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St.XAVIER'S CATHOLIC COLLEGE OF ENGINEERING

CHUNKANKADAI, NAGERCOIL 629003

INFOTECHZ 2016

DEPARTMENT OF

INFORMATION TECHNOLOGY

ASSOCIATION OF INFORMATION TECHNOLOGY

BRIGITZ

BRINGS IN

INFOTECHZ

ST.XAVIER'S CATHOLIC COLLEGE OF ENGINEERING

CHUNKANKADAI, NAGERCOIL – 629 003.

EDITORIAL VOICE

It is indeed a great honour to be the Editor for the Newsletter INFOTECHZ and it is an immense pleasure to launch this 19th volume which holds valuable information and modern technologies. I hope INFOTECHZ will cater to the need of IT student community. This has been accomplished through the efforts of our editorial team members. Also INFOTECHZ helps to make great collaboration within the department by sharing ideas. A huge thank to all the persons who contributed writing the wonderful articles, without which there wouldn't have been this newsletter issue. I thank the management, principal and the HOD for their endless support.

Mrs. N. Ansgar Mary

Staff Editor

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BRAINS BEHIND THIS ENDEAVOUR…

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OUR PRESIDENT’S MESSAGE....

Dear BRIGITZ family

I am so happy on hearing that our association is releasing the 19th volume of our technical newsletter INFOTECHZ. I hope this newsletter highlights many latest wonderful achievements that have brought laurels to the department both by students and staff. This newsletter will provide a glimpse of our student achievements in the year 2015-2016.

I thank and congratulate the members of BRIGITZ, and all the Staff who involved in the release of this newsletter.

With regards

Dr.R.P.Anto Kumar

[H.O.D.]

INDEX

ASSOCIATION ACTIVITIES

BRIGITZ started its activities for the year 2015-2016 with an installation ceremony on 10th August 2015 with Dr.R.P. Anto Kumar as the president and Prof.Suja A.Alex as the faculty advisor. The students were enlightened by the valuable seminar on "How to become Industry Ready" presented by the chief guest Ms.M.N.Anushia / Project Engineer,WIPRO Technology.

Third year students had their industrial visit to American University of India at Kodaikanal on 5th to 7th August 2015. The second year students had their industrial visit to Tuticorin Airport on 26th September 2015. The Final year students of our department went on a study tour to Delhi, Agra, Amritsar and Chandigarh on 22nd January to 2nd February 2016.

Our final year students undergone an aptitude training on 8th to 19th June by Face Academy for carreer enhance and an online aptitude test was conducted for final year students on 22nd July by Face academy.

On 16th and 17th July our department organized a workshop on "R-Programming" for PG students by Dr.E. Ben George and we organized a "Electronic Circuit workshop" for third year students on 24th August by Prof.J.Arul King and Prof.E.Christo Elgin Raj.

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Fortunately, a good selection of tools is available to help us mitigate and resolve any issues. Oracle has invested thoroughly in cloud integration and is now able to provide a nice set of advanced capabilities, which we will focus on in this article series. We believe that if we pair these elements with a strong body of knowledge regarding fundamental concepts, design patterns and best practices, we can come up with straightforward approaches for successfully jumping into cloud integration initiatives.

Over the course of four articles, beginning with this introduction, we will emphasize essential cloud computing concepts, integration scenarios, SOA and cloud computing touch points, as well as some hand-picked design patterns for cloud computing architecture. All of the latter will be contextualized within Oracle's cloud universe, highlighting the current capabilities, as well as some others that are identified in the roadmap.

So before anything else, let's start by reviewing the fundamental cloud computing concepts that will be referred to in this series.

Cloud Characteristics

Here are the most important characteristics of a Cloud:

- On-demand usage
- Ubiquitous access
- Multi-tenancy
- Elasticity
- Measured usage Resiliency

**If you're looking for a thorough definition of these concepts, we recommend the following body of knowledge: http://www.whatiscloud.com/*

Delivery Models

Here are the most common delivery models related to cloud computing:

IaaS - Infrastructure as a Service (e.g., Oracle Cloud Infrastructure, Amazon Web Services)

PaaS - Platform as a Service (e.g., Oracle Java Cloud Service, Google App Engine)

SaaS - Software as a Service (e.g., Oracle Taleo, SalesForce.com)

Some of the more sophisticated offerings on the market derive directly from the aforementioned models:

NaaS - Network as a Service (IaaS)

iPaaS - Integration Platform as a Service (PaaS)

DBaaS - Database as a Service (SaaS)

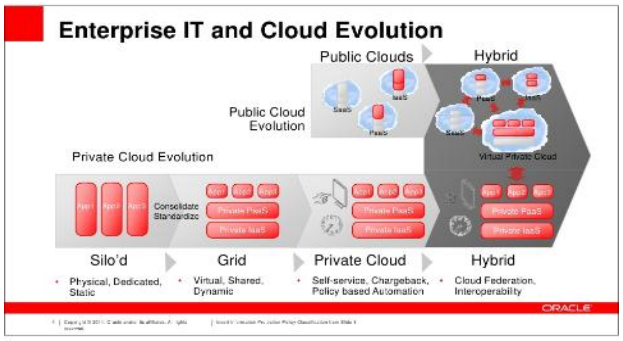
Deployment Models

These delivery models can be deployed and managed in a particular way, depending on access levels, permissions, resource availability, connectivity, security requirements and many other factors that will eventually shape the cloud offering's deployment model of choice:

- **Public Cloud -** Multi-tenancy and resource pooling are maximized, because any cloud-based asset may be shared

among a number of subscribers. Multiple organizations and particulars usually coexist in this model, though each tenant's proprietary information can remain private and secure.

- **Private Cloud** – An organization owns, manages and provides a set of cloud-based resources, which will be ultimately used with diverse purposes by cloud consumers inside itself.
- **Community Cloud** – A group of organizations with a common nature and related goals can put together and manage cloud-based resources in a joint effort. Those resources can be accessed and leveraged only by community members.
- **Hybrid Cloud** – A combination of two or more cloud offerings based on the models described above. Regarding Oracle's Cloud Adoption Strategy, this will be the case of most clients, which only enhances the need for a well-rounded Cloud Integration practice.



Once the theoretical concepts are clear and understood, it is important to identify the unique challenges to be faced when looking to adopt cloud computing technology and incorporate it into an organization's IT ecosystem.

In that context, one of the main focus points should be integration, which automatically brings to the table a lot of questions:

- How do I put this all together and make it work efficiently for the organization's benefit?
- Can the interaction between diverse cloud services/providers be automatized?
- What are the security considerations, and how do we address them?
- How do I go about cloud integration without going through an on-premise platform?
- Are there any mature design patterns and best practices for on-premise to cloud integrations?

All of these questions and many others have clear and very interesting answers, which we will clarify in the upcoming articles that comprise this series; these articles will focus on the following concerns:

- Cloud to Cloud Integration
- On-premise to Cloud Integration (and vice versa)
- Hybrid Integration: Solving complex / sophisticated scenarios.

Personality Profile…

SUNDAR PICHAI - GOOGLE'S CEO

Pichai Sundararajan (born 12 July 1972), better known as **Sundar Pichai** is an Indian American business executive. He is currently the Chief Executive Officer of Google Inc. Formerly Product Chief at Google, Pichai's current role was announced on August 10, 2015, as part of the restructuring process which made Alphabet Inc. into Google's parent company.He assumed the position upon the completion of the process on October 2, 2015.

Early life and education

He was born in Madurai, Tamil Nadu, India, in a Tamil family to Lakshmi and Regunatha Pichai. He spent his childhood in Madras (now Chennai). His father was a senior electrical engineer in General Electric and managed a factory that made electrical components.Sundar grew up in a two-room apartment on 46th Street, 7th Avenue, in Ashok Nagar, Chennai.[13] Sundar completed his Class X at

The Second Most Important Person At Google

Jawahar Vidyalaya, Ashok Nagar Chennai and completed the Class XII from Vana Vani school located in the IIT, Chennai. Pichai earned his degree from Indian Institute of Technology Kharagpur in Metallurgical Engineering. He holds an M.S. from Stanford University in Material Sciences and Engineering and a MBA from the Wharton School of the University of Pennsylvania, where he was named a Siebel Scholar and a Palmer Scholar, respectively.

Career

Pichai speaking at the 2015 Mobile World Congress in Barcelona, Spain. Pichai worked in engineering and product management at Applied Materials and in management consulting at McKinsey & Company.Pichai joined Google in 2004, where he led the product management and innovation efforts for a suite of Google's client software products, including Google Chrome and Chrome OS, as well as being

largely responsible for Google Drive. He went on to oversee the development of different apps such as Gmail and Google Maps. On November 19, 2009, Pichai gave a demonstration of Chrome OS and the Chromebook was released for trial and testing in 2011 and released in public in 2012.On May 20, 2010, he announced the open-sourcing of the new video codec VP8 by Google, and introduced the new video format WebM.

