What is *not* true about database relationships?

Step 1: Answer

They tend to increase the overall file size of a database

Step 2: Explanation

Relationships between tables are associations that are made using join statements to retrieve data.

Different sorts of data sets are gathered in relational databases using tables, records, and columns. In order to make relational databases easier to store, it is utilised to establish a clear relationship between database tables. Take relational databases like Microsoft SQL Server, Oracle Database, MYSQL, etc. as an example.

What is *not* true about modules?

Step 1: Answer

It is required for intermediate users.

Step 2: Explanation

Like macros, modules are objects that you may employ to give your database extra capabilities. While modules are written in the Visual Basic for Applications (VBA) programming language, macros are created in Access by selecting from a list of macro operations.

The code for the visual basic editor is stored in a file with the ". bcf" extension as a VBA module. There is a separate code window for writing in each module. A new module can be added, deleted, backed up, and imported.

A named group of declarations is known as a module (fields, methods, classes, interfaces, sub-modules, etc.) Modules are typically equivalent to classes, packages, files, and components in object-oriented programming.

One of the reasons someone may choose to start a database with a template is to save time by not having to \_\_\_\_\_\_\_\_.

Step 1:

Create as many objects

Step 2: Explanation

Any defined object used to hold or refer to data in a database is referred to as a database object. Database objects are any creations we build using the create command. It is possible to utilise it to store and manage the data. Views, sequences, indexes, and other database objects are a few examples.

Which of the following can*not* be imported from one Access database into another Access database?

Step 1: Answer

Sheets

Step 2: Explanation

The majority of desktop spreadsheet programmes normally offer cell formulae, and Google Sheets does too. Formulas that handle data and compute strings and integers can be built using functions.

Either MDB or ACCDB can be used as the file format. You can only import tables and queries from other Access databases if the file is in MDE or ACCDE format. Forms, reports, macros, and modules cannot be imported into an MDE or ACCDE file.

What field property insures that all phone numbers have a consistent look?

Step 1: Answer

Input Mask

Step 2: Explanation

A string of characters known as an input mask serves as a format indicator for valid input values. Table fields, query fields, and buttons on forms and reports can all employ input masks. An object property stores the input mask. When it's crucial that the input values' formats are uniform, you employ an input mask.

If you want the results of a query to display only those records that meet all criteria, you would use the \_\_\_\_\_\_\_\_ operator.

Step 1: Answer

AND

Step 2: Explanation

To filter records based on multiple criteria, use the AND and OR operators: If every condition that is divided by AND is TRUE, the AND operator displays a record. If any of the terms divided by OR is TRUE, the OR operator outputs a record.

When you import data, where can you *not* store it?

Step 1: Answer

New form

Step 2: Explanation

You can transfer data from outside sources and integrate it with data you gather through Analytics using Data Import. Then, using analytics, you can arrange and examine all of your data in ways that more accurately represent your company.

Which option would this wildcard, "H[!oe]" *not* display?

Step 1: Answer

House

Step 2: Explanation

A regular expression is a string of letters that designates a text search pattern. Such patterns are typically utilised by string-searching algorithms for input validation or "find" or "find and replace" operations on strings.

What field property helps to make sure that correct data is entered?

Step 1: Answer

Validation rule

Step 2: Explanation

One technique to limit input in a table field or a control (like a text box) on a form is to use a validation rule. You can give users who enter invalid data a message using validation text.

 Heterogeneous database migrations are difficult because: (Select TWO Responses)

Step 1: Answer

c.      You must export all data to flat files before importing to the new database.

d.     There may be incompatibilities of schema and database code.

Step 2: Explanation

A heterogeneous migration is one in which the source and target databases are created using multiple database management systems from various vendors.

There are numerous problems with query processing in a diverse database! Translation of the schema

Translation of the schema For each data source, create a wrapper to convert the data to a global schema. Additionally, wrappers must convert changes to the global schema into changes to the local schema! limited capabilities for queries

Some data sources, like flat file data sources and web forms, only permit certain types of options. It is necessary to split up and process queries partially at the source and partially at a distant location! When websites contain overlapping information, remove the duplicates! Choose which websites to query

Choose which websites to query query optimization globally

Which of the following is a major task in a database migration?

Step 1: Answer

b.     Compression

c.      Deduplication

step 2: Explanation

By re-encoding the file data to use fewer bits of storage than the original file, data compression is a procedure that reduces the size of a file. The ability to move, save, reconstruct, and use the original file later is a key aspect of data compression (with a process called decompression).

Which method would you use to replicate only file changes instead of entire files? <

Step 1: Answer

Block based replication

Step 2:

File-level replication replicates whole files as opposed to the storage blocks that make up those files, whereas block-level replication copies individual storage blocks. The optimum use for block-level replication is definitely in backup programmes.

