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Q1

Write a characteristic of Computer. Explain each in details.

ANS: characteristic of computer are following.

Basic characteristics about computer are:

Speed: - As you know computer can work very fast. It takes only few seconds for calculations that we take hours to complete. You will be surprised to know that computer can perform millions (1,000,000) of instructions and even more per second. Therefore, we determine the speed of computer in terms of microsecond (10^{-6} part of a second) or nanosecond (10^{-9} part of a second). From this you can imagine how fast your computer performs work.

Accuracy: - The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The accuracy level is 7.

determined on the basis of design of computer. The errors in computer are due to human and inaccurate data.

Diligence: - A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this capability it overpowers human being in routine type of work.

Versatility: - It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills.

Power of Remembering: - Computer has the power of storing any amount of information or data. Any information can be stored and recalled as long as you require it, for any numbers of years. It depends entirely upon you how much data you want to store in a computer and when to lose or retrieve these data.

No IQ: - Computer is a dumb machine and it cannot do any work without instruction from the user. It performs the instructions at tremendous speed and with accuracy. It is you to decide what you want to do and in what sequence. So a computer cannot take its own decision as you can.

No Feeling: - It does not have feelings or emotion, taste, knowledge and experience. Thus it does not get tired even after long hours of work. It does not distinguish between users.

Storage: - The Computer has an in-built memory where it can store a large amount of data. You can also store data in secondary storage devices such as floppies, which can be kept outside your computer and can be carried to other computers

Q 2

Write a note on each of the following.

- **Machine learning (ML)**

is the study of computer algorithms that improve automatically through experience.^{[1][2]} It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so.^[3] Machine learning algorithms are used in a wide variety of applications, such as email filtering and computer vision, where it is difficult or infeasible to develop conventional algorithms to perform the needed tasks.

Machine learning is closely related to computational statistics, which focuses on making predictions using computers. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a related field of study, focusing on exploratory data analysis through unsupervised learning.^{[5][6]} In its application across business problems, machine learning is also referred to as predictive analytics.

(b) 5G technology :

5G Technology: 5G mobile communications

The new 5G mobile communications system will enable many new mobile capabilities to be realised - offering high speed, enormous capacity, IoT capability, low latency and much more it provides the bearer for many new applications

5G	Cellular	Technology	Tutorial	Includes:
5G Technology	5G Requirements	5G NR, New Radio	5G NG	NextGen Network
5G waveforms & modulation	5G mmWave	Massive MIMO & beam-forming	Frequency bands & channels	5G multiple access scheme
Data channels: physical, transport & logical				

The 5G mobile communications system provides a far higher level of performance than the previous generations of mobile communications systems.

The new 5G technology is not just the next version of mobile communications, evolving from 1G to 2G, 3G, 4G, but it provides a new approach giving ubiquitous connectivity.

5G technology is very different. Previous systems had evolved driven more by what could be done with the latest technology. The new 5G technology has been driven by specific uses and applications.

5G mobile communications has been driven by the need to provide ubiquitous connectivity for applications as diverse as automotive communications, remote control with haptic style feedback, huge video

downloads, as well as the very low data rate applications like remote sensors and what is being termed the IoT, Internet of Things.

(C) Central processing Unit (CPU):

The central processing unit (CPU) or processor, is the unit which performs most of the processing inside a computer. It processes all instructions received by software running on the PC and by other hardware components, and acts as a powerful calculator.

The CPU is placed into a specific square-shaped socket found on all motherboards by inserting its metallic connectors or pins found on the underside. Each socket is built with a specific pin layout to support only a specific type of processor.

Since modern CPUs produce a lot of heat and are prone to overheating, they must be kept cool with appropriate fans or ventilation systems, and covered with heat sinks and thermal paste.

To control instructions and data flow to and from other parts of the computer, the CPU relies heavily on a chipset, which is a group of microchips located on the motherboard.

(d) Non-Positional Number Systems:

- **Characteristic:**

- use symbol such as i for 1,ii for 2,iii for 3,iiii for 4,iiiii for 5,etc

- Each symbol represents the same value regardless of its position in the number

- The symbols are simply added to find out the value of a particular number

- **Difficulty:**

- It is difficult to perform arithmetic with such a number system

Q3 Solve the following questions.

(a) Convert $(110101010)_2$ in to $()_{10}$

$$(110101010)_2 \quad (?)_{10}$$

$$(1 \times 2^8) \quad (1 \times 2^7) \quad (0 \times 2^6) \quad (1 \times 2^5) \quad (0 \times 2^4)$$

$$(1 \times 2^3) \quad (0 \times 2^2) \quad (1 \times 2^1) \quad (0 \times 2^0)$$

$$256 + 128 + 0 + 32 + 0 + 8 + 0 + 2 + 0$$

$$(426)_{10}$$

$$(110101010)_2 \quad (426)_{10}$$

Ans

Q3 b:

Multiply binary number 10001010
and 10101101

10001010 and 10101101

$$\begin{array}{r} 10001010 \\ 10101101 \\ \hline 00001010 \\ 00000000x \\ 010001010xx \\ 010001010xxx \\ 000000000xxx \\ 100010100xxxx \\ 000000000xxxx \\ \hline 101110101000010 \end{array}$$

Ans

