is at least the fourth I've lived through, it's important to remember that the best way to make money is slowly.",
      "url": "https://www.newsweek.com/bitcoin-overnight-success-does-making-bitcoin",
      "urlToImage": "https://d.newsweek.com/1011313/1079380/bitcoin1.jpg"
    }
  ]
}

```

This webinar is also available on the official YouTube channel of Technoforum.

# NEED OF GREEN COMPUTING

- One can consider the following aspects when evaluating the applications of green computing in any of the categories of computational systems:

1. Power consumption
2. Heat dissipation
3. Renewable energy resource
4. Cost
5. Minimizing area
6. Reliability
7. Performance

- Webinar Link:  
<https://www.youtube.com/watch?v=hWOKTTLEAVs>

On December 04, 2020, Tanmaya Singh (CSE-19) hosted a webinar on “Need of green computing”. This webinar was hosted via Google Meet platform. This webinar focused on the need for green computing for the future of technological and environmental resources. He also discussed some real-time and researched facts along with concepts such as Virtualization, Carbon Footprint.

Virtualization Maturity	Name	Applications	Infrastructure	Location	Ownership
Level 0	Local	Dedicated	Few	Distributed	Internal
Level 1	Logical	Shared	Few	Centralized	Internal
Level 2	Data Center	Shared	Virtual	Centralized	Internal
