



SARANATHAN COLLEGE OF ENGINEERING

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Department of
INFORMATION TECHNOLOGY

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To provide value based higher education in the field of Information Technology, enhance the potential of students in engineering education, innovations, entrepreneurship and provide resources to groom students as globally acknowledged IT professionals.

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- To encourage continuous learning and to impart personality
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BLOCKCHAIN

WHAT IS BLOCKCHAIN?

Blockchain seems complicated, and it definitely can be, but its core concept is really quite simple. A blockchain is a type of database. To be able to understand blockchain, it helps to first understand what a database actually is. A database is a collection of information that is stored electronically on a computer system. Information, or data, in databases is typically structured in table format to allow for easier searching and filtering for specific information.

What is the difference between someone using a spreadsheet to store information rather than a database?

Spreadsheets are designed for one person, or a small group of people, to store and access limited amounts of information. In contrast, a database is designed to house significantly larger amounts of information that can be accessed, filtered, and manipulated quickly and easily by any number of users at once. Large databases achieve this by housing data on servers that are made of powerful computers. These servers can sometimes be built using hundreds or thousands of computers in order to have the computational power and storage capacity necessary for many users to access the database simultaneously. While a spreadsheet or database may be accessible to any number of people, it is often owned by a business and managed by an appointed individual that has complete control over how it works and the data within it. Blockchain differs from database in following ways:

- Storage structure
- Transaction process
- Attributes of cryptocurrency
- Transparency
- Decentralization

Is Blockchain secure?

Blockchain technology accounts for the issues of security and trust in several ways. First, new blocks are always stored linearly and chronologically. That is, they are always added to the “end” of the blockchain. If you take a look at Bitcoin’s blockchain, you’ll see that each block has a position on the chain, called a “height.” As of November 2020, the block’s height had reached 656,197 blocks so far. After a block has been added to the end of the blockchain, it is very difficult to go back and alter the contents of the block

unless the majority reached a consensus to do so. That's because each block contains its own hash, along with the hash of the block before it, as well as the previously mentioned time stamp. Hash codes are created by a math function that turns digital information into a string of numbers and letters. If that information is edited in any way, the hash code changes as well.

Here's why that's important to security. Let's say a hacker wants to alter the blockchain and steal Bitcoin from everyone else. If they were to alter their own single copy, it would no longer align with everyone else's copy. When everyone else crossreferences their copies against each other, they would see this one copy stand out and that hacker's version of the chain would be cast away as illegitimate. Succeeding with such a hack would require that the hacker simultaneously control and alter 51% of the copies of the blockchain so that their new copy becomes the majority copy and thus, the agreed-upon chain. Such an attack would also require an immense amount of money and resources as they would need to redo all of the blocks because they would now have different timestamps and hash codes. Due to the size of Bitcoin's network and how fast it is growing, the cost to pull off such a feat would probably be insurmountable. Not only would this be extremely expensive, but it would also likely be fruitless. Doing such a thing would not go unnoticed, as network members would see such drastic alterations to the blockchain. The network members would then fork off to a new version of the chain that has not been affected. This would cause the attacked version of Bitcoin to plummet in value, making the attack ultimately pointless as the bad actor has control of a worthless asset. The same would occur if the bad actor were to attack the new fork of Bitcoin. It is built this way so that taking part in the network is far more economically incentivized than attacking it.

Bitcoin Vs Blockchain:

The goal of blockchain is to allow digital information to be recorded and distributed, but not edited. Blockchain technology was first outlined in 1991 by Stuart Haber and W. Scott Stornetta, two researchers who wanted to implement a system where document timestamps could not be tampered with. But it wasn't until almost two decades later, with the launch of Bitcoin in January 2009, that blockchain had its first real-world application. The Bitcoin protocol is built on a blockchain. In a research paper introducing the digital currency, Bitcoin's pseudonymous creator, Satoshi Nakamoto, referred to it as "a new electronic cash system that's fully peer-to-peer, with no trusted third party." The key thing to understand here is that Bitcoin merely uses blockchain as a means to

transparently record a ledger of payments, but blockchain can, in theory, be used to immutably record any number of data points. As discussed above, this could be in the form of transactions, votes in an election, product inventories, state identifications, deeds to homes, and much more.

How is Blockchain Used?

As we now know, blocks on Bitcoin's blockchain store data about monetary transactions. But it turns out that blockchain is actually a reliable way of storing data about other types of transactions, as well. Some companies that have already incorporated blockchain include Walmart, Pfizer, AIG, Siemens, Unilever, and a host of others. For example, IBM has created its Food Trust blockchain. to trace the journey that food products take to get to its locations. Why do this? The food industry has seen countless outbreaks of e Coli, salmonella, listeria, as well as hazardous materials being accidentally introduced to foods. In the past, it has taken weeks to find the source of these outbreaks or the cause of sickness from what people are eating. Using blockchain gives brands the ability to track a food product's route from its origin, through each stop it makes, and finally its delivery. If a food is found to be contaminated then it can be traced all the way back through each stop to its origin. Not only that, but these companies can also now see everything else it may have come in contact with, allowing the identification of the problem to occur far sooner, potentially saving lives. This is one example of blockchains in practice, but there are many other forms of blockchain implementation.

MIRUNALINI.R

IV YEAR , IT.

DEEP LEARNING

Deep learning ,as a branch of Machine learning employs algorithms to process data and imitate the thinking process or to develop abstractions and it uses layers of algorithms to process data,understand human speech and visually recognize objects.

It is a subset of Machine learning in which multilayered neural networks learn from vast amount of data

LAYERS IN DEEP LEARNING

A layer is the highest –level building block in deep learning .The first layer in a network is called the input layer ,while the last is called output layer.A layer is a container that usually receives weighted input,transform it with a set of mostly non linear functions and then passes these values as output to the next layer.A layer is usually uniform that is it only contains one type of activation function pooling,convolution etc.

DEEP LEARNING VS MACHINE LEARNING

Deep learning structures algorithms in layers to create an artificial neural network that can learn and make intelligent decisions on its own.

Machine learning uses algorithms to parse data,learn from that data and make informed decisions based on what it has learned.

While both fall under the broad category of artificial intelligence,deep learning is what powers the most human like artificial intelligence.