 There are typically hundreds of sectors per track and they may be either fixed or variable lengths.

Step 1: Answer

True

Step 2: Explanation

Hard disc platters are separated into a number of concentric tracks. Individually track has a number of sectors that can each hold the same amount of data. The smallest physical storage unit on a disc is called a sector, and on most file systems, it has a fixed size of 512 bytes.

Each track has hundreds of sectors, some of which may have fixed lengths and others which may have variable lengths.

29. A bit near the center of a rotating disk travels past a fixed point slower than a bit on the outside.

Step 1:

True

Step 2:

The discs might be fixedly affixed to the computer or could be taken out. The discs may be physically separated from the computers they service and connected to a network in large computer systems like mainframes and server farms.

In a spinning disc, a bit towards the centre moves past a fixed point more slowly than a bit on the outside.

30. With isolated I/O there is a single address space for memory locations and I/O devices.

Step 1: Answer

false

step 2: Explanation

Memory-mapped I/O addresses I/O devices and main memory using the same address space. I/O device memory and registers are mapped to (connected to) address values. A memory address can therefore refer to the memory and registers of the I/O device or a section of physical RAM.

31. The head must generate or sense an electromagnetic field of sufficient magnitude to write and read properly.

Step 1: Answer

True

Step 2: Explanation

 Most of the electromagnetic radiation that humans emit is infrared radiation, which has a frequency lower than visible light. This result does not only apply to people.

The fact that the brain produces its own electromagnetic field (EM field), which can be detected by electrodes put into the brain, has been known since the 19th century. As a result of ions moving in and out of the neuronal membranes during action potentials and synaptic potentials, electrical dipoles within those membranes serve as its source.

32. RAID is a set of ph) disk drives viewed by the operating system as a single logical drive.

Step 1: Answer

True

Step 2: Explanation

RAID (redundant array of independent discs) is a technique for protecting data in the event of a drive failure by storing the same data in several locations on numerous hard discs or solid-state drives (SSDs). However, there are several RAID levels, and not all of them aim to provide redundancy.

33. SSD performance has a tendency to speed up as the device is used.

Step 1: Answer

True

Step 2: Explanation

In the hierarchy of computer storage, a solid-state drive is a solid-state storage device that uses integrated circuit assemblies to store data persistently, generally using flash memory.

Solid-state drives, or SSDs, are a form of storage component found in computers. Persistent data is stored on solid-state flash memory in this non-volatile storage medium. SSDs perform the same fundamental tasks as a hard drive and are used in place of conventional hard disc drives (HDDs) in computers.

34. Flash memory becomes unusable after a certain number of writes.

Step 1: Answer

True

Step 2: Explanation

Flash memory, commonly referred to as flash storage, is a kind of nonvolatile memory that rewrites data at the byte level and erases data in units called blocks. Consumer electronics, business systems, and industrial applications all frequently use flash memory for data storage and transfer.

The floating gate serves as a charge storage area for the Flash memory cell. The channel's ability to conduct will then depend on the presence of charge. A "1" at the output during the read cycle indicates that the channel is in its low resistance or ON state.

35. An 1/O module must recognize one unique address for each peripheral it controls.

Step 1: Answer

True

Step 2: Explanation

The transfer of data between a processor and an I/O module, the acceptance and decoding of commands supplied by the processor, the reporting of current status, and the capacity of the I/O module to recognise its own specific address are the main activities involved in processor communication.

36. 1/0 channels are commonly seen on microcomputers, whereas i/o controllers are used on mainframes.

Step 1: Answer

False

Step 2: Explanation

An input channel, also referred to as an I/O channel, is a data communication path from the input/output bus, memory, and a CPU or computer peripheral. Based on the instructions from the CPU, it performs I/O instructions and manages I/O operations.

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37. A disadvantage of memory-mapped I/O is that valuable memory address space is used up.

Step 1: Answer

True

Step 2: Explanation

SQLite cannot detect and handle an I/O error on a memory-mapped file. As an alternative, the I/O error generates a signal that, if ignored by the application, leads to a programme crash.

The biggest drawback of MMFs is that they use up RAM, which reduces the efficiency of the file system cache. With such small files, there is no problem. Another drawback, though one that was undoubtedly intended, is that it is now impossible to calculate the cost of writing a file.

38. The disadvantage of the software poll is that it is time consuming.

Step 1: Answer

True

Step 2: Explanation

In computer science, the term "polling" or "polled operation" refers to a client application actively sampling the status of an external device as a synchronous action. I/O polling, also known as polled I/O or software-driven I/O, is most frequently used in relation to I/O.

Polling has drawbacks, like the CPU using needless time to check devices that haven't looked for data transfer and some devices' standby times being shorter than their response times, necessitating the use of a different transmission mechanism.