On March 13, 2013, Pichai added Android to the list of Google products he oversees. Android was formerly managed by Andy Rubin. He was rumored to be one of the contenders for the CEO position of Microsoft in 2014. He was a director of Jive Software from April 2011 to July 30, 2013. Pichai was announced as the next CEO of Google on August 10, 2015 after previously being appointed Product Chief by CEO Larry Page on October 24, 2014. He stepped into the new

position upon the completion of the formation of Alphabet Inc., the new holding company for the Google company family.Pichai had been suggested as a contender for Microsoft's chief executive officer

Personal life

He is married to Anjali Pichai, a chemical engineer and same-year classmate at IIT Kharagpur, and has two children.Sundar Pichai is a computer engineer and the current CEO of Google Inc. The technology giant Google, which specializes in Internet-related services and products, underwent a major corporate restructuring in 2015 following which Alphabet Inc was launched as its parent company with co-founders Larry Page as its CEO and Sergey Brin as President. Pichai, who had been serving as Google's head of Products and Engineering, was named the new CEO of Google which is the biggest company under Alphabet Inc. Pichai had joined Google years ago in 2004 as a product manager and led the innovative efforts for several of Google's products including Google Chrome and Chrome OS which went on to become highly successful. Eventually he took over the management of other Google products like Gmail and Google Docs, and rose through the ranks rapidly. Born in Chennai, India, Pichai was bright and creative from a young age. Having received his education from some of the most prestigious institutions in the world, he worked in engineering and product management at Applied Materials and in management consulting at McKinsey & Company before becoming a part of Google. Pichai is well-liked by his colleagues and is dubbed as the "man behind

Google's most important products

Childhood & Early Life

He was born as Pichai Sundararajan on July 12, 1972, in Chennai, Tamil Nadu, India.

Pichai grew up in a middle-class home and was a bright student. He excelled academically at his school, Padma Seshadri Bala Bhavan, and earned a seat in the Indian Institute of Technology in Kharagpur, one of the most prestigious engineering institutions in India.

He did his B.Tech in Metallurgical Engineering from IIT Kharagpur and then won a scholarship to study materials science and semiconductor physics from Stanford University from where he eventually earned his M.S.

Career

He initially planned to pursue a Ph.D. from Stanford and embark on an academic career. However, he dropped out and joined Applied Materials—a Silicon Valley semiconductor maker—as an engineer and product manager.

He did not work there for long.
He went on to complete his MBA from the Wharton School of the University of Pennsylvania (2002), where he was named a Siebel Scholar and a Palmer Scholar.

Following the completion of his MBA he was appointed as a management consultant at McKinsey & Company.
He joined Google in 2004. Initially he worked on Google's search toolbar as a part of a small team. The toolbar gave users of Internet Explorer and Firefox easy access to Google search.

He also worked on other Google products like Google Gears and Google Pack. The success of Google's toolbar gave Pichai the idea that Google should develop its own browser. He discussed his idea with his seniors and faced an objection from then-CEO Eric Schmidt, who thought that developing a browser would be a too expensive affair.

However, Pichai persevered and convinced the co-founders of Google, Larry Page and Sergey Brin, to launch Google's own browser. Pichai played a pivotal role in the ultimate launch of the browser, Google Chrome, in 2008. Chrome proved to be a great success as it allowed the users to directly access Google's search engine.

Pichai became an internationally known figure following the phenomenal success of the Chrome which eventually became the No. 1 browser in the world, surpassing competitors such as Internet Explorer and Firefox. The Chrome also paved

the way for a series of other important products like Chrome OS, Chromebooks, and Chromecast.

In 2008, Pichai was promoted to Vice President of product development. In this position he started appearing more often at Google presentations and continued rising up the ranks in Google. By 2012, he had become the Senior Vice President of Chrome and apps.

In 2013, Andy Rubin, the creator of Android, left to work on a different project. Larry Page then made Pichai in-charge of Android as well. His influence continued to increase and he was made the Product Chief in October 2014.

In 2015, Google formed a company, Alphabet Inc., to serve as a holding company and conglomerate to own the subsidiaries that were previously owned by Google, including a new “slimmed down” version of Google itself. On 10 August 2015, Sundar Pichai was named the new CEO of Google.

In February 2016, he was awarded 273,328 shares of Google's holding company Alphabet, which led to a rise in his net worth. These shares were worth $199 million, and this took his holdings up to $650 million.

Major Works

An engineering genius known for his innovative ideas, Sundar Pichai is best known as the mastermind behind the launch of the Chrome browser in 2008. He played a pivotal role in convincing his seniors at Google to launch the browser which in time became the most popular browser on the internet and also led to the launch of the Chrome operating system.

Net Worth

Sundar Pichai has an estimated net worth of $650 million

21 Unusual Facts About Sundar Pichai, Google's Surprise New CEO

Larry Page just announced that Google has become part of a new parent company called Alphabet Inc. As part of the deal, Google's iconic co-founders Page and Sergey Brin stepped out of their roles within Google, appointing Sundar Pichai CEO.

But who is he?

Here are 21 facts you may not know about Google's surprise new CEO:

With this reorganization of Google/Alphabet Inc., Pichai will control: search, ads, maps, the Google Play Store, YouTube, and Android.
In February 2014, Pichai was rumored to be in active negotiations with

Microsoft to become that tech giant
His colleagues tell Bloomberg that Pichai tends to walk it out when he's deep in thought. It's not unusual for him to wander away in the middle of a meeting, only to return with the solution to whatever problem is being discussed.

Born in Chennai in the state of Tamil Nadu, India, in 1972, Sundar's full name is Pichai Sundararajan. Though he had a modest upbringing, he's now worth a reported $150 million.

His father, an electrical engineer, had to save for three years to buy the family a new scooter, but made sure Pichai and his brother had the best education the family could afford, at Padma Seshadri Bala Bhavan.

Pichai's father told Bloomberg he believes that talking to young Sundar about the challenges in his work as an electrical engineer led to his son's interest in technology.

Pichai was captain of his high school cricket team before earning his bachelor of engineering degree from the Indian Institute of Technology; his MS from Stanford; and an MBA from the Wharton School of the University of Pennsylvania. When Sundar won a scholarship to Stanford, his father withdrew more than his annual salary from the family's savings to fly him to the United States.
Prior to joining Google, he did management consulting with McKinsey & Company.

Pichai has been with Google since 2004, when he joined to lead product management for Google Chrome and Chrome OS. He was involved with Google Drive and went on to oversee Gmail and Google Maps, as well.

In 2011, Pichai drew attention when he was considered to lead product and replace Jason Goldman at Twitter. He chose to stay with Google.

In 2013, Pichai took over Android founder Andy Rubin's portfolio to run mobile platforms. He was also entrusted with wooing more than a billion global users to the Android ecosystem.

According to *Business Insider*, Pichai was skilled at staying out of politics and drama at Google. When he reported to Marissa Mayer, he reportedly sat outside her office for hours, if necessary, to make sure his team had good performance reviews.
When he was almost lured away to Microsoft, Google reportedly
negotiated desperately to retain Pichai for $50 million a year in stocks.
Pichai was on the board of advisors for

Ruba Inc. and was a director of Jive Software In "Android One," Pichai's pet project designed to provide affordable smartphones in all households worldwide, launched in India in September 2014.

Though he was just appointed CEO of Google, Pichai has effectively been responsible for day-to-day operations at Google since October 2014.

Pichai had been Page's right-hand man for some time and is credited with trying to convince WhatsApp founder Jan Koum not to sell to Facebook. He also helped Page convince Nest's Tony Fadell to merge his company with the Google team, among other things.

Dieter Bohn at The Verge describes Pichai's office as "clean to the point of being spartan" and noted that this simplicity was reflected in his demeanor.

Now married to his love Anjali, whom he dated in India before she joined him in the United States, Pichai is the father of two.

Pichai is known for his soft-spoken, diplomatic nature. In 2013, he accompanied Larry Page and Google CBO Nikesh Arora to tour a Samsung factory in South Korea to help build Google's relationship with its partner.

Pichai has an unusual gift that seemed little more than a curiosity to him when he was a child, but has served him incredibly well in adulthood: he has insane numerical recall and can remember every number he's ever dialed.

Company Profile…

Infosys Technologies Ltd.

History

Infosys was co-founded in 1981 by CEO Narayan Murthy, Nandan Nilekani, N. S. Raghavan, S. Gopalakrishnan, S. D. Shibulal, K. Dinesh and Ashok Arora after they resigned from Patni Computer Systems. The company was incorporated as "Infosys Consultants Pvt Ltd." with a capital of 10,000 or US$1,250 (equivalent to about $3,254 in 2015) in Model Colony, Pune as the registered office. It signed its first client, Data Basics Corporation, in New York.In 1983, the company's corporate headquarters was relocated from Pune to Bangalore.

Change in name

The company changed its name to "Infosys Technologies Private Limited" in April 1992 and to "Infosys Technologies Limited" when it became a public limited company in June 1992. It was later renamed to "Infosys Limited" in June 2011.

An initial public offer (IPO) in February 1993 with an offer price of 95 (equivalent to 320 or US$4.70

in 2013) per share against book value of 20 (equivalent to 66 or 98¢ US in 2013) per share. The Infosys IPO was under subscribed but it was "bailed out" by US investment bank Morgan Stanley which picked up 13% of equity at the offer price.Its shares were listed in stock exchanges in June 1993 with trading opening at 145 (equivalent to 480 or US$7.10 in 2013) per share.

In October 1994, it made a private placement of 5,50,000 shares at 450 (equivalent to 1,400 or US$20 in 2013) each against book value of 10 (equivalent to 31 or 46¢ US in 2013) per share to Foreign Institutional Investors (FIIs), Financial Institutions (FIs) and Corporates.

In March 1999, it issued 2,070,000 ADSs (equivalent to 1,035,000 equity shares of par value of 10 (equivalent to 22 or 33¢ US in 2013) each) at US$34 (equivalent to $48.3 in 2015) per ADS

under the American Depositary Shares Program and the same were listed on the NASDAQ National Market in US. The total issue amount was US$70.38 million.

The share price surged to 8,100 (equivalent to 18,000 or US$260 in 2013) by 1999 making it the costliest share on the market at the time. At that time, Infosys was among the 20 biggest companies by market capitalization on the NASDAQ.