HOW DOES DEEP LEARNING WORKS

Computer programs that use deep learning go through much the same process as the toddler learning to identify the dog. Each algorithm

in the hierarchy applies a nonlinear transformation to its input and uses what it learns to create a statistical model as output. Iterations continue until the output has reached an acceptable level of accuracy. The number of processing layers through which data must pass is what inspired the label deep.

APPLICATIONS

A few years ago, we would have never imagined deep learning applications to bring us self-driving cars and virtual assistants like Alexa, Siri and Google.

- Fraud Detection
- Autonomous Cars
- Virtual Assistants
- Supercomputing
- Customer Relationship Management (CRM) Systems
- Investment Modeling

Predictions for the Future of Deep Learning claims that in the next 5 to 10 years, DL will be democratized via every software-development platform and facial Recognition Systems .

S.MONISHA

3rd Year,IT

THE FUTURE OF ROBOTIC PROCESS AUTOMATION

RPA Technology Will Continue Experiencing Explosive Growth. According to Gartner, RPA software has been recognized as one of the fastest growing software segments in the last two years, growing at more than 60 percent, while the “overall enterprise software market grew at just 13 percent.” And one estimate suggests more than 90 percent of enterprises will have an automation architect by 2025, up from less than 20 percent today.

So what are some key reasons for this continued growth? The first, most unexpected impact on the future has been the COVID-19 disruption, causing a tremendous acceleration of RPA adoption going forward. According to a recent Gartner survey, nearly one-quarter (24 percent) of all finance executives “expect to spend more on robotic process automation” to combat the remote workforce and inability to rely on staff to run routine processes.

Another reason for the growth of RPA technology into the future is that automation will evolve on optimizing digital processes. Based on predictions from Gartner, “over the next few years, the scope of automation will evolve from ‘discrete tasks and transactions based on static and rigid rules’ to automating knowledge work. This will require a new automation strategy that focuses on optimizing digital processes from IT infrastructure through customer-facing applications.” With the range of RPA technology broadening, IT teams will need to adapt their strategies to keep up with the pace of RPA adoption across the business.

Intelligence Will Fundamentally Transform Automation

In today's business climate, RPA is extremely well-suited for automating routine tasks. But as artificial intelligence, machine learning, deductive analytics, and predictive analytics are introduced and refined within automation, RPA will begin to complete more sophisticated and complex work, augmenting human capabilities and enhancing decision making across organizations.

Whether known as intelligent automation from organizations like Forrester or Ernst & Young (EY), hyper automation from Gartner, or intelligent process automation from IDC, intelligence that is integrated in lockstep with RPA will broaden the range of processes that can be automated within the business. In essence, intelligent automation considers the entire lifecycle of an automated process across tools and functions, and with regard to overall complexity.

Augmenting automation with intelligence will also lead to greater cost savings for organizations. In fact, Gartner predicts that by 2024, companies that leverage automation and intelligence will reduce operational costs by nearly 30 percent. Because of the advancements that intelligent automation will bring, RPA technology will continue playing an increasingly pivotal role in automating and integrating all possible business processes to drive lasting value for the organization.

Automation Strategies Must Holistically Work Together

Companies embracing digital transformation must ensure that they leverage a holistic, scalable approach for the future that makes use of complementary automation strategies. RPA technology today is considered automation on the front end, or from the user-interface (UI) level, while back end automation, sometimes referred to as API automation, leverages application programming interfaces for higher capacity transactions that are specifically defined. The capacity to leverage both UI and API automation going forward will enable

organizations to integrate applications and allow for more robust automation deployments.

Another crucial automation strategy for the future is understanding and using RPA and Business Process Automation in a way that complements one another to scale automation across overall business processes. The key to BPA is 'process,' taking repeatable processes that require considerable time in an organizations, like transferring files, generating reports, or extracting data from unstructured sources, and then automating them from a central location. With BPA software, each step in the process automatically triggers the next step and creates entire workflows across the business.

So while RPA hands over individual tasks to software robots, BPA takes over an entire business process—automating it from start to finish. Where this is really exciting for the future is how companies can combine both front end RPA technology and back end API automation with Business Process Automation to digitally transform their business. Simply put, the possibilities are endless for RPA and BPA to work together—achieving greater efficiencies together than possible alone.

**SUBMITTED BY,
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FINAL YEAR,IT.**

AUTONOMOUS DRIVING

This article tells about the driverless car and levels of interaction between drivers

Since the 1990s – when self-governing driving was still just found in sci-fi books or movies – BMW designers and specialists have been dealing with driver help frameworks. In the next decade, the vehicle business will change more fundamentally than it has throughout late years, since today we are staying at the way to some other time – of significantly electronic driving.

In his for nothing out of pocket digital book, master Matthias Hartwig from the Institute for Climate Protection, Energy and Mobility (IKEM) manages the issue of how far the improvements will assume a critical part later on.

EXPLANATION:

The levels 0 to 5 are characterized by their overall degree of computerization. Level 0, "No Automation", is the place where the driver controls the vehicle with no help from a driver help framework. The tables turn, notwithstanding, in level 5, where the vehicle can drive with no human cooperation. Level 3 "Profoundly Automated Driving", level 4 "Completely Automated Driving" and level 5 "Full Automation" are as yet in the testing stage. The driver helps frameworks of level 1 are regular today, and utilized altogether flow BMW models.

Five degrees of self-governing driving:

1. Driver assistance
Driver assistant system support the driver but do not take the control.
2. Partly automated driving
Frameworks can likewise take control; however, the driver stays answerable for working the vehicle.
3. Highly automated driving
In certain situation the driver can disengage from the driving for extended period of time.
4. Fully automated driving
The vehicle drives independently most of the time. The driver must remain able to drive, but can also take a nap.

CONCLUSION:

Self-sufficient vehicles have been liable to innovative work for almost a century. Google driver is the most development programming framework to date. Vehicles will at this point don't be considered as just a transportation choice, but instead a versatile diversion community outfitted with Wi-Fi, TV, and an amusement committed locally available PC. Japan has just started to utilize a self-ruling vehicle in the shipping business.