The time-consuming nature of the software poll is a drawback.

39. When large volumes of data are to be moved, a more efficient technique is direct memory access.

Step 1: Answer

True

Step 2: Answer

Data transmission without the need of the processor is known as direct memory access (DMA). It is frequently used to transport data between input and output devices. It is necessary to use a different DMA controller to manage the transfer.

Direct memory access is a more effective method to transport huge amounts of data (DMA).

40. An I/O channel has the ability to execute I/O instructions, which gives it complete control over V/O operations.

Step 1: Answer

True

Step 2: Explanation

An input channel, also referred to as an I/O channel, is a data communication path from the input/output bus, memory, and a CPU or computer peripheral. Based on the instructions from the CPU, it performs I/O instructions and manages I/O operations.

The DMA idea is expanded upon by I/O Channel. It has full control over I/O operations and the ability to execute I/O instructions using a special-purpose processor on an I/O channel. I/O instructions are not carried out directly by the processor.

\*\*\*\*\*

      Which of the following would essentially be the same whether running an OS on a virtual server or a physical server? (Choose two.)

Step 1: Answer

Security configuration

Licensing

Step 2: Explanation

Virtual machine licencing To licence virtual machines, use a host computer as the local licence server (VMs). This is especially helpful if your PC runs various product software versions, each of which is operating on a different virtual machine.

The mobility of physical servers and virtual servers is one of their main distinctions. With little effort on your part, you may quickly migrate virtual machines (VMs) across virtual environments and even from one real server to another. This is because VMs are hardware-independent because they are separated from one another and have their own virtual hardware.

An information system's default settings can be changed as part of the security configuration management process to improve security and reduce risk. Misconfigurations of a system's default configuration are found through security configuration management.

**Alice and Bob are using Public Key encryption. Alice's public and private keys are named A-Pub and A-Priv. Bob ’s public and private keys are named B-Pub and B-Priv**

**If Bob is sending encrypted data to Alice. Which key does Bob use to encrypt the data? Which key does Alice use to decrypt the data?**

Step 1:

Three mathematically related keys are used in transform encryption: one to encrypt plaintext for transmission to a recipient, another to decrypt the cipher text, and a third to change the cipher text for transmission to a recipient so that it can be decrypted by a different receiver.

A group public key is used to encrypt plaintext; a transform key transforms the plaintext into member cipher text; and the member private key decrypts the member cipher text on the member's client device, restoring the original plaintext.

Step 2:

You should now be aware that public-key encryption allows for the existence of both a public key and a private key. Typically, if Alice gives Bob encrypted data, Bob will encrypt it using his public key (Bpub), and then decrypt it using his private key (Bpriv).

Let's imagine instead that we have two key pairs that belong to Alice and Bob, respectively: (Apriv, Apub) and (Bpriv, Bpub). Alice's public key (Apub) is used to encrypt the data, while Bob's private key is used to decrypt it (Bpriv) Transform encryption is used in this situation, and a unique transform key (Apub -> Bpub) utilising Alice's private key (Apriv) and Bob's public key is used (Bpub).

Trent would then receive the encrypted data that had been secured using Alice's public key (Apub), along with the transformation key. Then, Trent can provide Bob the necessary cipher text, which he can only decipher using his private key (Bpriv).

If Alice is adding a digital signature to her messages to Bob to prove her identity. Which key does Alice use to encrypt the Message Authentication Code (MAC) that she sends? Which key does Bob use to decrypt the MAC that he receives?

Step 1:

A secret component and a public part make up the key in public key cryptography. Alice must first obtain Bob's public key in order to communicate with him. Bob likes to be reached, even if it's only through encrypted messaging, therefore he made his public key available for download on his homepage. After obtaining Bob's public key, Alice uses it to encrypt a message before sending it to Bob. Bob can then use the hidden portion of his own key to decrypt the message.

Advantages

1. Only one piece needs to remain a secret.

2. You don't have to modify your public/private key pair (unless someone finds your public key)

5. It can be used as a digital signature

Step 2:

Alice wants to submit a message on a website forum and wants everyone who visits the forum to be able to verify that the message was indeed posted by her and not by someone else who is impersonating her. Alice takes her message and encrypts it with her personal key. If Alice genuinely submitted the message in the forum, it should be possible to decrypt it using her public key. Her public key is available to everyone; thus this can be confirmed.

Describe the problems with the traditional two-tier client–server architecture and discuss how these problems were overcome with the three-tier client–server architecture.

Step 1:

The first tier of a two-tier architecture is where the client is located. On the same server machine, which is part of the second tier, are both the database server and the web application server. The web application's second tier serves data and carries out business logic. Businesses that choose this design frequently desire to combine their database server and application server capabilities onto a single tier. The organization's online environment's availability, scalability, and performance characteristics are provided by the second tier.