During July 2003, June 2005 and November 2006, it made secondary ADS issues of US$294 (equivalent to $378.19 in 2015) million, US$1.07 (equivalent to $1.3 in 2015) billion and US$1.605 (equivalent to $1.88 in 2015) billion respectively.

In December 2002,Infosys transferred the listing of its American Depositary Shares (ADS) from the NASDAQ to the NYSE.

In July 2014, Infosys spun off a subsidiary, Edgeverve Systems Ltd., focusing on enterprise software products for business operations, customer service, procurement and commerce network domains.

In August 2015, Finacle joins Edgeverve product portfolio.

The credit rating of the company is A- (given by Standard & Poor's on 13-Dec-2013). In February 2015, Infosys announced it would acquire the US automation technology company Panaya for around $200 million.

Infosys Foundation

In 1996, Infosys established the Infosys Foundation, to support the underprivileged sections of society. At the outset, the Infosys Foundation implemented many programs in Karnataka. It subsequently covered Tamil Nadu, Telangana, Andhra Pradesh, Maharashtra, Odisha, and Punjab in a phased manner. A team at the Foundation identifies all the programs in the areas of Healthcare, Education, Culture, Destitute Care and Rural Development.

Employees

Infosys has a total of 193,383 employees as of 15 January 2016, of which 35% were women. Its workforce

consists of employees representing 122 nationalities working from 32 countries (37 countries as per the base location). Out of its total workforce, 93.8% are softwareprofessionals.

Staff Column….

5G Technology

-J. Arul king,
Asst.professor,
IT dept.

INTRODUCTION

If you take a stroll outside today, you'll see a lot of people with mobile phones, phablets or tablets in their hands making calls, using the internet to catch up on the news, watch videos, or interacting with others via Facebook, Tumblr or Twitter including you. In doing so, we all are using a mobile data network. Many of these applications particularly video consume a lot of bandwidth, so telecommunications companies across the world always try to talk about upgrading to the latest generation of mobile data to help speed things up. As we approach 2020 it is likely that there will be more than 50 billion connected devices worldwide and The Internet of Things will no longer be something we think about but will be all around us. Everything from home appliances to our cars will be connected to the network, and

5G is being designed and built with this in mind. 5G is not just a mobile technology, its ubiquitous access to high & low data rate services. The technology is still a long way from becoming a reality, but it has the potential to completely change the way we interact with wireless devices, from the smartphones in our pockets to the cars we drive.

Not only will more devices be connected to the 5G network than we've ever imagined, but the network will do everything better than 4G. This includes providing the capability and capacity for high resolution video streaming such as ultra-high definition 4K video. Privacy and security are also key considerations, so 5G will include extra capabilities to ensure that customer information is protected and our devices are harder to hack.

Battery life is essential aspect of our mobile connectivity. The target for 5G networks is handsets, phablets, tablets and other devices with five times the battery life of existing 4G devices. Imagine not having to recharge for a couple of days or being able to watch a couple of movies without having to find a power outlet to plug into.

FEATURES OF 5G TECHNOLOGY

1. 5G technology offer high resolution for crazy cell phone user and bi-directional large bandwidth shaping.

2. The advanced billing interfaces of 5G technology makes it more attractive and effective.

3. 5G technology will be also providing subscriber supervision tools for fast action.

4. The high quality services of 5G technology based on Policy to avoid error.

5. 5G technology will be providing large broadcasting of data in Gigabit which supporting almost 65,000 connections.

6. 5G technology offer transporter class gateway with unparalleled consistency.

7. The traffic statistics by 5G technology makes it more accurate.

8. Through remote management offered by 5G technology a user can get better and fast solution.

9. The remote diagnostics is also a great feature of 5G technology.

10. The 5G technology will be providing up to 25 Mbps connectivity speed.

11. It will be globally accessible.

12. It will be having 6th sense technology.

13. The 5G technology also support virtual private network.

14. The new 5G technology will take all delivery service out of business prospect.

15. The uploading and downloading speed of 5G technology will be touching the peak.

16. The 5G technology network offering enhanced and available connectivity just about the world.

SPECIFICATIONS

Although the standards bodies have not yet defined the parameters needed to meet a 5G performance level yet, other organizations have set their own aims, that may eventually influence the final specifications.

Typical parameters for a 5G standard may include:

PARAMETER	SUGGESTED PERFORMANCE
Network capacity	10 000 times current network
Peak data rate	10 Gbps
Cell edge data rate	100 Mbps
Latency	< 1 ms

CURRENT RESEARCH

There are several key areas that are being investigated by research organizations. These include:

Millimeter-Wave technologies - Using frequencies much higher in the frequency spectrum opens up more spectrum and also provides the possibility of having much wide channel bandwidth , possibly 1 - 2 GHz. However this poses new challenges for handset development where maximum frequencies of around 2 GHz and bandwidths of 10 - 20 MHz are currently in use. For 5G, frequencies of above 50GHz are being considered and this will present some real challenges in terms of the circuit design, the technology, and also the way the system is used as these frequencies do not travel as far and are absorbed almost completely by obstacles.

Future *PHY / MAC* - This area presents many possibilities from the use of new modulation formats including GFDM, Generalized Frequency Division Multiplexing, as well as FBMC, Filter Bank Multi-Carrier, UFMC, Universal Filtered Multicarrier and other schemes to the management of the multiple access schemes. All these need to be developed. Higher levels of processing that will be available by the time 5G is launched mean that multicarrier systems will not require to be orthogonal as in the case of OFDM. This provides considerably more flexibility.

Massive MIMO- Although MIMO is being used in many applications from LTE to Wi-Fi, etc., the numbers of antennas is fairly limited, Using microwave frequencies opens up the possibility of using many tens of antennas on single equipment becomes a real possibility because of the antenna sizes and spacing in terms of a wavelength.

Dense networks- Reducing the size of cells provides a much more overall effective use of the available spectrum. Techniques to ensure that small cells in the macro-network and deployed as femto cells can operate satisfactorily are required.

Pervasive *networks*- This technology being considered for 5G cellular systems is where a user can concurrently be connected to several wireless access technologies and seamlessly move between them.

Group cooperative relay- This is a technique that is being considered to make the high data rates available over a wider area of the cell. Currently data rates fall towards the cell edge where

interference levels are higher and signal levels lower.

Cognitive radio technology- If cognitive radio technology was used for 5th generation, 5G cellular systems, then it would enable the user equipment / handset to look at the radio landscape in which it is located and choose the optimum radio access network, modulation scheme and other parameters to configure it to gain the best connection and optimum performance.

Comparison of 4G and 5G

what will 5G allow us to do that we can't right now with 4G? To provide a little more context around how much faster 5G speeds will be compared to 4G, let's go back to the video example I mentioned at the beginning. According to Huawei, 5G will allow us to download an eight gigabyte HD movie in six seconds versus the seven minutes it would take over 4G or more than an hour on 3G.

But 5G is much more than just faster data speeds on our mobile devices. It also opens the door to a lot of different consumer and industrial applications and uses, some of which seem unbelievable now because they're so futuristic.

For example, Ulrich Dropmann, head of industry environment networks at Nokia, gave a scenario where we might be cruising in our driverless car when, unbeknownst to us, a crash has just occurred up the road. With 5G, sensors placed along the road would be able to instantly relay that information back to our car (this is where having low latency is important), so it could brake earlier and avoid another accident. At MWC (MWC is an annual event in Barcelona where the wireless industry comes together to show off the latest devices and technologies.), Ericsson showed how 5G could be used to control heavy machinery from a remote location. Inside the booth, attendees strapped on an Oculus Rift headset and were able to remotely control one of two real diggers to move dirt either outside the conference hall or one thousands of miles away in Sweden.

CHALLENGES FOR 5G-

Standardization- One of the big challenges facing 5G is standardization. There are already multiple groups working to come up with standards around interoperability, backward compatibility with older technologies (4G, 3G), and making sure the network will be future-proof. While many companies agree that a global standard is needed, whether they'll be able to come together and agree on one is another story.

Infrastructure - Building the infrastructure for 5G is also a huge task, with issues around spectrum and installing new antennas. 5G is likely going to rely, at least in part, on higher-frequency bands. There is more space in those airwaves available, but at such high frequencies, signals can't travel nearly as far as they can over the frequencies used for 4G, resulting in a poor connection.

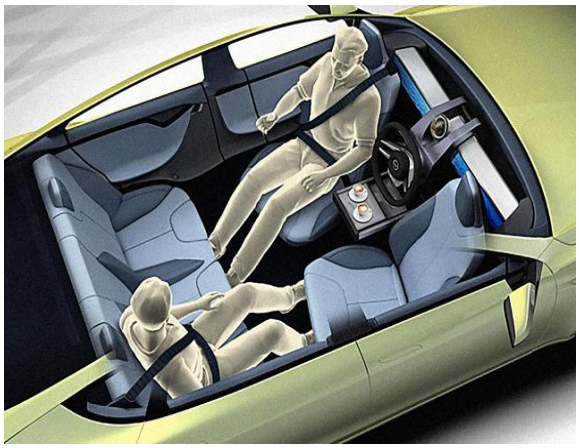
One major enabler for 5G will be the release of frequency spectrum and this need to be managed on a global scale to ensure commonality and also the reduction of interference between services, especially those operating globally. This process is managed under the auspices of the International Telecommunications Union, ITU.Obstacles like buildings and trees and even bad weather can also cause interference, according to Nokia's Dropmann. To offset that, carriers will need to install more base stations to ensure better coverage, and use antenna technologies like MIMO (multiple-input and multiple-output).