G.B.DHIVYA JAI SREE

B.DELPHIN LYDIA

FINAL YEAR, IT

MACHINE LEARNING

What is Machine Learning? It is a method of data analysis that automates analytical model building. It is a branch of Artificial Intelligence based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention. Machine Learning today is not like machine learning of the past. It was born from pattern recognition and the theory that computers can learn without being programmed to perform specific tasks, researchers interested in artificial intelligence wanted to see if computers could learn from data. While many Machine Learning algorithms have been around for a Long time, the ability to automatically apply complex mathematical calculations to big data over and over, Faster and Faster is a recent development.

Machine Learning in today's world:

By using algorithms to build models that uncover connections, organizations can make better decisions without human intervention. Learn more about the technologies that are shaping the world we live in.

Opportunities and Challenges for Machine Learning in business:

Business are now being forced to look deeper into their data to increase efficiency and competitiveness. Enter Machine Learning, Recent advances have led to increased interest in adopting this technology as part of a Larger, more comprehensive analytics strategy. But incorporating modern machine learning techniques into production data infrastructures is not easy.

Machine Learning Importance:

Machine Learning is due to the same factors that have made data mining and bayesian analysis more popular than ever. Things like growing volumes and varieties of available data, computational processing that is cheaper and more powerful, and affordable data storage.

Who's Using it?

Financial Services , Government, Health Care , Retail , Oil and Gas,Transportation

**SUBMITTED BY,
VIJAYA MEENA S,
FINAL YEAR – IT.**

CODING PUZZLES

1. Print all numbers between 1 to N without using any loop

Solution:

```
#include<stdio.h>

int main(){
    static int i=1;
    int N;
    printf("Enter a number :");
    scanf("%d",&N);
    if(i<=N){
        printf("%d ",i++);
        main();
    }
    return 0;
```

2. Swap two numbers without using third variable

Solution:

```
#include<stdio.h>

void main(){
    int a=5, b=6;
    printf ("Before Swapping,a=%d,b=%d",a,b);
    a=a+b;
    b=a-b;
    a=a-b;
    printf ("After Swapping,a=%d,b=%d",a,b);
    getch ();}
```

3.Add two numbers without using addition operator

Solution:

```
int Add(int x,int y){
    while(y!=0){
        int carry = x & y;    //carry now contains common set bits of
x and y
        x = x^y;              //Sum of bits of x,y where atleast one of
the bits is not set
        y = carry <<1;        //Carry is shifted by one so that adding it
to x gives the required sum}
    return x;}

int main(){
    printf("%d",Add(45,33));
    return 0;}
```

4.Multiply two numbers without using multiplication operator

Solution:

```
void main(){
    int a=6,b=7,product=0;
    while (b!=0){
        product +=a;}
    printf("Product of %d,%d is %d",a,b,product);
    getch();}
```

5.Find if a number is even or odd without using conditional statement

Solution:


```

int main(){
    int n;
    char* arr[2]={“Even”,“Odd”};
    printf(“Enter a number:”);scanf(“%d”,&n);
    (n & 1 && printf(“Odd”) ||printf(“Even”));
    return 0;}

```

// n&1 will be 1 when 1 is present at LSB,So it is Odd,else Even

6. Find maximum of three numbers without using conditional & ternary operator

Solution:

```

int max(int a,int b, int c){
    int m =a;
    (void)( (m<b) && (m=b));
    (void)((m<c) && (m =c));
    return m;}

int main(){
    printf(“Max value=%d”,max(1,6,9));
    return 0;}

```

7.Implement power function without using multiplication and division operators+

Solution:

```

int pow(int a,int b){
    if (b==0){return 1 };
    int ans,inc =a; int
    i,j;
    for(i=1;i<b;i++){
        for(j=1;j<a;j++){
            ans += inc;}

```

```
        inc = ans;}  
    return ans;}
```

8.Implement ternary operator without using conditional expressions

Solution:

```
#include<stdio.h>  
  
int ternary(int x,int a,int b){  
    return x*a +!x *b;}    // function to return result of  
the expression(x?a:b)  
  
int main(void){  
    int a=10,b=20;  
    printf("%d\n",ternary(0,a,b));  
    printf("%d\n",ternary(1,a,b)); }  

```

P. Keerthana

3rd Year IT

HUMAN AUGMENTATION

Definition of new technology:

In a field of research to improvise the human capability using human augmentation. This technology may include some genetic design, using medicine or other external wearable devices. Human augmentation is not a new phenomenon. We are augmenting ourselves for thousand years ago. For example: The spear is an augmented arm, hammer is an augmented fist. Now we are in the exciting stage of an evolution.

Working:

The first level of human augmentation is replication. This refers to any augmentation that replicates something a typical person can already do. It simply replicates a pre-existing human function and provides it to someone who may not have had it previously.

Human 2.0-Augmented Human beings:

Focuses on creating cognitive and physical improvements as an integral part of the human body. Human augmentation is generally used to refer to technologies that enhance human productivity or capability, or that somehow add to the human body.

Human augmentation in various fields:

Human-augmentation technologies work with specific IT resources including the cloud, big data, and mobile computing. These include wearable devices such as watches or bracelets that link the human body to external sources of information that are visual, audio, or text based.

Role in health and performance:

Definition of “augment” includes both increasing something and adding to it. Human augmentation includes both. Activities to improve human health and performance have been ongoing for millennia and include teaching and learning, diet and exercise, training and practice, equipment and tools.

Eyeglasses, hearing aids, artificial limbs are only a subset of the physical devices we wear or use to perform better.

Types of augmentation:

- One dimension is from mental to physical in the part or function of the human augmented. It is a spectrum rather than two separate choices. A brain implant for memory, for example, augments both the physical brain and its mental functioning. Implants, chemicals, and surgery are examples of physical technologies.
- A second dimension is from mental to physical in the technology. Neural-linguistic programming, mental imaging, and other “teaching techniques” are examples of technology. Implants, chemicals, and surgery are examples of physical technologies.
- A third dimension is from direct to indirect. For instance, one can sculpt parts of the body through surgery (direct) or intense exercise (indirect)
- Fourth dimension involves permanence of change.

HEMALATHA. A

3rd YEAR – IT.