Step 2:

The application logic or process in a three-tier system resides in the middle tier, away from the data and user interface. Systems with three tiers are more scalable, reliable, and adaptable. They can also combine data from several sources. Between the user system interface client environment and the database management server environment, a third tier was added to the three-tier design. This intermediate layer can be implemented in many different ways, such as via message servers, application servers, or transaction processing monitors.

The main advantage of a three-tier architecture is that each tier may be built concurrently by a different development team and can be updated or scaled as necessary without affecting the other tiers because each tier runs on its own infrastructure.

Briefly describe the file-based system.

Step 1:

The naming, storing, and retrieval of files from a storage device are all governed by a file system. Your operating system uses its internal file system to load a file from the storage device each time you open a file on your computer or mobile device.

Step 2:

A file system, often known as a file-based data management system, is a form of software that enables users to access and arrange small groupings of data. It is in charge of saving and retrieving files from a storage media, like a hard drive or flash drive, and is typically integrated into a computer's operating system.

The phrase "file-based approach" describes a situation in which data is kept in one or more distinct computer files that are organised and controlled by various application applications.  Typically, for example, the details of customers may be stored in one file, orders in another, etc.

**What are the disadvantages of the file-based system and how are these disadvantages addressed by the DBMS approach?**

Step 1:

A file system, often known as a file-based data management system, is a form of software that enables users to access and arrange small groupings of data. It is in charge of saving and retrieving files from a storage media, like a hard drive or flash drive, and is typically integrated into a computer's operating system.

Step 2: Disadvantage

**Redundant data:**

It's conceivable for the same data to appear twice in distinct files. This causes data duplication, which wastes memory.

**Data Inconsistency:**

Due to data redundancy, it is possible that the data may not be in a consistent state.

**Data Accessibility Issues:**

The file processing system makes it difficult and inefficient to access data.

**Limited Data Sharing:** Data are dispersed throughout different files. Additionally, separate files may have various formats, and they may be kept in several directories belonging to various departments. Therefore, it is challenging to transfer data among other apps as a result of this data segregation.

**Integrity issues:**

Data integrity refers to the accuracy and consistency of the data stored in a database. The data saved in the database must adhere to correctness and limitations for this reason.

**Problems with atomicity:**

All database operations must be atomic. This implies that it must occur completely or not at all.

**Concurrent Access Anomalies:**

Multiple people may access data simultaneously, which is known as a concurrent access anomaly.

Better performance and quicker reaction are the intended benefits of this.

**Security issues:**

Users should only have limited access to the database.

Each user should only be able to access the information that pertains to his needs.

Step 3:

The process of maintaining data in two or more locations within a database or data storage system is known as data redundancy. In the event that something was to happen to an organization's data, data redundancy assures that activities or services can continue.

when the same data is present in numerous tables in various formats. Data consistency is the term used to describe this issue. It implies that various files regarding a specific thing or person have different information in them. As a result, there can be inaccurate and meaningless information.

Sequential access and random access are the two methods used to access data that has been stored. The sequential method necessitates the use of a seek operation to transfer data across the disc until the desired data is found. Each data segment must be read one by one until the requested data is found.

It suggests that the data are kept on one or more network servers, and that a software locking mechanism prevents two users from making simultaneous changes to the same set of data. A database management system's main feature is data sharing (DBMS).

The primary key cannot be null thanks to the Entity Integrity Constraint. Individual records in a table are identified by a primary key, and if the primary key is null, we are unable to do so.

An atomic transaction is a sequence of database actions that cannot be divided or reduced; either everything happens or nothing happens. A guarantee of atomicity stops incomplete database modifications from happening, which can cause greater problems than rejecting the whole series outright.

Multiple users having simultaneous access to the same data is referred to as concurrent access. When changes made by one person are overwritten by changes made by another user, an anomaly has occurred. There is no process to prevent abnormalities in the file system.

The variety of tools, rules, and precautions created to establish and maintain database confidentiality, integrity, and availability is referred to as database security.

**Why would an organization outsource information systems operations?**

Step 1:

When information systems (IS) are outsourced, an external, specialised supplier provides and/or manages the physical and/or human resources associated with an organization's information technologies (ITs).

Step 2:

Possibly, outsourcing is economical. If a business specialises in managing payroll for other businesses, it can charge extremely inexpensive rates because of the economies of scale it generates by managing one reliable computer application for numerous businesses. Additionally, outsourcing enables businesses to advance beyond their existing level of expertise in information systems and to delegate growth and operations to external staff members who have knowledge and abilities not available internally. Other justifications for outsourcing include freeing up internal resources, boosting the company's revenue potential, cutting down on time to market, and improving procedure.