Level 3	Cloud	Software as a Service	Virtual	Virtual	Virtual

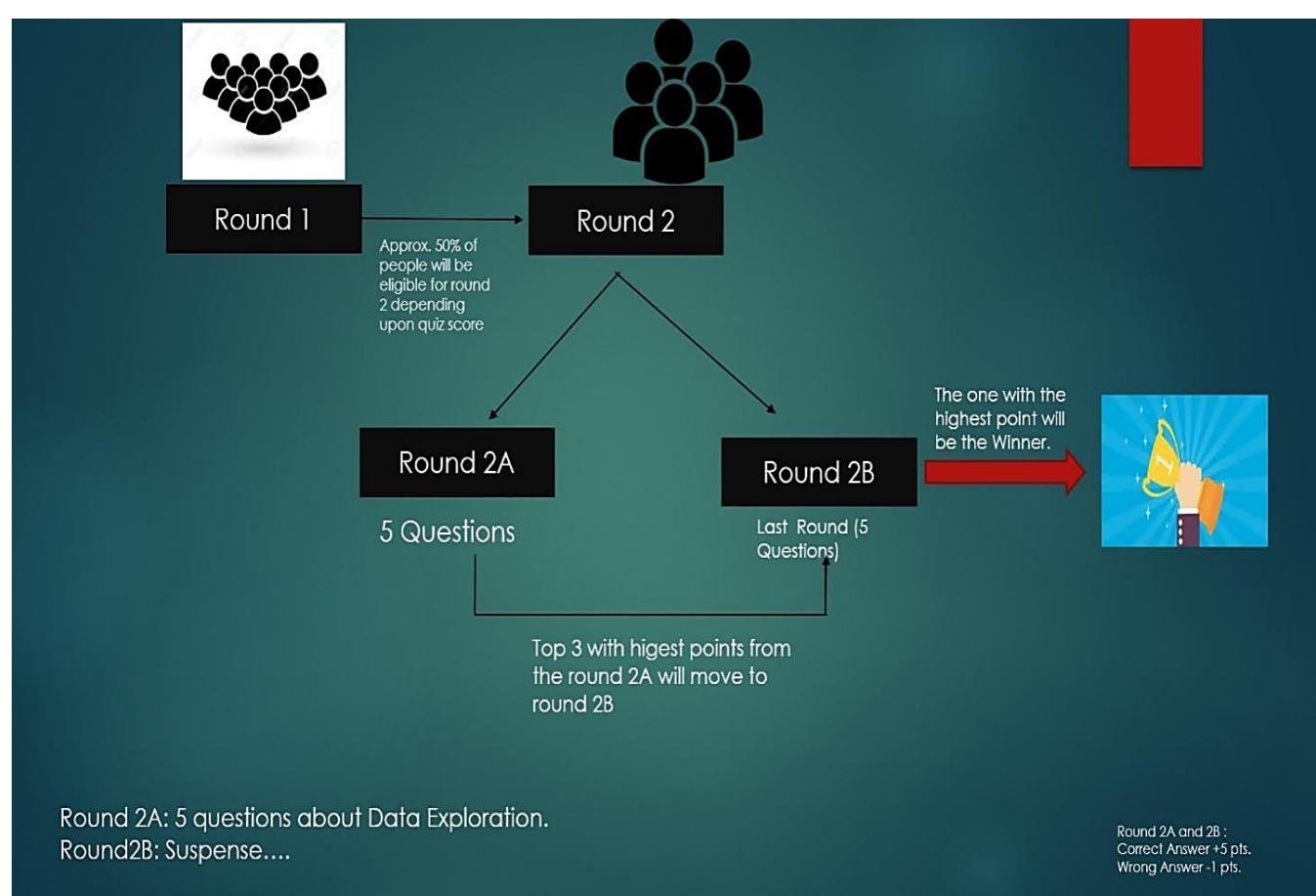
**Blackle Site**

- Blackle is a website powered by Google Custom Search and created by Heap Media, which aims to save energy by displaying a black background and using grayish-white font colour for search results.
- Blackle saves energy because the screen is predominantly black
- Set Blackle as your homepage.

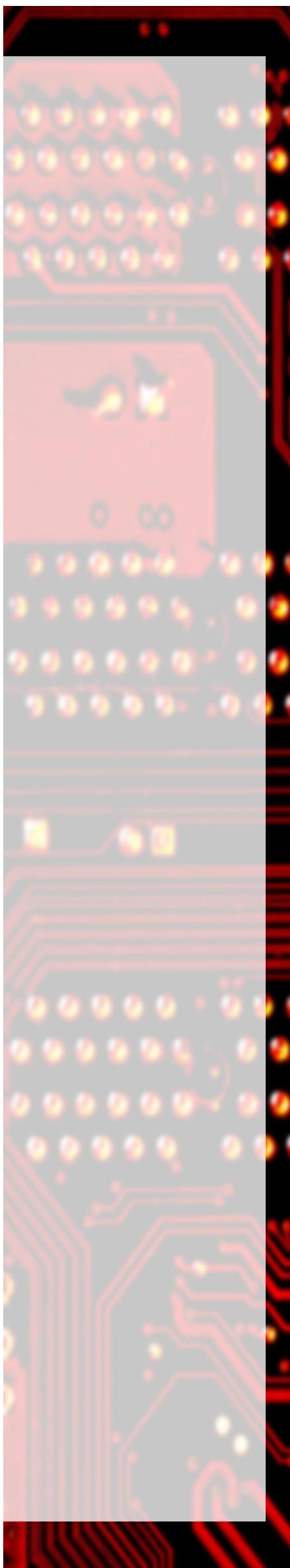
## THE INSIGHTFUL: DATA SCIENCE QUIZ

“The Insightful: Data Science Quiz” competition was conducted by Aditi Sahni (CSE-18) and Aman Singh Bisht (ECE-18). The competition was divided into two rounds. In the first round, participants were to solve a total of 15 questions associated to data science and machine learning in 20 mins. This round was conducted online via Google Forms. The top 50% of the participants were eligible for the second round.

The second round was the buzzer round, in round 2A participants were to answer 5 questions (+5pts for every correct answer and -1pt for every wrong answer) on the topic “Data exploration” and based on the scores, top 30% of the participants were promoted to round 2B. Both the rounds 2A and 2B were conducted on Google Meet. In round 2B, participants were to answer 5 questions and the candidate with a highest score was declared as the winner.