INTERNET OF THINGS (IOT)

The Internet of Things, or IoT, is the name that the IT folks have given to the now billions of physical devices throughout the world that are connected to the internet. These devices not only collect data, but they share it as well. Through the proliferation of wireless networks as well as cheap processors, it's now possible to turn a multitude of physical objects into an IoT device.

In this article, we will focus on current advancements in the world of the IoT, advancements that only a few short years ago were talked about but had no tangible demonstrations yet of their viability.

ADVANCEMENTS AND APPLICATIONS OF IOT:

The rise of 5G technology is the first advance we will talk about. 5G networks are at the forefront of development of cellular mobile communications. Recent developments will ensure that their spread will mean much more than just a faster internet connection for your smartphone. Their extremely high speeds will offer an array of new possibilities for the IoT, paving the way for a degree of connectivity that is impossible with current standards. Through 5G, data can be gathered, analyzed and managed in real time, virtually without delays, greatly broadening potential [IoT](#) applications and opening up pathways to further technological innovation.

Connected Smart Cars

At virtually every price point, current car models have much more IoT upgrades than ever before. These come in the form of diagnostic information about the car. Everything from tire pressure, oil level, fuel consumption , and when something goes wrong with the engine is now available to be sent to the palm of your hand via a Wi-Fi connection to your smartphone. In the next year or so, we will see even more IoT advancement beyond diagnostic info.

Smart Stores

In 2019, smart lighting devices, video feeds and Wi-Fi enabled food traffic-monitoring software allows store owners to collect info about customer traffic patterns in the shop, how much time they spend in each of its aisles and how they interact with products on display. After analyzing this data, retailers are able to change the way they lay out their merchandise and decide how much of it they put

on display or even change their entire store layouts to enhance them in line with knowledge they have gained about customer behavior.

Increased Security Concerns

Despite the promise that the IoT holds for all of us in making our lives easier, at the same time it carries the dual-edged sword of making us more vulnerable to an attack. In the past, a malware infection meant just lost or compromised data. The emergence of the IoT means that a virus or ransomware infection can easily disable vital functions and services. In Atlanta, in March 2018, ransomware crippled the city's water services and ticket payments systems. In 2019, hardware manufacturers like Cisco, HPE, Dell and more are building specific infrastructure for micro-centers to be more physically rugged and secure, and security vendors are starting to offer endpoint security solutions to their existing services to prevent data loss and give suggestions about threat protection and network health.

Edge Computing

Edge computing is literally the opposite of cloud computing, the technology that has gained so much prominence just in the last five years or so. Edge computing means that data is stored in micro-centers as opposed to the cloud, providing numerous new options for the IoT. By storing data locally, it offers a cheaper, faster, and more efficient approach to data processing. In this manner, data can be made immediately available to a corresponding IoT device, decreasing the "stress" on the network and the necessary bandwidth.

**SUBMITTED BY,
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FINAL YEAR – IT.**

AI ROBOT DOG “AU-SPOT” – TRAINED TO EXPLORE CAVES ON

Traditional Mars rovers are limited mostly to rough surfaces but many regions are only reachable by crossing a very rough terrain or descending below grounds. In order to travel to those regions “Walking robot dogs” are introduced which even if they fall down, they can get back up again. NASA/JPL – Caltech scientists introduced their “Mars Dogs” which are four-legged animal, mimicking robots with artificial intelligence (AI) and an array of sensing equipment to help the bots navigate treacherous terrain and subsurface caves autonomously on the Red Planet. Agility and resilience of new robots are coupled with sensors which allow them to avoid obstacles. It also allows them to choose between multiple paths and build virtual maps of buried tunnels and caverns for operators at home base. A Mars Dog would be roughly 12 times lighter than current rovers and would be capable of travelling much faster, reaching normal walking speeds of 3 mph (5 km/h) during terrestrial tests. That is rover rolls along the Martian surface at about 0.09 mph (0.14 km/h). The autonomous Mars canine dubbed “Au-Spot” is a modified version of “Spot”. Au-Spot processes input from Lidar (remote sensing using laser pulses), visual, thermal and motion sensors to create 3D maps. It also uses AI to learn which structures to avoid and to identify objects that may be of scientific interest. A communication module allows the robot to transfer data to the surface while it’s exploring underground. CoSTAR team members testing Au-Spot in a range of obstacle courses, putting them through its paces in tunnels and hallways, up stairs and ramps and in outdoor locations which is similar to Martian landscapes such as lava tubes in Northern California. These demonstrations show that these robots can navigate around boulders and map deep caves. One day these behaviors could enable revolutionary scientific missions to take place on Martian surface and subsurface, thereby pushing boundaries of NASA’s capability in exploring traditionally inaccessible sites.

L.AARTHI

FINAL YEAR, IT

PREDICTING NATURAL DISASTERS WITH THE WORLDS FASTEST SUPERCOMPUTERS:

Artificial intelligence (AI) and machine learning (ML) may soon help to alleviate major global environmental crises, as researchers and scientists are exploring how powerful algorithms and machines with learning abilities could tackle some of the greatest challenges humanity has ever faced. Whether fighting climate change, helping biodiversity or cleaning oceans and air, AI could be applied to assist humans in better understanding what is happening on the planet. Recently, disaster resilience has been an increasingly popular area where AI technology could be harnessed to know how, when and where natural disasters occur.

The AI model developed by Fujitsu Laboratories can predict flooding forecasts for specific areas, making it easier to evacuate people and offer insights on potential damage to surrounding infrastructure.

AI-based systems can scan images obtained from satellites orbiting the earth, and look for any changes that could help to predict the occurrence of a natural disasters like landslides, floods, volcanic eruptions, and tsunamis. The Japanese government announced plans to launch a new satellite based system for disaster prediction in 2020. The system would “accurately forecast the locations of disasters such as floods and landslides, thus enabling local governments to issue an early warning of disasters, including timely evacuation order to residents” according to Japan News.