**Briefly describe why systems development is more difficult now than it was in the past.**

Step 1:

A new software application or programme is defined, designed, tested, and implemented through the process of systems development. It could involve building specialised systems internally, developing database systems, or purchasing software that was produced by a third party.

As system development grew, there was a need to systemize the process of system development and come up with a set of steps that are required for any system because the entire goal of system development is to increase the productivity of the organisation and the group of people working in that organisation.

Step 2:

Not that long ago, neither symbolic computer programming languages nor systems analysts were commonplace. Nevertheless, individuals continued to create and design software for computers. Even though there are numerous programming languages and development tools available to the systems analyst of today, system development is still more challenging than it was 60 years ago. Certain matters were settled for you back then and even more recently: You created the software from scratch internally if you wanted to write application software. Today, there are numerous sources for software, and internal development is no longer the only thing on peoples' minds. The emphasis will instead be on where to purchase the numerous parts and components that will be assembled to form the application system. Code will be written to mainly make all the different pieces work together.

**List development specializations and provide an example of the leading software firms for the specialty.**

Step 1:

When people and organisations specialise, they concentrate on the small number of productive tasks that they excel in. Because of their increased specialisation, workers must stop doing other jobs for which they lack the necessary expertise, giving those employments to those who are more qualified.

Through specialisation, a worker can leverage their education and work history to speed up procedures and boost sales. High-quality work results from specialisation. Focus plus skills equate to higher quality. An employee can improve their talent and continuously raise the calibre of their performance by concentrating on one thing.

Step 2:

IT services (Accenture, CSC, IBM, HP); packaged software providers (Intuit, Microsoft, Oracle, SAP AG, Symantec); enterprise software solutions (Oracle, SAP AG); cloud computing (Amazon.com, Google, IBM, Microsoft, salesforce.com); and open source software are among the top software companies.

We can design stack architectures, accumulator architectures, or general-purpose register architectures. Explain the differences between these choices and give some situations where one might be better than another.

Step 1:

Stack Architecture

First-in, last-out applies to data in a stack. drop the stack's top element to the desired location. The top element(s) of the stack serve as implied operands for further operations. The operands are pushed into the stack first before performing an operation.

An accumulator machine, also known as a 1-operand machine or a CPU with accumulator-based architecture, is a type of CPU in which, despite having several registers, the CPU primarily saves the results of calculations in one unique register, sometimes referred to as "the accumulator."

Combined data/address registers, or general-purpose registers (GPRs), are registers that can store both data and addresses. In some architectures, the register file is unified, allowing the GPRs to also store floating-point values.

Step 2:

Stack architectures use the operands located at the top of the stack to carry out instruction execution. Even though stack-based machines have good code densities and a straightforward paradigm for expression evaluation, a stack cannot be randomly accessed.

One operand is implicitly included in the accumulator in an accumulator architecture. Shorter instructions are possible as a result, and the machine's internal complexity is reduced. Since the accumulator is only a temporary storage, there is a lot of memory traffic.

The general-purpose register architectures are currently the most often used machine architectural models. They operate faster than memory, and the smoother linking with compilers enables their effective and efficient use.

How do memory-memory, register-memory, and load-store architectures differ? How are they the same?

Step 1:

Memory architecture is the term used to describe how electronic computer data storage is implemented in a way that combines the quickest, most dependable, most long-lasting, and least expensive method of information storage and retrieval.

An instruction set architecture known as a register-memory architecture enables operations to be carried out on (or from) memory in addition to registers. A "register plus memory" architecture is one that permits all operands to be either in memory, registers, or a combination of both.

Memory access (load and store between memory and registers) and ALU operations are the two groups of instructions that make up a load-store architecture (which only occur between registers).

Step 2:

1 - An architecture is referred to as memory-memory if it permits an instruction to execute an operation even if no operand is present in a register and occasionally permits up to two or three operands in memory.

2 - We can classify an architecture as Register-memory if at least one operand is in a register and one is in memory.

3 - A load-store architecture is used when it is required that data be moved into registers before any actions on it can be carried out.

A customer reports that his recently purchased computer does not consistently run his old applications. Application errors occur intermittently, and data files get corrupted. He has tried uninstalling and reinstalling the apps, and the problems persist. As you troubleshoot the problem, you reboot the system and get a BSOD error. The customer tells you the BSOD has occasionally appeared. Which subsystem is most likely causing the problem? What is the next best step?

Step 1: Answer

c. Memory is faulty; run Memory Diagnostics.

Step 2: Explanation

A BSOD is a complete system failure at the Windows kernel level brought on by a hardware or Windows driver conflict. It's not a software crash. In the event of a browser crash, Windows keeps functioning. Because they operate at a higher level in the operating system, apps rarely result in a blue screen.