### ■ Framework of the event



## WORLD OF OUTPUT

“World of Output” is a virtual tech competition hosted by Nidhi Sah (CSE-18) and Deepesh Rawat (CSE-18). The competition consisted of two rounds; the first round was a quiz and the second round were of coding. In round 1, participants were to answer 20 questions in 60 minutes. The quiz was conducted via Flexiquiz platform. Participants having maximum score in round 1 were promoted to round 2 where they had to solve a coding problem using any programming language.

- 
- ✓ Question: 3  
Points: 1/1  
In the for loop structure, which statement is present?  
 Assign statement  
 Alter statement  
 Both (a) and (b) ✓  
 None of these
- 
- ✓ Question: 4  
Points: 1/1  
When the computer is waiting for the input?  
 Files are selected  
 The cursor is blinking in the VDU screen ✓  
 Menu will appear on the screen  
 None of these
- 
- ✓ Question: 6  
Points: 1/1  
\_\_\_\_\_ is a picture in which the flows of computational paths are depicted.  
 Algorithm  
 Program  
 Code  
 Flow chart ✓
- 
- ✓ Question: 7  
Points: 1/1  
Among unary operation which operator represents increment?  
 -  
 ++ ✓  
 -  
 !
- 

■ Some of the questions in round 1 of World of Output



## LET US C

“Let us C” was a technical quiz competition conducted by Himadri Tripathi (ECE-19). The questions were based on the C programming language. C is also called as a procedural programming language. It was originally developed by Dennis Ritchie in 1972. C was primarily developed as a system programming language for writing an operating system. The foremost characteristics of C language include low-level memory access, simple set of keywords, and clean style, makes it ideal for compiler development and for programming an operating system. Participants were to solve 15 questions of 2 marks each within 30 minutes. Participants with highest scores were affirmed as the winners. The quiz was conducted using Google Forms.

2. #define is used to:
  - define a variable
  - define a macro
  - define a function
  - define a constant
4. What do you mean by “int (\*ptr)[10]”
  - ptr is an array of pointers to 10 integers
  - ptr is a pointer to an array of 10 integers
  - ptr is an array of 10 integers
  - Invalid statement
5. How to round-off a value “5.77” to 6.0?
  - ceil(5.77)
  - round-off(5.77)
  - round-up(5.77)
  - floor(5.77)
6. Which concept allows you to reuse the written code?
  - Encapsulation
  - Abstraction
  - Inheritance
  - Polymorphism
10. The C language is-
  - A context free language
  - a context sensitive language
  - A regular language
  - Parsable fully only by a Turing machine
11. If an array is used as function argument, the array is passed-
  - By value
  - By reference
  - By name
  - the array cannot be used as a function argument

### ■ Some of the questions in Let Us C



## ESPORT X

“ESport X” was an online gaming event conducted by Manas Tewari (CSE-18), Aditya Joshi (CSE-18), Prithvi Raj Tiwari (ECE-18), Harshit Negi (CSE-18), Som Rawat (CSE-19). The games hosted were “Valorant” and “PUBG”.