In India, Google is developing an AI platform that could warns about impending floods through Google Maps and Google Search. Google’s engineering Vice-President Yossi Matias explained that the AI based system would make the predictions through a combination of machine learning, rainfall records, and flood simulations. A combination of satellite images and machine learning could also offer a more effective technique to predict cyclones and hurricanes. When the tragic 9.0-magnitude earthquake hit Japan a decade ago, causing a tsunami that flooded the eastern coast, the early warning system (EWS) relied on dart buoys in the Pacific Ocean to detect tsunami and alert the country. That system had grossly underestimated the size of the wave to 3-metre high. But, the actual wave reached 50 metres in some places, claiming over 20,000 lives. The mistaken forecast shows that accurate information is required to predict and mitigate such calamities

efficiently. One way to better predict outcomes is by using artificial intelligence (AI).

Japan's Fujitsu Laboratories has developed an AI model to predict tsunami flooding in coastal areas in real-time. The technology company used Fugaku, the world's fastest supercomputer, to develop the model. A team of researchers generated training data for 20,000 possible tsunami scenarios based on high-resolution tsunami simulations, using the supercomputer. They created the AI model using these data sets into the model helps predict flooding in coastal areas before the wave makes landfall. This will make it possible to accurately and rapidly obtain flooding forecasts for specific areas and can also offer critical insights into the effects of localised waves on surrounding infrastructure like buildings and roads, according to the company. The system is also said to make evacuation measures more efficient. The model can also be run in seconds on ordinary PCs, making it easier to build practical, real-time systems, which previously required supercomputers, Fujitsu Laboratories said. Fujitsu developed the Fugaku supercomputer at the RIKEN Centre for Computational Science in Japan in 2014, and is said to officially start operating this year. In June last year. The supercomputer was termed the world's fastest, carrying out 2.8 times more calculations per second than IBM's machine which stood second in the Top500 list.

**SUBMITTED BY,
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SECOND YEAR - IT**

INTERVIEW TIPS

Interviews are your chance to sell your skills and abilities.

They also give you a chance to find out if the job and company are right for you. Follow the tips here to ace your interviews.



Review common interview questions. Practice answering them with someone else or in front of a mirror. Come prepared with stories that relate to the skills that the employer wants, while emphasizing your:

- Strengths
- Willingness to work and flexibility
- Leadership skills
- Ability and willingness to learn new things
- Contributions to the organizations in which you have worked or volunteered
- Creativity in solving problems and working with people

Figure out in advance how well you qualify for the job. For each requirement listed in the job posting, write down your qualifications. This can show you if you lack a particular skill. Plan how you will address this in the interview so you can convince the interviewer that you can learn the skill.

Make a list of questions that you would like to ask during the interview. Pick questions that will demonstrate your interest in the job and the company. This might include commenting on the news you learned from the company website, and then asking a question related to it. Also ask questions about the job you will be expected to perform, like:

- What are the day-to-day responsibilities of this job?

- How will my responsibilities and performance be measured? By whom?
- Could you explain your organizational structure?
- What computer equipment and software do you use?
- What is the organization's plan for the next five years?

Be prepared. Remember to bring important items to the interview:

- Notebook and pens
- Extra copies of your resume and a list of references
- Copies of letter(s) of recommendation, licenses, transcripts, etc.
- Portfolio of work samples

On the day of the interview, remember to:

- Plan your schedule so you arrive 10 to 15 minutes early.
- Go by yourself.
- Look professional. Dress in a manner appropriate to the job.
- Leave your MP3 player, coffee, soda, or backpack at home or in your car.
- Turn off your cell phone.
- Bring your sense of humour and SMILE!

Display confidence during the interview , but let the interviewer start the dialogue. Send a positive message with your body language.

- Shake hands firmly, but only if a hand is offered to you first.
- Maintain eye contact.
- Listen carefully. Welcome all questions, even the difficult ones, with a smile.
- Give honest, direct answers.
- Develop answers in your head before you respond. If you don't understand a question, ask for it to be repeated or clarified. You don't have to rush, but you don't want to appear indecisive.

End the interview with a good impression. A positive end to the interview is another way to ensure your success.

- Be courteous and allow the interview to end on time.
- Restate any strengths and experiences that you might not have emphasized earlier.

- Mention a particular accomplishment or activity that fits the job.
- Find out if there will be additional interviews.
- Ask when the employer plans to make a decision.
- Indicate a time when you may contact the employer to learn of the decision.
- Don't forget to send a thank-you note or letter after the interview.

SUBMITTED BY
NIKEETHA C
SECOND YEAR - IT

THE MEDIA CONTROLS HOW AND WHAT WE THINK

A quite evening at home is often spent in front of the television or computer surfing the web. But have we ever thought of the way we are being manipulated by these media. Media creates a very strong influence on young people as they tend to believe whatever is shown on television and social websites. For example, media has completely changed our perception of beauty. You cannot turn on the television or flip through a magazine without being bombarded with advertisements on weight loss pills, home gyms etc. Women are just air brushed on the cover of the magazine to hide their flaws. This has created an unrealistic and unhealthy image for beauty.

When it comes to politics, media houses have certain bias in their narration. Due to their reliance to different parties people are just exposed to one side of the truth. Media has caused lots of social upheavals across the country which has resulted in political turmoil.

The violence which is being promoted in media increases the likelihood of aggressive and violent behaviour in both short and long term context.

The next thing is cyber bullying which is the most common thing in social media. This creates depression and stress among the youth. The juggernaut of media is a double edged sword. On one hand if it is used properly, it can prove to be a boon to the society. On the other hand, it can sound the death knell of the social fabric.

So it is up to us. We have to control our minds and we have to decide which is right and which is wrong.

**SUBMITTED BY,
RITHI AFRA J,
FINAL YEAR – IT.**

MACHINE LEARNING

The term Machine Learning was coined by Arthur Samuel in 1959, an American pioneer in the field of computer gaming and artificial intelligence and stated that “it gives computers the ability to learn without being explicitly programmed”. And in 1997, Tom Mitchell gave a “well-posed” mathematical and relational definition that “A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E.