More often than any other piece of hardware, the Windows memory management bluescreen problem is related to your RAM. Your system might occasionally recover after a quick reset. Restart your computer and check to see if the error reappears if you see a memory management BSOD. If not, it might have been an isolated incident.

The Windows Memory Diagnostic tool is a very helpful utility for troubleshooting when the computer starts to run slowly, freezes, hangs, shows a blue screen, or reboots by itself. It can also assist in identifying issues with installed applications, whether or not they are brought on by memory errors.

A broken, out-of-date, or improper video card driver is a frequent reason for the MEMORY MANAGEMENT issue. You must thus upgrade your video card driver to the most recent, accurate version in order to resolve the issue. There are two methods—manually and automatically—for updating the driver.

What are the various types of malware?

Step 1:

Software that has malicious intentions is referred to as malware. There are many different kinds of malware, and each one has a different means of getting into your computer. These methods can include attempting to take over your computer systems without authorization, stealing your personal data, encrypting your vital files, or otherwise harming your machine. Damage can occasionally be irreparable.

Step 2:

Virus

A type of malware is a virus. a programme that might be harmful and is capable of damaging a computer or other equipment. I'll change how it functions without the user's knowledge.

Worm

This type of malicious software duplicates itself repeatedly. It consumes resources and could cause a network, computer, or device to crash.

Trojan Horse

Malware in the form of a Trojan Horse. This programme hides itself and/or presents as legitimate. It DOESN'T REPLICATE ON ITS OWN.

Rootkit

a programme that conceals itself in a gadget or computer. This makes it possible for someone in a distant area to assume total control over it. That is a type of malware.

Spyware

an application that is installed on a computer or other device without the user's knowledge. The user's information will then be discreetly collected and shared with outside sources while they are online. malware in some kind.

Adware

an application that shows an online advertisement as a pop-up or banner on a website, email, or other internet service. malware in some kind.

 How do worms differ from viruses?

Step 1:

A standalone malicious application that copies itself in order to propagate to other systems is known as a computer worm. It frequently spreads via a computer network and makes use of security flaws in the target computer to do so. This device will serve as a host for it to scan and infect other computers.

A certain kind of computer programme called a virus multiplies itself after being run by altering other programmes and adding its own code. The damaged areas are then referred to as being "infected" with a computer virus, a metaphor borrowed from biological viruses, if this replication is successful.

Step 2:

The main distinction between a worm and a virus is that worms are standalone hostile programmes that may self-replicate and spread after they have infiltrated the system, whereas viruses must be activated by their host.

A worm can spread more fast than a virus, making it more deadly. For instance, a worm might spread to every email contact you have. The potential for damage would exponentially increase as it might then travel to all of your connections' contacts, followed by your contacts' contacts' contacts, and so forth. Worms can also propagate through security flaws without informing you or communicating with you in any way. Any device that has the vulnerability can be detected by the worm, and it can then insert itself.

Computer worms and viruses vary primarily in that worms are self-replicating programmes that spread without human intervention. However, despite the fact that they are also capable of self-replication, viruses typically require user interaction in order to spread.

Do Trojan horses carry viruses or worms?

Step 1:

Unlike viruses and worms, Trojan Horse does not replicate itself. It is a covert piece of code that steals the user's vital information. The e-mail ID and password, for instance, are observed by Trojan horse software when entered into a web browser for logging.

Step 2:

A Trojan is a programme that poses as a legitimate application and deceives people into clicking it; it is not a virus or worm. A Trojan conceals its destructive intent while infiltrating a software and launching attacks from within.

Malware comes in a variety of forms, including back doors, worms, trojan horses, and viruses. Worms are normally standalone programmes, whereas viruses can reproduce and cause harm. Both can be carried by a Trojan horse.

**28/7**

The keys() method returns a

|  |  |
| --- | --- |
| a | view object containing all of the keys in a dictionary |
| b | list object containing all of the keys in a dictionary |
| c. | view object containing all of the key/value pairs in a dictionary |
| d. | list object containing all of the key/value pairs in a dictionary |

Step 1: Answer

|  |  |
| --- | --- |
| a. | view object containing all of the keys in a dictionary |

Step 2: Explanation

In Python, a dictionary is a collection of data values that merely keeps track of the order of insertion. It is used to store data values like a map, but unlike other Data Types, it can store key value pairs.

A view object that displays a list of all the keys in the dictionary in order of insertion is returned by the keys() method in the Python dictionary.

syntax: dict.keys ()

There are no parameters in this sentence.

Returns: A view object with a list of all the keys is given back. According to changes in the dictionary, this view object alters.

The list of keys is returned as a view object by the keys() method, which extracts the dictionary's keys.

All of the keys in a dictionary are returned using the Python dictionary keys() function. This method returns keys as a unique object that may be iterated through. keys() doesn't take any parameters. The keys() method is then added after the dictionary name.