STUDENT ARTICLES

Self-Driving Cars

-Shylu

Third Yr IT



It is the year 2023, and for the first time, a self-driving car navigating city streets strikes and kills a pedestrian. A lawsuit is sure to follow.

The law now assumes that a human being is in the driver's seat, which is why Google's professional drivers and Tesla owners are supposed to keep their hands near the wheel and their eyes on the road. That makes the vehicles street legal for now, but it doesn't help speed the rollout of fully autonomous vehicles. It is possible to make changes to the laws that govern the roads and the infrastructure, and those could go a long way toward making driverless cars the rule instead of the rare exception.

No matter how the laws and infrastructure evolve and how smart the cars become, bad things will still happen and manufacturers will end up in court.

For now, the legal landscape is a hodgepodge. European regulators have allowed limited tests of self-driving cars and even tractor-trailors. The United Kingdom authorized testing starting last year and has begun reviewing road regulations to figure out how to eventually allow a fully autonomous shuttle.Japan allowed its first road test of an autonomous car in 2013.

The United States' National Highway Traffic Safety Administration has been carefully watching the technology and is generally endorsing it, stating.

We can't put off changing the laws until the advent of robotic driving, because today's laws leave a lot of room for uncertainty, and uncertainty stalls progress. A car company can't be expected to invest in putting out a new fleet of autonomous cars when it could be forced to pull them all off the road after the first accident. We won't have truly autonomous cars on the road until this gets sorted out.

Volvo recently announced that it would take the blame if "any of its self-driving cars crashes in autonomous mode."

Although that may sound like a big deal, it doesn't represent progress. Under current U.S. law, Volvo would most likely take the blame anyway.

Most legal scholars think that an accident will lead to a major design-defect lawsuit. That worries the car companies for several reasons.

First, it's expensive no matter who wins. A multimillion-dollar legal case is nearly a certainty when new, complex driving systems involving millions of lines of source code are involved.

Second, the outcome of that case is hard to predict. Generally, the key question in a product liability lawsuit is whether the product had a "defective condition" that was "unreasonably dangerous." This often involves determining whether the product designer could have made the product safer at an acceptable cost.

Third, a lawsuit can lead to a recall. A legal determination that a design is defective, caused an accident, and will likely cause another can be a powerful incentive for a recall.

Finally, punitive damages can come into play. Punitive damages are generally available in the United States for outrageous conduct in designing or manufacturing a defective product.

Because of the risk of lawsuit, the potential legal costs faced by manufacturers of autonomous vehicles are higher than the costs faced by human drivers..

The solution to the lawsuit problem is actually pretty simple. To level the playing field between human drivers and computer drivers, we should simply treat them equally. Instead of applying design-defect laws to computer drivers, use ordinary negligence laws. That is, a computer driver should be held liable only if a human driver who took the same actions in the same circumstances would be held liable. The "mind" of the computer driver need not be examined any more than a human's mind should be. The robo-driver's private "thoughts" need not be parsed. Only its conduct need be considered.

That approach follows basic principles of negligence law. As Dobbs's *Law of Torts* explains: "A bad state of mind is neither necessary nor sufficient to show negligence; conduct is everything. One who drives at a dangerous speed is negligent even if he is not aware of his speed and is using his best efforts to drive carefully. Conversely, a person who drives without the slightest care for the safety of others is not negligent unless

he drives in some way that is unreasonably risky. State of mind, including knowledge and belief, may motivate or shape conduct, but it is not in itself an actionable tort"—that is, wrongful conduct.

As the safety of autonomous vehicles improves and as legal costs become more predictable, stricter safety standards could be imposed to encourage further progress. Self-driving cars would shield manufacturers from excessive financial risk while compensating accident victims no less than they are today. With such predictability, it is likely that self-driving car manufacturers would pay about the same for insurance per vehicle as an average human driver does. Insurance costs could even be lower because the self-driving car would qualify for all the "good driver" discounts.

Public policy is holding back self-driving cars in another way—it influences the design of the roads and the way they are governed based on the needs of drivers that "see." The rules require that we stop on red, yield when we see a triangle-shaped sign, and obey metering lights at freeway entrances. That's easy and intuitive for humans, not so easy for machines. Today's autonomous vehicles recognize objects with a combination of object tracking using distance and velocity and object recognition .

There's a reason to speed the rollout of autonomous vehicles. By replacing error-prone human drivers, autonomous driving technology can potentially save 30,000 lives each year in the United States alone. It can annually prevent 5 million accidents and 2 million injuries, conserve 7 billion liters of fuel, and save so many hundreds of billions of dollars in lost productivity and accident-related costs.

That's because computer drivers are in principle fundamentally safer drivers. They never text, do their makeup, or fall asleep at the wheel. Robo-drivers can have 360-degree vision, they can see through fog and in the dark.

Computer drivers can have "telepathy": A computer driver could let another computer driver know that it is considering changing lanes before making the decision to do so. It could communicate with traffic lights to minimize wait times at intersections and optimize traffic flow.

Computer drivers react faster.And, finally, computer drivers have the potential to accumulate far more wisdom than any human.

When self-driving cars do succeed, the

effect will be widespread. And they will succeed, despite having two giant thumbs on the human side of the scale—the stacked deck of liability rules and the transportation infrastructure that relies on vision rather than other means of communication. Then a host of new social and legal issues will emerge.

Paper battery

-Ajith

Final Yr IT

A **paper battery** is an electric battery engineered to use a spacer formed largely of cellulose (the major constituent of paper). It incorporates nanoscale structures to act as high surface-area electrodes to improve conductivitiy.

Advantages

The composition of these batteries is what sets them apart from traditional batteries. Paper is abundant and self-sustaining, which makes paper cheap. Disposing of paper is also inexpensive since paper is combustible as well as biodegradable. Using paper gives the battery a great degree of flexibility. The battery can be bent or wrapped around objects instead of requiring a fixed casing. Also, being a thin, flat sheet, the paper battery can

easily fit into tight places, reducing the size and weight of the device it powers. The use of paper increases the electron flow which is well suited for high performance applications. Paper allows for capillary_action so fluids in batteries, such as electrolytes, can be moved without the use of an external pump

Disadvantages

Although the advantages of paper batteries are quite impressive, many of the components that make them great, such as carbon__nanotubes and pattering, are complicated and expensive.

Electrolytes

This cellulose based spacer is compatible with many possible electrolytes. Researchers used ionic_liquid, essentially a liquid salt, as the battery's electrolyte, as well as naturally occurring electrolytes such as human sweat, blood and urine. Use of an ionic liquid, containing no water, would mean that the batteries would not freeze or evaporate, potentially allowing operation in extreme temperatures.

Potential applications

The paper-like quality of the battery combined with the structure of the nanotubes embedded within gives them light weight and low cost, offering potential for portable electronics, aircraft, automobiles and toys (such as model aircraft).

The batteries employ nanotubes, potentially slowing commercial adoption due to excessive cost. Commercial adoption also requires larger devices. E.g., a newspaper-sized device could be powerful enough to power a car.

Electrochemical Batteries

Electrochemical batteries can be modified to integrate the use of paper. An electrochemical battery typically uses two metals, separated into two chambers and connected by a bridge or a membrane which permits the exchange of electrons between the two metals, thereby producing energy. Paper can be integrated into electrochemical batteries by depositing the electrode onto the paper and by using paper to contain the fluid used to activate the battery. Paper that has been patterned can also be used in electrochemical batteries. This is done to make the battery more compatible with paper electronics. These batteries tend to produce low voltage and operate for short periods of time, but they can be connected in series to increase their output and capacity. Paper batteries of this type can be activated with bodily fluids which makes them very useful in the healthcare field such as single-use medical devices or tests for specific diseases.

Lithium-ion Batteries

Paper can be used in lithium-ion batteries as regular, commercial paper, or paper enhanced with single-walled carbon nanotubes. Enhanced paper is used as the

electrode and as the separator which results in a sturdy, flexible battery that have great performance capabilities such as good cycling, great efficiency, and good reversibilityA carbon nanotube and silver nanowire film can be used to coat regular paper to create a simpler and less expensive separator and battery support. The resulting battery performs well, while simplifying the manufacturing process and reducing the cost. Lithium-ion paper batteries are flexible, durable, rechargeable, and produce significantly more power than electrochemical batteries.The pores in the paper allow the electrons to travel easily while preventing the anode and the cathode from being in contact with one another. This translates into greater output, battery capacity and cycle stability; these are improvements to conventional Li-S batteries. The carbon paper is made from pyrolyzed filter paper which is inexpensive to make and performs like multi-walled carbon nanotube paper used as a battery.

Biofuel Cells

Biofuel cells operate similarly to electrochemical batteries, except that they utilize components such as sugar, ethanol, pyruvate, and lactate, instead of metals to facilitate redox reactions to produce electrical energy. Enhanced paper is used to contain and separate the positive and negative components of the biofuel cell. This paper biofuel cell started up much more quickly than a conventional biofuel cell since the porous paper was able to absorb the positive biofuel and promote the attachment of bacteria to the positive biofuel.

Supercapacitors

Paper battery technology can be used in supercapacitors. Supercapacitors operate and are manufactured similarly to electrochemical batteries, but are generally capable of greater performance and are able to be recharged. Paper, or enhanced paper can be used to develop thin, flexible supercapacitors that are lightweight less expensive. Paper that has been enhanced with carbon nanotubes is generally preferred over regular paper because it has increased strength and allows for easier transfer of electrons between the two metals.