CLASSIFICATION OF MACHINE LEARNING:

Machine learning implementations are classified into three major categories, depending on the nature of the learning “signal” or “response” available to a learning system which are as follows :

- 1. Supervised learning:** When an algorithm learns from example data and associated target responses that can consist of numeric values or string labels, such as classes or tags, in order to later predict the correct response when posed with new examples comes under the category of Supervised learning.
- 2. Unsupervised learning:** Whereas when an algorithm learns from plain examples without any associated response, leaving to the algorithm to determine the data patterns on its own. This type of algorithm tends to restructure the data into something else, such as new features that may represent a class or a new series of un-correlated values. They are quite useful in providing humans with insights into the meaning of data and new useful inputs to supervised machine learning algorithms.
- 3. Reinforcement learning :** When you present the algorithm with examples that lack labels, as in unsupervised learning. However, you can accompany an example with positive or negative feedback according to the solution the algorithm proposes comes under the category of Reinforcement learning, which is connected to applications for which the algorithm must make decisions (so the product is prescriptive, not just descriptive, as in unsupervised learning), and the decisions bear consequences.

4. **Semi-supervised learning:** where an incomplete training signal is given: a training set with some (often many) of the target outputs missing. There is a special case of this principle known as Transduction where the entire set of problem instances is known at learning time, except that part of the targets are missing.

CATEGORIZING ON THE BASIS OF REQUIRED OUTPUT:

Another categorization of machine learning task arises when one considers the desired output of a machine-learned system:

1. **Classification:** When inputs are divided into two or more classes, and the learner must produce a model that assigns unseen inputs to one or more (multi-label classification) of these classes. This is typically tackled in a supervised way. Spam filtering is an example of classification, where the inputs are email (or other) messages and the classes are “spam” and “not
2. **Regression:** Which is also a supervised problem, A case when the outputs are continuous rather than discrete.
3. **Clustering:** When a set of inputs is to be divided into groups. Unlike in classification, the groups are not known beforehand, making this typically an unsupervised task

SUBALAKSHMI.S

3RD YEAR,IT

MICROKERNEL IN OPERATING SYSTEM

Kernel is the core part of an operating system which manages system resources. It also acts like a bridge between application and hardware of the computer. It is one of the first programs loaded on start-up (after the Bootloader).

Kernel mode and user mode of CPU operation

The CPU can execute certain instruction only when it is in the kernel mode. These instruction are called privilege instruction. They allow implementation of special operation whose execution by the user program could interface with the functioning of operating system or activity of another user program. For example, instruction for managing memory protection.

- The operating system puts the CPU in kernel mode when it is executing in the kernel so, that kernel can execute some special operation.
- The operating system puts the CPU in user mode when a user program is in execution so, that user program cannot interface with the operating system program.
- User-level instruction does not require special privilege. Example are ADD,PUSH,etc.

The concept of modes can be extended beyond two, requiring more than a single mode bit CPUs that support virtualization use one of these extra bits to indicate when the virtual machine manager, VMM, is in control of the system. The VMM has more privileges than ordinary user programs, but not so many as the full kernel.

System calls are typically implemented in the form of software interrupts, which causes the hardware's interrupt handler to transfer control over to an appropriate interrupt handler, which is part of the operating system, switching the mode bit to kernel mode in the process. The interrupt handler checks exactly which interrupt was generated, checks additional parameters (generally passed through registers) if appropriate, and then calls the appropriate kernel service routine to handle the service requested by the system call.

User programs' attempts to execute illegal instructions (privileged or non-existent instructions), or to access forbidden memory areas, also generate software interrupts, which are trapped by the interrupt handler and control is transferred to

the OS, which issues an appropriate error message, possibly dumps data to a log (core) file for later analysis, and then terminates the offending program.

What is Microkernel?

Microkernel is one of the classification of the kernel. Being a kernel it manages all system resources. But in a microkernel, the **user services** and **kernel services** are implemented in different address space. The user services are kept in **user address space**, and kernel services are kept under **kernel address space**, thus also reduces the size of kernel and size of operating system as well

It provides minimal services of process and memory management. The communication between client program/application and services running in user address space is established through message passing, reducing the speed of execution microkernel. The Operating System **remains unaffected** as user services and kernel services are isolated so if any user service fails it does not affect kernel service. Thus it adds to one of the advantages in a microkernel. It is easily **extendable** i.e. if any new services are to be added they are added to user address space and hence requires no modification in kernel space. It is also portable, secure and reliable.

**SUBMITTED BY,
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COMMONLY ASKED JAVA PROGRAMMING INTERVIEW QUESTIONS:

In this article, some of the most important Java Interview Questions and Answers are discussed, to give you the cutting edge in your interviews. Java is one of the most popular and widely used programming language and platform. Java is fast, reliable and secure.

1.Can we overload or override static methods in java?

- **Overriding** : Overriding is related to run-time polymorphism. A subclass (or derived class) provides a specific implementation of a method in superclass (or base class) at runtime.
- **Overloading**: Overloading is related to compile time (or static) polymorphism. This feature allows different methods to have same name, but different signatures, especially number of input parameters and type of input parameters.
- **Can we overload static methods?** The answer is ‘Yes’. We can have two or more static methods with same name, but differences in input parameters
- **Can we Override static methods in java?** We can declare static methods with same signature in subclass, but it is not considered overriding as there won't be any run-time polymorphism. Hence the answer is ‘No’. Static methods cannot be overridden because method overriding only occurs in the context of dynamic (i.e. runtime) lookup of methods. Static methods (by their name) are looked up statically (i.e. at compile-time).

2. What happens if you remove static modifier from the main method?

Program compiles successfully. But at runtime throws an error “NoSuchMethodError”.

3. What is the in java in following cases?

- **Member Variables** (Class Level Scope) : The member variables must be declared inside class (outside any function). They can be directly accessed anywhere in class
- **Local Variables** (Method Level Scope) : Variables declared inside a method have method level scope and can't be accessed outside the method.

Loop Variables (Block Scope) : A variable declared inside pair of brackets “{” and “}” in a method has scope within the brackets only.

4. Which class is the superclass for every class?

Object class

5. Can we override private methods in Java?

No, a private method cannot be overridden since it is not visible from any other class

6. What is static variable in java

The static keyword in java is used for memory management mainly. We can apply java static keyword with variables, methods, blocks and nested class. The static keyword belongs to the class than the instance of the class.

The static can be:

- variable (also known as class variable)
- method (also known as class method)
- block
- nested class

7. When is the super keyword used?

super keyword is used to refer:

- immediate parent class constructor,
- immediate parent class variable,
- immediate parent class method.