Rank	Name	Kills	Team
1	MaSTana	2	14
2	GotUWithPAN	0	14
3	StunOP	2	14
4	Mighty00eagle	0	14
5	AlmightyAbhi	0	14
6	AbduBaderq	0	14
7	DPDuRqEsh	2	14
8	Gerroulous	1	14
9	AmanBisht3	2	14
10	AKPATWAL	1	14
11	AYushjoshi	1	14
12	Kunaljoshi01	0	14
13	AmanBisht3	0	14
14	AKPATWAL	0	14
15	DesTrucToFTW	0	14
16	FalconOPu	0	14
17	PROBTzSartha	0	14
18	trojan8080	0	14
19	Chitkara University	0	14
20	Chitkara University	0	14
21	Chitkara University	0	14
22	Chitkara University	0	14
23	Chitkara University	0	14
24	Chitkara University	0	14
25	Chitkara University	0	14

■ Snapshots of the event



# WEB DEVELOPMENT

On December 15, 2020 Karan Joshi (CSE-19) and Shivani Joshi (CSE-19) hosted a webinar on “Web Development”. This webinar was hosted via Google Meet. In this webinar, they demonstrated:

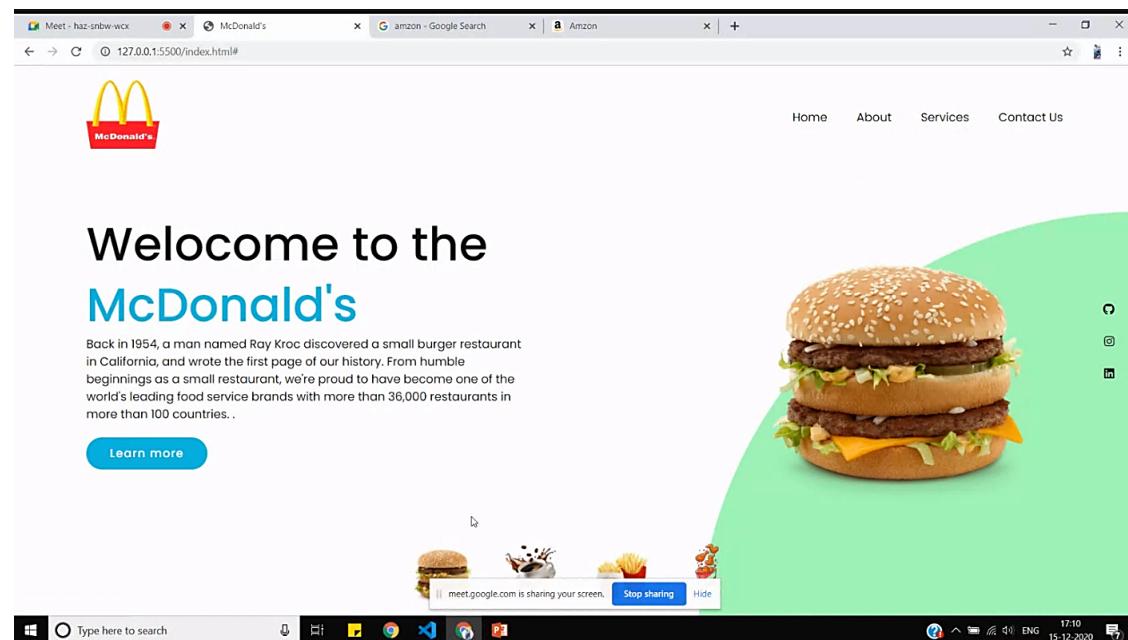
-- how websites are developed

- The website developed as a demonstration in the webinar is already hosted you can check it out using the link given below

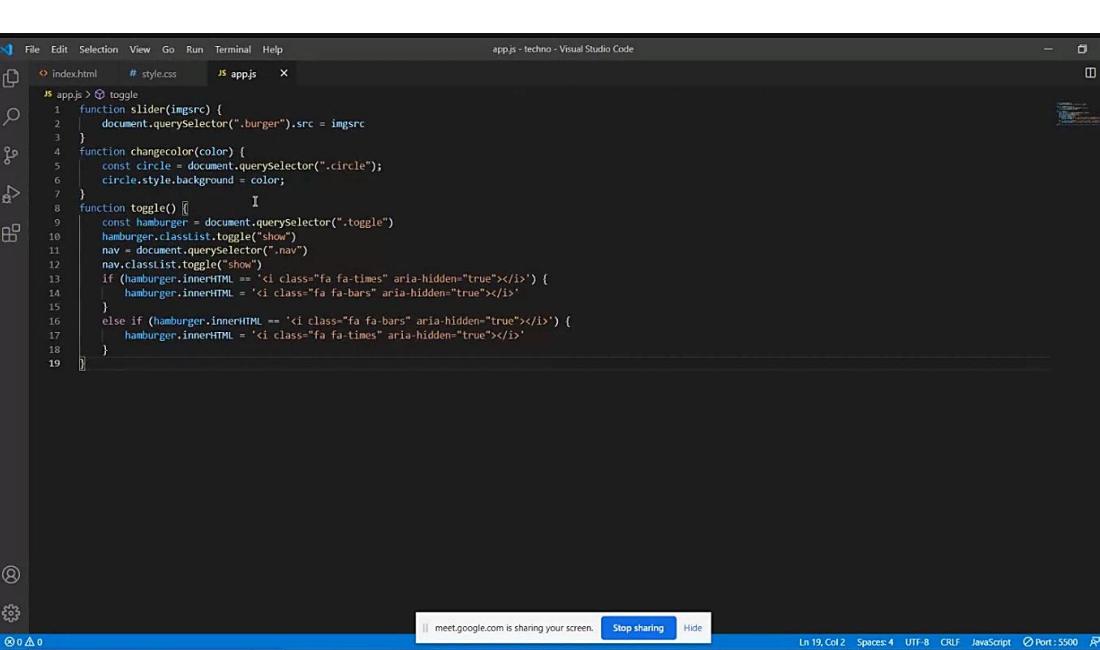
<https://mc-donalds.vercel.app/>

- Source code for the same is  
<https://github.com/karanjoshi1206/MCDonalds>

- Webinar Link:  
<https://www.youtube.com/watch?v=69FFrUx0fV8>



-- frontend and back end of a website



```
File Edit Selection View Go Run Terminal Help
index.html # style.css JS app.js x
app.js - technuo - Visual Studio Code

js app.js toggle
1 function slider(imgsrc) {