Nanogenerators

Nanogenerators are a more recent device that convert mechanical energy to electrical energy. Paper is desirable as a component of nanogenerators for the same reasons discussed above. Such devices are able to capture movement, such as body movement, and convert that energy into electrical energy that could power LED lights.

Smart Note Taker

-Shyni David

Final Yr IT

The Smart NoteTaker is such a helpful product that satisfies the needs of the people in today's technologic and fast life. This product can be used in many ways. The Smart NoteTaker provides taking fast and easy notes to people who are busy one's self with something. With the help of Smart NoteTaker, people will be able to write notes on the air, while being busy with their work. The written note will be stored on the memory chip of the pen, and will be able to read in digital medium after the job has done. This will save time and facilitate life.

The Smart NoteTaker is good and helpful for blinds that think and write freely. Another place, where our product can play an important role, is where two people talks on the phone. The subscribers are apart from each other while their talk, and they may want to use figures or texts to understand themselves better. It's also useful especially for instructors in presentations. The instructors may not want to present the lecture in front of the board. The drawn figure can be processed and directly sent to the server computer in the room. The server computer then can broadcast the drawn shape through network to all of the computers which are present in the room. By this way, the lectures are aimed to be more efficient and fun. This product will be simple but powerful. The product will be able to sense 3D shapes and motions that user tries to draw. The sensed information will be processed and transferred to the memory chip and then will be monitored on the display device. The drawn shape then can be broadcasted to the network or sent to a mobile device.

Technical Definition of the Product

In order to meet the technical requirements of the product we need Operating System Like Windows or Linux in order to implement software part of the project, Displacement Sensors to recognize the displacement of the pen in three dimensions, parallel cable to communicate with computer, software to solve the displacement data and finds the individual coordinate displacements in three axes and transform the data into text format, analog to digital converter to process analog displacement data and convert them into digital format, switch to control the pen and Rechargeable battery. • Analog to digital converter • Software program to convert data into text or string format ,Operating System,Parallel cable , Switch • Rechargeable battery ,Displacement Sensor.

PC Note Taker

PC Notes Taker is the world's first device that capture natural handwriting on any surface onto a PC in real time. Based on a revolutionary electronic pen,PC Notes Taker displays the user's handwritten

notes, memos or drawings on the computer and stores the image for future use. PC Notes Taker is ideal for markets where handwritten input is essential, such as health, educational and financial sectors. Supplied with user-friendly software, PC Notes Taker is compatible with PCs and notebooks.

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Features & Benefits:

Capture of handwriting from any plain paper or other writing surface Input of continuous writing up to A4 page size Insert sketches, signatures, equations, and notes into Word documents E-mail sketches or handwritten notes in any language using MS OUTLOOK Convert handwriting to digital text using MS word recognition engine Annotate, add comments, edit and draw in your own handwriting onto MS office documents Create instant messaging using ICQ

The Smart Pen system includes the Smart Pen and a pen cradle connected to an internet-enabled computer. As CRFs are filled out, the Smart Pen records each stroke. It identifies each CRF and where it is on the page through a very fine grid pattern that appears as a light gray background shading on the CRF. The Pen is then placed and the password-protected Internet link to Health Decisions.

Spün

-Jaffrin Kathija

Final Yr IT

The Spün (pronounced "spoon") utensils use patented technology to accurately calculate calorie and nutritional information for each bite of food you eat. Spün may be a godsend for dieters or people who just want to eat more mindfully. The product is more than just the titular tool. It's a sensor-packed handle that's bundled with interchangeable spoon and fork heads. The idea here is to use the utensils to complete your calorie-counting fitness tracker, taking some of the guesswork out of the input.

Spün utensils measure the exact weight of the food going into your mouth and convert the weight to calorie and nutrition information in real-time. You use the Spün's app to take a picture of your meal. Spün utensils and the Spün mobile app are designed to provide you with as much (or as little) data on your eating habits as you'd like.The app uses technology similar to face recognition to identify your food. Once you confirm what you're eating, you use the Bluetooth-connected Spün utensil to eat your dish, and the app will tell you the nutritional information for each spoonful or forkful you take (the utensil has an interchangeable body for the included spoon and fork attachments) based on sensors that measure the weight of your bite.

Steps:

Step 1:Take a picture of your food using the Spün app so Spün knows What you are going to eat.

Step 2: Confirm Spün correctly identified your food.

Step 3: Eat using a Spün utensil.

Features:

- Set calorie or nutrition targets for a meal and Spün will give you a gentle buzz when you've hit your target.
- Spün will let you know when you are eating fast.
- Spün uses photo recognition to automatically detect what food items are on your plate.

Solar Roadways

-Anushka Victo Peter

Final Yr IT

Solar Roadways Incorporated is a startup company based in Sandpoint, Idaho, that is developing solar powered road panels to form a smart highway. Their technology combines a transparent driving surface with underlying solar cells, electronics and sensors to act as a solar array with programmable capability. Solar Roadways Inc is working to develop and commercially produce road panels which are made from recycled materials and incorporate photovoltaic cells.

History

Solar Roadway panel prototypes

In 2006, the company was founded by Scott and Julie Brusaw, with Scott as President and CEO.

The company envisioned replacing asphalt surfaces with structurally-engineered solar panels capable of withstanding vehicular traffic." The proposed system would require the development of strong, transparent, and self-cleaning glass that has the necessary traction and impact-resistance properties.

In 2009, Solar Roadways received a $100,000 Small Business Innovation Research (SBIR) grant from the Department of Transportation (DOT) for Phase I to determine the feasibility of the proposed project. In 2011, Solar Roadways received $750,000 SBIR grant from the DOT for Phase II to develop and build a solar parking lot. The DOT distinguishes the technology proposed by Solar Roadways Inc. as "Solar Power Applications in the Roadway," as compared to a number of other solar technologies categorized by the DOT as "Solar Applications along the Roadway." From SBIR grant money, Solar Roadways has built a 12-by-36-foot (3.7 by 11.0 m) parking lot covered with hexagonal glass-covered solar panels sitting on top of a concrete base, which are heated to prevent

snow and ice accumulation, and also include LEDs to illuminate road lines and display messages. The hexagonal shape allows for better coverage on curves and hills. According to the Brusaws, the panels can sustain a 250,000 lb (110,000 kg) load.

In April 2014, Solar Roadways started a crowdfunding drive at Indiegogo to raise money so they can get the product into production. In May, it was extended by another 30 days. The campaign raised 2.2 million dollars, exceeding its target of 1 million dollars. The drive became Indiegogo's most popular campaign ever in terms of the number of backers it has attracted. The success was attributed in part to a Tweet made by George Takei, who played Sulu on *Star Trek*, due to his more than 8 million followers. One of the Brusaws' videos went viral, with over 20 million views as of November 2015.

In November 2015, the USDOT awarded Solar Roadways a Phase IIB SBIR contract to further their research. The 2-year $750,000 award includes additional civil engineering tests including freeze/thaw cycling, moisture conditioning, shear testing, and advanced loading.

Technology

Solar Roadway panels are planned to be available in two texture designs: a semi-smooth surface designed for light traffic, and a rougher surface for highways. Targeted load capacity is 250,000 pounds (110,000 kg).

The panels are designed to be hotswapped if a unit is damaged. The damaged unit would be remanufactured. The panels are being designed to last a minimum of 20 years. Solar Cells can last up to 30 years before efficiency suffers.[14]

Power grid

Solar Roadways estimate they could produce at least 14,085 billion kilowatt-hours in one year. Their SR2 Panel was able to generate approximately 302.506MWh per year per lane mile, enough to remove 86 homes from the grid on a 2 lane road. Their SR3 Panels are able to generate roughly 1/3 more energy than the SR2 Panels.The United States used 3,937.003 Billion Kilowatt-hours in 2014.[19] Solar Roadways are intended to function as a smart grid.

Weather management

The panels contain low power heating elements which keep the temperature above 32 °F (0 °C) to prevent snow and ice from accumulating. This is designed to obviate the need for snowplows. The power going to the heaters is generated by the panels themselves. A "Cable Corridor" running along the road can deposit snowmelt or stormwater below the frost line, bring it to a treatment facility, or deposit the liquid into existing drainage systems.

Traffic management circuitry

The positioning circuitry in the panels would enable a local positioning system. The panels' big-data-gathering capabilities would be harnessed to reroute traffic intelligently. Each panel has a series of LEDs to display lane markings or warnings of wildlife, fallen rock, and accidents. Cars with compatible hardware would receive driving directions from the road.[24] The LEDs are also claimed to enable dynamic rearrangement of parking space layouts. The firm claims brightness will remain acceptable even in daylight, and will adjust automatically. Each panel contains several load sensors, whose data gathering is touted as useful in alerting drivers to hazards.[15] They also have the potential to weigh every truck in a weigh station's queue simultaneously.

Anti-theft mechanism

The panels communicate with one another wirelessly to report malfunctions or unauthorized tampering. This would allow law enforcement to trace a stolen panel and, in turn, the thief.

Feasibility

In 2014, doubt was expressed regarding the political feasibility of the project on a national scale by Jonathan Levine, a professor of urban planning at the University of Michigan. He suggested, however, that a single town might be able to deploy the concept in a limited test case such as a parking lot.

Sebastian Anthony wrote in ExtremeTech that the cost to replace all roads in the United States with Solar Roadways panels would come to approximately $56 trillion, based on Scott Brusaw's cost estimate of $10,000 for a 12×12-foot section. The company's website rebutted that amount, saying the $10,000 cost was an estimate of what would be required to achieve cost parity with asphalt roads, and that the actual cost per panel was still unknown.