8. Difference in set and list interface?

Set and list both are child interface of collection interface. There are following two main differences between them

- List can hold duplicate values but set doesn't allow this.
- In List interface data is present in the order you inserted but in the case of set insertion order is not preserved.

9. Explain final keyword in java?

Final keyword in java is used to restrict usage of variable, class and method.

10. Difference in set and list interface?

Set and list both are child interface of collection interface. There are following two main differences between them

- List can hold duplicate values but set doesn't allow this.
- In list interface data is present in the order you inserted but in the case of set insertion order is not preserved.

**SUBMITTED BY,
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IoT AND THE NEW AUTOMATED SELF-CHECKOUT MACHINES

We have discerned an enormous uplift in the adoption of self-checkout (SCO) by retailers over recent years. This trend is primarily propelled by consumer experience, cost savings and most recently the COVID-19 pandemic has been charged for stimulating the thrust for creation in physical retail. Self-checkouts (SCOs), also known as assisted checkouts (ACOs) or self-service checkouts, are devices that deliver a mechanism for consumers to accomplish their transactions from a dealer without requiring a conventional staffed checkout. When using SCOs, customers scan item barcodes before paying without wanting one-to-one staff assistance. Self-checkouts are utilized largely in supermarkets. Most self-checkout regions are overseen by at least one staff member, frequently boosting customers' process transactions or correcting prices.

Furthermore, recent US-based research by weigh scale solutions manufacturer, Shekel Brainweigh found that almost two-thirds of customers are shifting their grocery shopping habits in reaction to the worldwide COVID-19 pandemic, whilst over 87% of shoppers say they would incline toward shop in stores with touchless or frictionless self-checkout options.

The pandemic has directed to a massive increase in contactless card payments with customers being worried about the probable health implications of handling cash. According to a recent poll of 1,000 UK consumers delegated by Ergonomic Solutions, 60% of respondents have improved their use of contactless. This improvement can also be associated with the raising of the contactless payment threshold introduced across much of Europe along with the capacity to attain their transaction without any desire to physically interact with the technology.

Lengthy queues and waiting times could steer customer churn. On the other hand, strengthening a huger crew to trade with congestion may not be economically possible. With IoT, you can set up a network to read tags on each item as the customers appear at the checkout or depart the shop or even as they put articles into their shopping cart. You can further automate the billing and payment method by promptly generating the bill to your consumer's mobile phone or email and deducting the expenditure from their payments app. This seamless procedure can develop high levels of customer satisfaction and pan out saving your customers a lot of time which would likely give rise to making them return to your store more often, even when they are in a hurry.

The census, enforced in the U.S., found that more than two-thirds of consumers are now using self-checkout, touchless self-checkout, or frictionless micro-markets to pay for groceries, while less than one-third of respondents are ordering groceries online. Exactly half of the consumers are conscious of touchless self-checkout options, where items are automatically scanned and discerned without requiring to touch a pad or screen to enter their names. Self-checkout options stay prominent with almost 75% of shoppers using self-checkout to pay for groceries frequently. 90% of respondents were between the ages of 18-60.

As of 2013, there were 191,000 self-checkout units deployed across the world, and by 2025, it is foreseen that 1.2 million units will be introduced worldwide. The devices were initially formulated by David R. Humble, with NCR Corporation having the largest market share.

Decathlon is inaugurating a mobile self-checkout solution across its 81 stores in Germany facilitating consumers to scan and pay for items via their smartphone, thereby decreasing vital contact with other people, lessening the threat of Covid-19 transmission. Walmart is the biggest, with about 21% of the market share the previous year. Yet even as a minor performer, Amazon has been an ambitious one. It has quickly broadened its biological grocery footprint to comprise dozens of cashier-less Amazon Go shops, a new chain of Amazon Fresh grocery stores, and hundreds of Whole Foods locations. It's stirred up on how customers shop, pay for and obtain their groceries.

IoT-connected devices can enhance how we work and live. Today, we're living in a world where there are more IoT-connected devices than humans. The Internet of Things pledges many optimistic modifications for health and safety, business operations, industrial performance, and humanitarian issues. The Internet of Things has had substantial impacts on our world. IoT enables in understanding customer needs in a big-time hence, the self-checkout machine has helped the retail shopkeepers during this pandemic time by helping them understand the consumer needs.

Aswini Devi. B

2nd year, IT.

MICROSERVICE ARCHITECTURE

Definition of architectural term:

The term "Microservice Architecture" has sprung up over the last few years to describe a particular way of designing software applications as suites of independently deployable services. While there is no precise definition of this architectural style, there are certain common characteristics around organization around business capability, automated deployment, intelligence in the endpoints, and decentralized control of languages and data.

MONOLITHIC ARCHITECTURE:

monolithic style: a monolithic application built as a single unit. Enterprise Applications are often built in three main parts: a client-side user interface (consisting of HTML pages and javascript running in a browser on the user's machine) a database (consisting of many tables inserted into a common, and usually relational, database management system), and a server-side application. The server-side application will handle HTTP requests, execute domain logic, retrieve and update data from the database, and select and populate HTML views to be sent to the browser. This server-side application is a *monolith* - a single logical executable. Any changes to the system involve building and deploying a new version of the server-side application.