Indicate which one of the following is not an advantage of FM over AM:

a. Better noise immunity is provided.

b. Lower bandwidth is required.

c. The transmitted power is more useful.

d. Less modulating power is required.

Step 1:

Radio modified AM and FM signals. Modulation types include AM (amplitude modulation) and FM (frequency modulation) (coding). A carrier wave of a certain frequency is modulated (varied) using the sound of the programme material, which typically originates from a radio studio, before being broadcast.

Step 2: Answer with Explanation

Answer

b. Lower bandwidth is required.

Over amplitude modulation, frequency modulation has various advantages, including higher noise immunity and a lower modulating power requirement. However, FM's increased bandwidth requirements are not a benefit over AM. Due to its greater bandwidth, FM has better sound quality.

The amplitude of the signal is most affected by noise, hence AM is less noise immune. It has more frequency fluctuation, which improves noise immunity.

Modulation provides numerous benefits over amplitude modulation, including higher noise immunity and a lower modulating power requirement. However, FM's increased bandwidth requirements are not a benefit over AM.

**\*\*Explain why it is important for a multi-user DBMS to provide a recovery mechanism.**

Step 1:

The term "recovery mechanism" refers to an indigenous or substitute infrastructure that has been specially created, trained, and commanded by US troops to contact, authenticate, support, relocate, and smuggle designated isolated personnel back to friendly control from uncertain or hostile locations. also known as RM.

Step 2:

When a database crash or other event occurs, we must attempt to recover any lost data. Therefore, a recovery mechanism is necessary. If a recovery mechanism is lacking. This will result in inconsistent data.

If a database system is affected by such a failure, you must typically recover the database and resume normal operation as soon as you can. Recovery should prevent or at least lessen the risk of unneeded issues, safeguard the database and connected users, and reduce the possibility of having to duplicate work manually.

Recovery is important because the DBMS cannot allow some of the transaction's operations to be implemented to the database while others are not. This essentially may occur if a transaction fails after performing some but not all of its processes.

**Discuss how the log file is a fundamental feature in any recovery mechanism.**

Step 1:

Log is nothing more than a file with a series of records in it, each of which relates to a write operation. All the log data are captured step by step in the log file. Log files, so to speak, record the history of all update activities.

An operating system, application, server, or other device's usage patterns, activities, and operations can all be found in a log file, which is a computer-generated data file.

Step 2:

With the write-ahead log protocol, log records are written to reliable storage prior to the corresponding write to the database. As a result, the system can recover using the data in the log file if it fails before the write occurs after the log record has been recorded but before the write to the database.

**Explain what is meant by undo and redo and describe how the log file is used in recovery.**

Step 1:

Undo and Redo Operations –

Because all database alterations must be preceded by creation of log record, the system has available both the old value prior to modification of data item and new value that is to be entered for data item. This enables the system to carry out suitable redo and undo operations:

A log record's specified data item is set to its previous value when it is used to undo.

Redo: Using a log record changes the value of the data item specified in the log record.

To restore changes made after the backup was obtained, use the archived log files. This differs from cyclical logging, where any changes made after the time of the backup are lost and you can only recover to that point. Taking online backups is only supported when the database is configured for archive logging.

**What is the significance of the write-ahead log protocol?**

Step 1:

A series of techniques known as write-ahead logging (WAL) is used in database systems to provide atomicity and durability, two of the ACID qualities.

Step 2:

For crash and transaction recovery, a write ahead log is a disk-resident auxiliary structure that accepts only appends. Before the changes are posted to the database, the log must be written to stable storage so that it may be updated.

Allow the page cache to buffer updates to disk-resident pages while ensuring durability semantics in the broader context of a database system. This is the main purpose of a write-ahead log.

Until the cached copies of pages affected by these operations are synchronised on disc, keep all operations active on disc. Before the contents on the associated pages may be changed, every operation that changes the database state needs to be recorded to disc.

In the event of a crash, enable reconstruction of lost in-memory changes from the operation log.

**Tiffany is the only digital marketer assigned to the project, but only 60 percent of her time is available to the project. There is enough work for a person assigned 100 percent of the time to the project, so Tiffany is struggling to meet her deadlines. This is an example of which of the following?**

A.      Low-quality resources

B.      Interdependencies

C.      Dedicated resources

D.      Resource over allocation

Step 1: Answer with Explanation

Answer: Resource over allocation

Explanation

When a resource is given more work than they can handle in a certain amount of time, this is referred to as being overloaded. In a matrix organisation with numerous reporting lines and varying priorities, over allocation is a problem.

Step 2: Explanation of incorrect option

resources of poor quality or insufficient quality.

Mutual dependence between things is interdependence. You can learn more about the relationship between plants and animals by studying biology. Interdependence is the dependence of two or more objects, since inter- implies "between." Interdependence is a common term used to characterise complicated systems.