Dr Roy Spencer criticized the claim that the solar panels in winter will use the energy they generate to melt snowfall.

Imagining a World Without Traffic Lights

- Sree devi

Third Yr IT

Getting stuck in traffic, like death and taxes, is just part life for people who drive vehicles to get from point A to B.Traffic jams are the result of competition for a scarce and highly valuable resource — the open road, and by extension, our freedom to travel where and when we want. Our traffic woes are compounded, however, by human fallibility. Drivers are often reckless, distracted or overly cautious, and each small mistake on the road propagates throughout the whole system.With the era of driverless cars fast approaching,

human incompetence may be removed from the driving equation entirely, according to new research from scientists at MIT. Instead of racing to beat yellow lights, or bemoaning an excruciatingly stale red light, they've shown that a centrally-controlled system in constant communication with every car on the road could synchronize the flow of traffic to optimize travel times and send us racing fearlessly through four-way intersections. In other words, traffic lights may someday go the way of pay phones — urban relics that remind us of simpler times.

A World Without Traffic Lights

The researchers built a computer model that simulated traffic conditions at an intersection under the control of both a normal stoplight and a computer algorithm that adjusted approaching vehicles' speeds. The algorithm, theoretically, communicates with cars to deduce their trajectories and directions to determine the exact moment they will pass through the intersection. The computer-vehicle interface adjusts the speed of individual automobiles so that numerous drivers can simultaneously zip through an intersection unscathed.

In a second iteration of the test, the researchers grouped cars into "platoons" that went through the lights together, making the system even more efficient. Ultimately, the algorithm eliminates the need for any pauses in traffic by removing unpredictability and reading any sudden increases in traffic in advance. So-called "slot-based" systems are already in use at airports, where air traffic controllers assign each incoming plane a "slot," or window, during which it can land, and aircraft slow down or speed up to hit the time frame.

The results of their tests were clear — traffic signals are far from the most efficient way to control intersections in an Internet-of-everything world. Under the command of a computer, the number of cars passing through the intersection doubled in the same amount of time. They recently published their findings in the journal *PLOS ONE*.

Complete Control

The algorithm worked so well because it knew exactly where each car was going and when it would arrive, something that is impossible to do in a system involving countless individuals who don't always act rationally. We've all experienced drivers who brake for no good reason, or

who decide to suddenly switch lanes. By taking the element of human unpredictability out of the system, the computer reduced the problem to a mathematical equation.

Not Likely in Near Future

This is proof-of-concept that computer-controlled traffic could cut commute times and accommodate more drivers, but don't expect red lights to disappear anytime soon. Google and other tech companies, to be sure, are making strides toward developing driverless cars, but refining these technologies into consumer-ready products still requires work. Convincing consumers to make the switch to a driverless car could take even longer. A recent AAA study found that three-fourths of drivers would be afraid of riding in an autonomous car, and only slightly more than half of respondents would consider buying cars with semi-autonomous features.

Paulo Santi, a co-author of the study, is more optimistic about the implementation of his research. Speaking to *BGR*, he said the system could be implemented in a much shorter time frame, even without driverless cars."In terms of what kind of technology you would need, you won't need to wait 20 years," Santi said. "We don't need autonomous driving. It's actually much simpler."

However, a computer-controlled intersection, as detailed in the study, could be thrown off by a single maverick driver who decides to take control of a vehicle himself, thereby throwing off the precise timing set out by the algorithm. For such a system to work, the computer would need to have absolute control over every variable, and every vehicle would need to be connected to "the grid." There also wasn't mention of when pedestrians would cross these optimized intersections.

Still, major automobile manufacturers are taking steps to build "smarter" vehicles. Wi-Fi connectivity, cameras, radar and other sensors are already enhancing safety by tuning vehicles into what's happening in the world around them. The National Highway Traffic Safety Administration announced a pact last week among 20 automakers to make automatic emergency braking a standard feature on all vehicles by 2022. Other options, like lane-departure warnings and collision avoidance, already warn drivers of potential mishaps, and even take steps to avoid them with mechanical precision.

It may take a few years or decades, but someday updating Facebook and eating breakfast while "driving" won't be

considered cultural faux pas. Still, if it ever hits the streets, playing a computer-optimized game of chicken could still be unsettling for beta testers of MIT's intersection technology.

ANDROID

-M.AshmiGraha

Third year I.T.

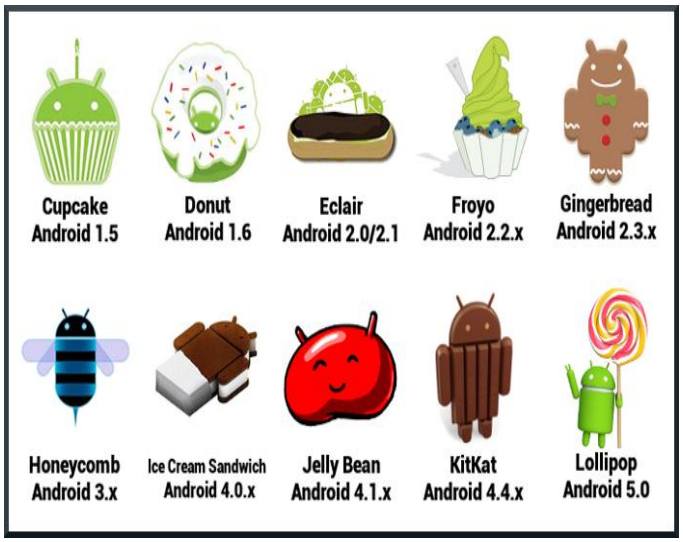
INTRODUCTION:

Android is a mobile operating system (OS) currently developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input. In addition to touchscreen devices, Google has further developed Android TV for televisions, Android Auto for cars, and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on notebooks, game consoles, digital cameras, and other electronics.

History:

Android, was founded in Palo Alto, California in October 2003 by Andy Rubin (co-founder of Danger), Rich Miner (co-founder of Wildfire Communications, Inc.), Nick Sears (once VP at T-Mobile), and Chris White (headed design and interface development at WebTV) to develop, in Rubin's words, "smarter mobile devices that are more aware of its owner's location and preferences". The early intentions of the company were to develop an advanced operating system for digital cameras. Though, when it was realized that the market for the devices was not large enough, the company diverted its efforts toward producing a smartphone operating system that would rival Symbian and Microsoft Windows Mobile.Despite the past accomplishments of the founders and early employees, Android Inc. operated secretly, revealing only that it was working on software for mobile phones.

ANDROID VERSIONS :



LATEST VERSION:

Android Marshmallow

Android 6.0

"Marshmallow" is a version of the Android mobile operating system. First unveiled in May 2015 at Google I/O under the codename "Android 'M'", it was officially released in October 2015.

Marshmallow primarily focuses on improving the overall user experience of Lollipop,introducing a new permissions architecture, new APIs for contextual assistants (a feature notably leveraged by "Google Now On Tap"—a new capability of the Google Search app), a new power management system that reduces background activity when a device is not being physically handled, native support for fingerprint recognition and USB Type-C connectors, the ability to migrate data and applications to a microSD card and use it as primarystorage, as well as other internal changes.

HISTORY:

The developer preview build, codenamed Android "M", was unveiled and released at Google I/O on May 28, 2015, for the Nexus 5 and Nexus 6 phones, Nexus 9 tablet, and Nexus Player set-top box, under the build number MPZ44Q.The third developer preview under build number MPA44G was released on August 17, 2015, later updated to MPA44I, and brought fixes related to Android for Work profiles."Marshmallow" was officially announced as the release's name the same day.

On September 29, 2015, Google unveiled launch devices for Marshmallow: the LG Electronics-produced Nexus 5X, the Huawei-produced Nexus 6P, and the in-house Pixel C tablet. Android 6.0 updates and factory images for Nexus 5, 6, 7 (2013), 9, and Player were released on

October 5, 2015, with over-the-air updates following shortly after. Older Nexus devices, such as the Nexus 4, Nexus 7 (2012) and Nexus 10 did not receive an official update. On October 14, 2015, LG announced that it planned to release Marshmallow for its flagship LG G4 in Poland the following week, marking the first third-party device to receive an update to Marshmallow. On December 7, 2015, Google released the Android 6.0.1 update and factory images for Nexus 6P, Nexus 5X, Nexus 6, Nexus Player, Nexus 9, Nexus 5 and Nexus 7 (2013) which added support for more emoji as well as security updates.

Features

User experience:

A new "Assist" API allows information from a currently-opened app, including text and a screenshot of the current screen, to be sent to a designated "assistant" application for analysis and processing. This system is used by the Google Search app feature "Google Now on Tap", which allows users to perform searches within the context of information currently being displayed on-screen. By holding the "Home" button or using a voice command, on-screen cards are generated which display information, suggestions, and actions related to the content."Direct Share" allows Share menus to display recently used combinations of contacts and an associated app as direct targets.

A newly inserted SD card or other secondary storage media can be designated as either "portable" or "internal" storage. "Portable" maintains the default behavior of previous Android versions, treating the media as a secondary storage device for storage of user files, and the storage media can be removed or replaced without repercussions, but is subject to access restrictions by apps.When designated as "Internal" storage, the storage media is reformatted with an encrypted ext4 file system, and is "adopted" by the operating system as the primary storage partition. Existing data (including applications and "private" data folders) are migrated to the external storage, and normal operation of the device becomes dependent on the presence of the media. Apps and operating system functions will not function properly if the adopted storage device is removed. If the user loses access to the storage media, the adopted storage can be "forgotten", which makes the data permanently inaccessible.Samsung and LG have, however, removed the ability to

use an SD card as "internal" storage on their Galaxy S7 and G5 devices, with Samsung arguing that the feature could result in unexpected losses of data, and prevents users from being able to transfer data using the card.