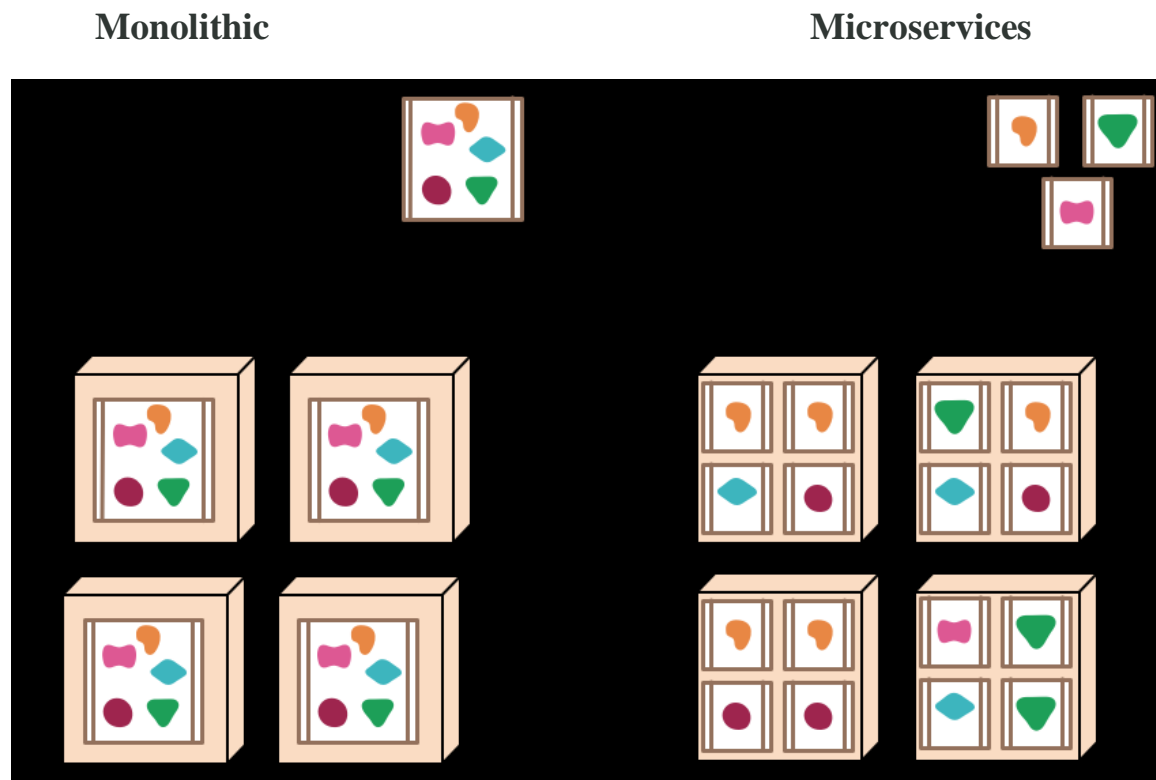
Such a monolithic server is a natural way to approach building such a system. All your logic for handling a request runs in a single process, allowing you to use the basic features of your language to divide up the application into classes, functions, and namespaces. With some care, you can run and test the application on a developer's laptop, and use a deployment pipeline to ensure that changes are properly tested and deployed into production. You can horizontally scale the monolith by running many instances behind a load-balancer.

Monolithic applications can be successful, but increasingly people are feeling frustrations with them - especially as more applications are being deployed to the cloud. Change cycles are tied together - a change made to a small part of the application, requires the entire monolith to be rebuilt and deployed. Over time it's often hard to keep a good modular structure, making it harder to keep changes that ought to only affect one module within that module. Scaling requires scaling of the entire application rather than parts of it that require greater resource.

MICROSERVICE_ARCHITECTURE:

Microservices - yet another new term on the crowded streets of software architecture. Although our natural inclination is to pass such things by with a contemptuous glance, this bit of terminology describes a style of software systems that we are finding more and more appealing. We've seen many projects use this style in the last few years, and results so far have been positive, so much so that for many of our colleagues this is becoming the default style for building enterprise applications.

These frustrations have led to the microservice architectural style: building applications as suites of services. As well as the fact that services are independently deployable and scalable, each service also provides a firm module boundary, even allowing for different services to be written in different programming languages. They can also be managed by different teams



**HEMALATHA A,
VAISHNAVI M,
3rd YEAR , IT**

TECHNICAL INTERVIEW QUESTION

1.What does following program snippet prints out?

```
public class test
{
public static void main(String args[])
{
System.out.println((Math.min(Double.MIN_VALUE, 0.0d));
}
}
```

Answer: output: 0.0

Explanation: This question is tricky because unlike the Integer, where MIN_Value is negative .because of Double.MIN_VALUE is greater than 0.1.

2. Does java support multiple inheritance?

Answer is much more simple than it looks like, because Java does support multiple inheritances of Type by allowing an interface to extend other interfaces, what Java doesn't support is multiple inheritances of implementation.

3. A complete binary tree has a property that the value at each node is at least as large as the values at its children nodes. What is this binary tree known as?

- A. Binary Search Tree
- B. AVL Tree
- C. Completely Balanced Tree
- D. Heap

Answer: Heap

4. For which of the following is the stack implementation useful?

- A. Radix search
- B. Breadth first search

- C. Recursion
- D. None of the above

Answer: Recursion

5 Which of the following sorting algorithm yields approximately the same worst case and average-case running time behaviour in order(log n)?

- A. Bubble sort and Selection sort
- B. Heap sort and Merge sort
- C. Quick sort and Radix sort
- D. Tree sort and Median-of-3 Quick sort

Answer: Heap sort and Merge sort

6. Anuj writes a program in low level language, now she wants to translate it into a higher language without rewriting the program. What another program she must use for this purpose?

- A. Compiler
- B. Decompiler
- C. Interpreter
- D. Executer
- E. Cross compiler

Answer: Compiler

7.What is Correlated Subquery in DBMS?

Answer: A Subquery is also known as a nested query i.e. a query written inside some query. When a Subquery is executed for each of the rows of the outer query then it is termed as a Correlated Subquery. Example of Non-Correlated Subquery is: Select * from EMP where „RIYA“ IN (Select Name from DEPT where EMP.EMPID=DEPT.EMPID)

8.What are the disadvantages of using a DBMS?

Answer: 1) High initial investments in h/w, s/w, and training.

2) Generality that a DBMS provides for defining and processing data.

3) Overhead for providing security, concurrency control, recovery and integrity functions.

9.What is the query to find 2nd highest salary of an employee?

Answer: SELECT max(salary) FROM EMPLOYEES WHERE salary IN (SELECT salary FROM EMPLOYEEs MINUS SELECT max(salary) FROM EMPLOYEES); (OR) SELECT max(salary) FROM EMPLOYEES WHERE salary <> (SELECT max(salary) FROM EMPLOYEES);

10.Get employee details from employee table whose first name ends with 'n' and name contains 4 letters

Answer: Select * from EMPLOYEE where FIRST_NAME like '____n'
(Underscores).

**SUBMITTED BY,
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