2     document.querySelector(".burger").src = imgsrc
3 }
4 function changeColor(color) {
5     const circle = document.querySelector(".circle");
6     circle.style.backgroundColor = color;
7 }
8 function toggle() [
9     const hamburger = document.querySelector(".toggle")
10    hamburger.classList.toggle("show")
11    nav = document.querySelector(".nav")
12    nav.classList.toggle("show")
13    if (hamburger.innerHTML == '<i class="fa fa-times" aria-hidden="true"></i>') {
14        hamburger.innerHTML = '<i class="fa fa-bars" aria-hidden="true"></i>'
15    }
16    else if (hamburger.innerHTML == '<i class="fa fa-bars" aria-hidden="true"></i>') {
17        hamburger.innerHTML = '<i class="fa fa-times" aria-hidden="true"></i>'
18    }
19 ]



meet.google.com is sharing your screen. Stop sharing Hide
Ln 19, Col 2 Spaces:4 UTF-8 CRLF JavaScript Port:5500

```



## DEBUG YOUR SOUL

*Winning is commendable, but participation is pivotal for intellect.*

“Debug Your Soul” was a coding competition conducted by Abhay Dumka (CSE-19) and Durgesh Pandey (ECE-18). This competition was conducted online via HackerRank. Participants were to solve and write the code for the given problem statement in 60 minutes. Participants who passed maximum test cases in the least time got declared as the winner. This competition aimed at providing a platform for students, to not only demonstrate but also develop their coding, analytical and problem-solving skills.