Platform:

Android Marshmallow introduces a redesigned application permission model: there are now only eight permission categories, and applications are no longer automatically granted all of their specified permissions at installation time.An opt-in system is now used, in which users are prompted to grant or deny individual permissions (such as the ability to access the camera or microphone) to an application when they are needed for the first time. Applications remember the grants, which can be revoked by the user at any time. The new permission model will be used only by applications compiled for Marshmallow using its software development kit (SDK), and older apps will continue to use the previous all-or-nothing permission model. Permissions can still be revoked for those apps, though this might prevent them from working properly, and a warning is displayed to that effect.

Marshmallow introduces new power management schemes known as "Doze" and "App Standby"; when running on battery power, a device will enter a low-power state if it is inactive and not being physically handled.

In this state, network connectivity and background processing is restricted, and only "high-priority" notifications are processed.Additionally, network access by apps is deferred if the user has not recently interacted with the app. Apps may request a permission to exempt themselves from these policies, but will be rejected from Google Play Store as a violation of its "Dangerous Products" policy if their core functionality is not "adversely affected" by them.

Android Marshmallow provides native support for fingerprint recognition on supported devices via a standard API, allowing third-party applications to implement fingerprint-based authentication. Fingerprints can be used for unlocking devices and authenticating Play Store and Android Pay purchases. Android Marshmallow supports USB Type-C, including the ability to instruct devices to charge another device over USB. Marshmallow also introduces "verified links" that can be configured to open directly in their specified application without further user prompts. User data

for apps targeting Marshmallow can be automatically backed up to Google Drive over Wi-Fi. Each application receives up to 25MB of storage, which is separate from a user's Google Drive storage allotment.

As of Marshmallow, the Android Compatibility Definition Document contains new security mandates for devices, dictating that those that are capable of accessing encrypted data without affecting performance must enable Secure boot and device encryption by default.These conditions comprise part of a specification that must be met in order to be certified for the operating system,and be able to license Google Mobile Services software. The requirement for mandatory device encryption was originally intended to take effect on Lollipop, but was delayed due to performance issues.

CLOUD COMPUTING

- **Aswini R.B**

3rd year,IT.

INTRODUCTION

Cloud computing It derives from an old practice of representing the Internet as a “small cloud”, in an attempt to depict with this metaphor what the
Internet actually is – a gargantuan net formed by hundreds, thousands of sub-networks, some available for the general public, others restricted to private use, all interconnected.

There are different types of services available to Internet users on these sub-networks. Services that can be totally or partially paid for, such as those of Newspapers and Magazines; free services, which intend to becomecharged, such as Linkedin; services that bear a cost, but are sponsored, so there is no expense to the user, such as Yahoo; services that are totally free, which certainly intend to bear a price in the future; Private Services, such as Banks and Airway Services, which exist to assist their clients; Public services,offered by government bodies or institutions to provide citizens with information and services, such as CityAdministrations, State or Federal Government Secretariats; and, of course, learning computational environments made available bythe teaching institutions.

Cloud computing also **on-demand computing**, is a kind of Internet-based computing that provides shared processing resources and data to computers and other devices on demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources which can be rapidly provisioned and released with minimal management effort. Cloud computing and storage solutions provide

users and enterprises with various capabilities to store and process their data in third-party data center. It relies on sharing of resources to achieve coherence similar to a utility over a network.

The impact of Cloud Computing on Educational Institutions

Regarding the evolution of Information Technology, Cloud Computing is as revolutionary as, or even more than, the earlier big technological leaps, such as "time-sharing", which in the 1970's, allowed large computers to perform various jobs at the same time, increasing their processing power dramatically;and, later, in the 80's/90's, client-server computing, which enabled "job sharing" between computers of different sizes, such as personalcomputers, which assisted users through their user-friendly interface,exchanging information with larger machines, with more processing capacity and speed – where bulk volumes of data were processed and stored. By the advent of local, regional networks, and then, the Internet, the client-server computing became the basis of all the accelerated development of the use of information Technology in widescale, such as we have today. It has evolved from a business support framework to become an inherent part of it. Today, we cannot devise companies or institutions such as banks,telecommunications operators or large educational institutions, deprived of Information Technology.

The main advantages of a migration to Cloud Computing are linked to development, cost cutting and performance .

Interoperability – capacity to develop with different software platforms;
High computing capacity – HPC capacity (high processing computing);
Data in Cloud – security and enormous storage capacity in servers;

Cost cutting, by pay per use ; Fast system implementation, quick to adapt or change systems; Possibility of cutting fixed costs, enabling their change into variable costs. In addition to these advantages, there are two other very important ones, though obvious, given that they derive from general concept. They are usually overlooked as far as Cloud Computing is concerned: one is the freedom and flexibility that teaching institutions have gained in being disconnected from the physical world of their data-centers and entering a virtual/logical world, where everything is possible with various options of implementation of Cloud Computing strategy; and the other is the interoperability, which is the capability of integration of different platform systems (Windows and Linux; Linux and Windows), which seems to be an intrinsic quality of Cloud Services Platforms. The interoperability ensures even more freedom to organizations. Unhindered from the physical world, they free themselves from restrictions and polemics of the "old World". In the case, for instance, of our major teaching institution, with various units in the country, the

advantages are evident. Seeking to motivate the collaboration between Professors and students to share material, learning methods, academic notes, the Cloud Computing would greatly facilitatethe Knowledge Management systems. Major e-learning or Collaboration systems in Education would benefit from a migration to Cloud Computing,though the use ofapplications . The differentiated access control required between students and Professors can be implemented easily on a Software framework as a Service, which does not depend on client-applications, and, mainly, it can be implemented, managed, reconfigured, and modified, without difficulty, in a centralized manner, to thousands of students in the entire country. Most importantly, it will not consume hardware and software resources of the teaching institution - a current significant barrier to theseeducational centers, as they usually experience a serious disproportion between the number of students and the number of Professors. Another issue to be considered is that in average usage situations, thousands of Internet users operate accessing hundreds of different sites, distributing statistically the traffic on the net and the load on servers, which are hosting the services. An Educational activity, using a virtual environment, which hosts an e-learningsystem, entails a different behavior – hundreds of users accessing the same site, at the same time, causing a “ traffic jam“ problem. This problem may be resolved through Cloud Computing, given that the traffic management becomes a responsibility of the company in charge of the Cloud processing.

Security issues in cloud computing

Due to its distributed nature, the cloud results in weak security systems those are easy to break into. The security of the system is only as strong as the weakest user’s set-up. Weak password recovery workflows, key loggers, and phishing attacks present bigger security risks. In collaborative web applications that are built for groups, like Google Apps or any web-based software, any breach of security spreads across all participants. In cloud computing an organization’s data is locked-in and the third party in control. When you participate in the cloud, you depend on a third party to make decisions about your data and platforms.Cloud computing also comes with chances of server unavailability and account lock-out. When the Internet goes down, access to one’s data is cut off. An important measure of security often overlooked by companies is how much downtime a cloud service provider experiences. The client should request the provider’s reliability reports to determine whether these meet the requirements of their business.

The biggest concern with cloud

computing is that it puts all of a company's data and applications in one place. Businesses should be wary of putting sensitive company information in public clouds. They should instead stick to low volume, low-risk applications and build internal and private clouds to enable collaboration within the organization and externally with partners. Security is one of the most often-cited objections to cloud computing. Cloud users face security threats from both outside and inside the cloud. This responsibility is divided among the cloud user, the cloud provider and any third party vendors that users rely on for security-sensitive software or configurations.

General Cloud based Application Platform Software as a service

(SaaS):

A SaaS application runs entirely in the cloud (that is, on servers atan Internet-accessible service provider). The on-premises client is typically a browser or some other simple client. The most well-known example of a SaaS application today is probablySalesforce.com, but many, many others are also available.

Attached services:

Every on-premises application provides useful functions on its own. An application can sometimes enhance these by accessing application-specific services provided in the cloud. Because these services are usable only by this particular application, they can be thought of as attached to it. One popular consumer example of this is Apple's iTunes: The desktop application is useful for playing music and more, while an attached service allows buying new audio and video content. Microsoft's Exchange Hosted Services provides an enterprise example, adding cloud-based spam filtering, archiving, and other services to an on- premises Exchange server.

Cloud platforms:

A cloud platform provides cloud-based services for creating applications. Rather than building their own custom foundation, for example, the creators of a new SaaS application could instead build on a cloud platform.

Infrastructure services:

In a modern distributed environment, applications frequently use basic services provided on other computers. It's common to provide remote storage, for example, integration services, an identity service, and more.

Application services:

As more and more applications become service-oriented, the functions they offer become accessible to

new applications. Even though these applications exist primarily to provide services to end users, this also makes them part of the application platform. And while they're not shown in Figure 2, development tools are another important part of this story. Modern tools can help developers build applications using all three parts of an application platform. To make this abstract model more concrete, think about how it fits with today's most popular on premises Platforms.

The future

Cloud computing is therefore still as much a research topic, as it is a market offering. What is clear through the evolution of cloud computing services is that the chief technical officer is a major driving force behind cloud adoption. The major cloud technology developers continue to invest billions a year in cloud R&D; for example: in 2011 Microsoft committed 90% of its US$9.6bn R&D budget to its cloud. Centaur Partners also predict that SaaS revenue will grow from US$13.5B in 2011 to $32.8B in 2016. This expansion also includes Finance and Accounting SaaS. Additionally, more industries are turning to cloud technology as an efficient way to improve quality services due to its capabilities to reduce overhead costs, downtime, and automate infrastructure deployment.

Conclusions

Cloud Computing has the potential to help teaching institutions reduce costs in their offer of access to computational learning and collaboration environments, leading to educational experiments in wider scale and offering conditions for deeper and broader experiments to be conducted by researchers using the ICTs in Education. This favors the adoption of more adequate uses promoting the improvement of both teaching and learning. Furthermore, the various application modalities of Cloud Computing allow an optimal use of resources of the current data-centers, which may be kept for activities that are less susceptible to demand fluctuations. Professors and students will be able to increase the experience of spontaneous creation of collaborative sites and the practice of sharing information on the projects being developed, through access from home and school, allowing the discovery of new paths that favor the improvement of teaching and learning. Finally, we can state that we are on the threshold of a new technological era, which will contribute to the expansion of the use of Information and Communication Technologies in Education.

GOOGLEWATCH (Android Wear)

-DENCI MONIKA.M
Third Yr IT

INTRODUCTION

Android Wear is a version of Google's Android operating system designed for smartwatches and other wearables. By pairing with mobile phones running Android version 4.3 or newer, or iOS version 8.2 or newer with limited support from Google's pairing application, Android Wear integrates Google now technology and mobile notifications into a smartwatch form factor. It also adds the ability to download applications from the Google Play Store.

Android Wear supports both Bluetooth and Wi-Fi connectivity, as well as a range of features and applications. Watch face styles include round, square and rectangular. Released devices include Motorola Moto 360, the LG G watch, and the Samsung Gear Live Hardware manufacturing partners include ASUS, Broadcom, Fossil, HTC, Intel, LG, MediaTek, Imagination Technologies, Motorola, Qualcomm, Samsung and TAG Heuer.

In the first six months of availability, Canalys estimates that over 720,000 Android Wear smartwatches were shipped. As of 15 January 2016, Android Wear had between one and five million application installations. Android Wear was estimated to account for 10% of the smart watch market in 2015.

History

The platform was announced on March 18, 2014, along with the release of a developer preview. At the same time, companies such as Motorola,Samsung,LG,HTC and Asus were announced as partners. On June 25, 2014, at Google I/O, the Samsung Gear Live and LG G Watch were launched, along with further details about Android Wear. The LG G Watch is the first Android Wear smartwatch to be released and shipped. Motorola's Moto 360 was released on September 5, 2014.

On December 10, 2014, an update started to roll out, adding new features including a watch face API and changed the software to be based on Android5.0”Lollipop”.

The LG G Watch and Gear Live started shipping in July 2014, while the Moto 360 began shipping in September 2014. The next batch of Android Wear devices, which arrived at the end of 2014, included the Asus ZenWatch,the Sony SmartWatch 3,and the LG G Watch R. As of March 2015, the latest Android Wear devices are the LG Watch Urbane,and the Huawei Watch.

On August 31, 2015, Google launched pairing application for iOS version 8.2 or newer, allowing limited support for receiving iOS notifications on smartwatches running Android Wear. As of September 2015, only the LG Watch Urbane and Huawei Watch are supported, but Google announced support for more smartwatch models.

Features

Users can find directions by voice from the phone, choose transport mode, including bike, and start a journey. While traveling, the watch shows directions, and will even use tactile interaction to indicate turns by feel, obviating the need to look at ones phone, or even watch screen.

Via Google Fit, and similar applications such as Moto Body, Android Wear supports ride and run tracking ("OK Google, start a run"), heart activity can be sampled automatically through the day or on demand ("OK Google, what's my heart rate"), step-counting, calorie expenditure etc. are all active. These features work within the Fit ecosystem, allowing integration with companion devices and applications such as Withings Smart Body scales for weight monitoring. The watch reinforces achievements with cards noting goal attainment, when a goal is near, summaries of heart, and body activity.

Users can use their Android Wear Watch to control their phone. Music can be requested (for instance, "OK Google, play the Rolling Stones"). The screen then shows a card for play-control, volume, skip, media images, allowing music to be controlled from the wrist with the user free to move.

Notifications

The vibration engine alerts users about important notifications originating from a user-selectable set of applications. Wear provides multiple smart options for replying, including Google Voice that allows dictating responses to email (including third-party email applications like Type), spoken or drawn emoticons.

Intelligent notifications from Google Now are supported including traffic, flights, hotel check-in, meeting alerts, location- and time-based reminders, weather and

sport, stocks, flight status, boarding passes, restaurant bookings, etc.

Incoming text messages, Hangouts etc. appear on the watch. The user can reply to these from the device by voice. Currently new SMScan be initiated from the watch. Wear 5.1.1 supports drawing to reply, which uses AI to interpret the user's sketch as an emoji character. Search by voice is fully supported. Google Now searches such as "How tall is Nicole Kidman" result in Knowledge Graph cards appearing on screen, with options to open the search result on another device.

If the phone's camera app is activated, the screen is relayed to the watch, and the user can control the shutter, and view photos on the watch. Third-party applications support using the phone camera as a streaming device, or more varied camera control. Events appear as cards on screen. "OK Google, show my agenda" will display the user's agenda. Watch faces also support marking out appointments (for instance with contrasting color to show periods with an appointment, and/or illuminating a lighted "count-down" line for upcoming appointments.

Note taking is fully supported via Google Keep and other note-apps, as is marking-off check lists etc. Via voice commands such as "OK Google, remind me to call Roy at work", or "Remind me to baste the chicken in 25 minutes" the user can create location and time-based reminders, set alarms, timers etc. which appear on the watch at the appropriate time or place.

A large array of applications has been released, with significant players such as Evernote etc. creating new functionality on the watch: for instance, handing-off notes to the watch screen when the user turns off their phone screen. Location-based applications like Foursquare show Android Wear users suitable near-by venues, allow check-in etc.

Version History

- **Android Wear 1.0**
- **Android Wear 1.3**
- **Android Wear 1.4**

Problems:

Calender:

1.It was Sunday on Jan 1, 2006. What was the day of the week Jan 1, 2010?

Answer:

Friday

Explanation:

On 31st December, 2005 it was Saturday.

Number of odd days from the year 2006 to the year 2009 = (1 + 1 + 2 + 1) = 5 days.

ie,On 31st December 2009, it was Thursday.

Thus, on 1st Jan, 2010 it is Friday.

2.The last day of a century cannot be Tuesday why?

Explanation:

100 years contain 5 odd days.

Last day of 1st century is Friday.

200 years contain (5 x 2) ≡ 3 odd days.

Last day of 2nd century is Wednesday.

300 years contain (5 x 3) = 15 ≡ 1 odd day.

Last day of 3rd century is Monday.

400 years contain 0 odd day.

Last day of 4th century is Sunday.

This cycle is repeated.

Last day of a century cannot be Tuesday or Thursday or Saturday.

Problems on Ages:

3.The sum of ages of 5 children born at the intervals of 3 years each is 50 years. What is the age of the youngest child?

Answer:

4 years

Explanation:

Let the ages of children be x, $(x + 3)$, $(x + 6)$, $(x + 9)$ and $(x + 12)$ years.

Then, $x + (x + 3) + (x + 6) + (x + 9) + (x + 12) = 50$

-> $5x = 20$

-> $x = 4$.

Hence, Age of the youngest child $= x = 4$ years.

4.Present ages of Sameer and Anand are in the ratio of 5 : 4 respectively. Three years hence, the ratio of their ages will

become 11 : 9 respectively. What is Anand's present age in years?

Answer:

24

Explanation:

Let the present ages of Sameer and Anand be $5x$ years and $4x$ years respectively.

Then, $\frac{5x + 3}{4x + 3} = \frac{11}{9}$

$9(5x + 3) = 11(4x + 3)$

$45x + 27 = 44x + 33$

$45x - 44x = 33 - 27$

$x = 6.$

Anand's present age = $4x$ = 24 years.

Numbers:

5.1397 x 1397 = ?

Answer:

1951609

Explanation:

1397 x 1397 $= (1397)^2$

$= (1400 - 3)^2$

$= (1400)^2 + (3)^2 - (2 \times 1400 \times 3)$

$= 1960000 + 9 – 8400$

$= 1960009 – 8400$

$= 1951609.$

6. What is the largest 4 digit number exactly divisible by 88 ?

Answer:

9944

Explanation:

Largest 4-digit number = 9999

```
9999 (113
88
----
119
 88
----
 319
 264
 ---
  55
 ---
```

Required number = (9999 - 55)
= 9944.

Partnership

7. A and B invest in a business in the ratio 3 : 2. If 5% of the total profit goes to charity and A's share is Rs. 855, the total profit is:

Answer:

Rs. 1500

Explanation:

Let the total profit be Rs. 100.

After paying to charity, A's share = Rs. $\left(95 \times \frac{3}{5}\right)$ = Rs. 57.

If A's share is Rs. 57, total profit = Rs. 100.

If A's share Rs. 855, total profit = $\left(\frac{100}{57} \times 855\right)$ = 1500.

Probability:

8.Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

Answer:

9/20

True Discount:

9. A man purchased a cow for Rs. 3000 and sold it the same day for Rs. 3600, allowing the buyer a credit of 2 years. If the rate of interest be 10% per annum, then the man has a gain of:

Answer:

0%

10.If Rs. 10 be allowed as true discount on a bill of Rs. 110 due at the end of a certain time, then the discount allowed on the same sum due at the end of double the time is:

Answer:

Rs. 18.33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