The screenshot shows a computer screen with a HackerRank contest window open. The contest title is "HackerRank - Yahoo India Selection Test". The problem statement is titled "1. WATER BALLOON FALL". It describes a scenario where you have M water balloons and want to find the minimum number of attempts needed to find the critical height for all balloons. The rules include: 1. A water balloon that suffers a fall can be used again. 2. A burst water balloon must be excluded. 3. The effect of a fall is the same for all water balloons. 4. If the water balloon does not burst at a certain height, it will not burst at any height below. 5. If the water balloon bursts at a certain height, it will burst at any height above. The task is to calculate the minimum number of attempts. Example: n=1, k=36. Output: 36. Since we only have one water balloon so we start dropping it from the first floor till it breaks. In the worst case it would break on the 36th floor so the problem would end with output 36. The code editor shows a C++ template for the solution:

```
1 #include <bits/stdc++.h>
2
3 using namespace std;
4
5
6
7
8 int main()
9 {
10     WATERBALLOONFALL();
11
12     return 0;
13 }
14
```

This screenshot shows the same "WATER BALLOON FALL" problem statement and code editor as the previous one, but with different example inputs and outputs. The example now includes n=2 and k=36, with an output of 18. The note states: "Since we have two water balloons so we can start dropping one from below and the other from half the height hence reducing the minimum number of test cases." The problem statement notes that the goal is not to find the critical floor, but merely to decide floors from which water balloons should be dropped so that the total number of trials are minimized.

■ Problem Statement



# Google DSC Events

## Editors

Sumant Biswas (CSE'18)

Shray Dasila (ECE'19)



# GOOGLE DEVELOPER STUDENT CLUB EVENTS

Dates	Event Names
15 Nov 2020	Get it Done with the Experts
05 Dec 2020	Number Theory and Mathematics
06 Dec 2020	Android Study Jams
07-13 Dec 2020	DSC WOW



## GET IT DONE WITH THE EXPERTS

On November 15 2020, the Coding Culture, an initiative by 50+ DSC all across India, collectively organised a webinar on "Get it done with the experts". The webinar was on best practices and learning resources. The webinar was a great success and was flawlessly organised.

It comprised of a panel discussion with: -

- Aanshul Sadaria, A Software Engineer II at Google; Institute Gold Medalist; Patent Holder (Internship at Adobe).
- Kunal Kushwaha, A CNCF Intern | Co-Founder at Code for Cause | MLH Fellowship Team Leader | GSoC Mentor.
- Aarnav Jindal, Google Kickstart top 3 percentile | CodeChef 6 star | CodeForces 1932 | SDE Cure.Fit

## NUMBER THEORY AND MATHEMATICS

On Dec 5 2020, the Coding Culture conducted their first webinar about Number Theory and Mathematics. It gave a better understanding of the topics and a great start towards the Competitive Programming World. The best part of the webinar included resolving every small doubt of every single individual. It was a part of the webinar series which will cover all the topics that are required to be in this competitive programming world.



## ANDROID STUDY JAMS

On December 6, 2020 the first ever session of Android Study Jams was successfully held for the beginners. Later, December 13, 2020 a session was also conducted for intermediates. It was the best opportunity one would ever get to learn android development from scratch.

### What are Android Study Jams?

Android Study Jams are community-organized study groups for people to learn how to build Android apps in the Kotlin programming language, using a curriculum provided by Google.

### What else it had.....!!

- Virtual badges on Google Developers profile on completion of each unit of the course!
- Certificate of Completion signed by facilitators after completion to add to your CV/LinkedIn.
- Selected apps will be showcased in blog format or on social media!
- And Tracks for Android Study Jams!

## DSC WOW

On December 7, 2020 a 7 Day technological celebration, hosted by more than 120 DSC chapters across India started. It mainly had a week-long virtual event consisting of webinars & workshops for five days and the ‘CodeOffDuty’ Hackathon for the last 48 hours.

DSC WOW brought Industry leaders as mentors and college students from all over the country and beyond to compete over 48 hours to develop creative solutions to real-world problems. Multiple prizes and swags were there to keep the competitors motivated.

It included domains like AI/ML, Blockchain, Design Thinking from Googlers, and experts from all over the world! Notable speakers included Miri Rodriguez, Ada Rose Cannon, Rachel Hu, and Mrinal Jain, who gave the insights like never before.

# HORIZON' 21

*coming soon*

*“Strive  
not to be a success,  
but rather to be of value”*

*~Albert Einstein*



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