Teams or individuals with dedicated resources are those who work full-time on a specific task or project, frequently through outsourcing.

**Direct Memory Access (DMA) operations require the following information from the processor:  
a. Address of I/O device  
b. Starting memory location to read from or write to  
c. Number of words to be read or written  
d. All of the above**

Step 1: Answer

d. All of the above

step 2: Explanation

Some computer bus architectures have the Direct Memory Access (DMA) feature, which enables data to be transmitted directly from an associated device (such a disc drive) to the motherboard's memory.

Direct memory access (DMA) is a technique that speeds up memory operations by allowing an input/output (I/O) device to send or receive data directly to or from the main memory without going through the CPU. The operation is controlled by a device called a DMA controller (DMAC).

The information is sent across the data bus by the CPU to initialise the DMA.

The memory block's starting address, where data are either already available (to read) or are to be stored (to write).

Additionally, word count is sent, indicating how many words are in the memory block that has to be read or written.

a control that specifies the transfer mode, such as read or write.

a command that starts the DMA transmission.

The DMA controller has the following three registers.

The address register in memory holds the information needed to indicate the target location.

The word count register keeps track of the words that need to be transferred.

The transmission mode is specified by the control register.

**All of the following is true about CRM, or Customer Relationship Management except:**

a. It is the processes a company uses to track and organize all aspects of customer encounters

b. Accounting department uses it to facilitate billing

c. It is an enterprise software

d. It is replacing the human resource department

step 1: Answer

d. It is replacing the human resource department

step 2: Explanation

CRM

It is known as customer relationship management (CRM) is used to handle all interactions and relationships between your business and its clients. The objective is straightforward: strengthen business ties to expand your company.

HR specialists and recruiters utilise CRM software for recruiters as a sort of HR software to manage their relationships with candidates. Recruiters can streamline and automate communication with applicants, promote candidate engagement, and enhance the candidate experience with the use of CRM software.

The idea that CRM will take the position of the HR department is untrue

CRM (Customer Relationship Management) is the greatest software for making crucial data about your clients and partners accessible, regardless of whether you are an accounting expert or not. CRM essentially gathers and centralises all of the current transactions between your clients, leads, and business.

A comprehensive customer relationship management solution is provided by an enterprise CRM that is tailored to the requirements of larger businesses with sizable sales divisions.

By utilising Vtiger CRM software, CRM aids in enhancing client connections. It will contribute to higher retention rates for current, devoted clients. which frequently results in more money coming in for the company..

**Any action, device, procedure, technique, or other process that reduces the vulnerability of a system or asset to an acceptable level is best identified as a:**

**a. Safeguard.**

**b. Precaution.**

**c. Safety measure.**

**d. Countermeasure.**

Step 1: Answer with Explanation

Answer: d. Countermeasure.

Step 2: Explanation

A countermeasure is an action or measure used to balance out or oppose another. Any technological or tactical method or system created to stop a process' unwanted conclusion falls under this general concept, which demands accuracy. The given reference has answer d, which is the right response.

A countermeasure can also take the form of a safeguard, whereas a precaution is a justification for installing a countermeasure, and a safety measure combines a safeguard and a countermeasure.

**What application does PGP help protect?**

**a. E-mail**

**b. Web browsing**

**c. File transfers (FTP)**

**d. Telnet**

step 1: Answer with Explanation

Answer: a. E-mail

An encryption method called Pretty Good Privacy (PGP) is used for both transmitting encrypted emails and encrypting private files. Since its creation in 1991, PGP has established itself as the industry norm for email security.

A security programme called Pretty Good Privacy (PGP) is used to encrypt and decrypt email as well as to authenticate email communications using digital signatures and file encryption.

Step 2: Explanation for incorrect option

Browsing is the act of browsing over a collection of facts without having a clear goal in mind. It typically refers to using the internet and the world wide web. The phrase may suggest that the individual is simply squandering time online without any real purpose.

Transmission Control Protocol/Internet Protocol (TCP/IP) connections can be used to send files between computers using the FTP (File Transfer Protocol) network protocol. FTP is regarded as an application layer protocol within the TCP/IP family of protocols.

Telnet is a network protocol that allows for two-way, collaborative, text-based communication between two computers as well as remote computer access. It uses the Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocol to create remote sessions in response to user commands.

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**\*\*After clicking on a chart, how can you create a copy of it? Select an answer:**

Step 1: Answer with Explanation

Ctrl+D

Explanation

To duplicate the information from the selected cell above, use CTRL-D. You can select several cells and fill them all at once. Player for video.

Step 2: Explanation for incorrect option

Any cell, word, or other object that is chosen in a spreadsheet in Microsoft Excel or another spreadsheet programme will be deleted by pressing Ctrl + X. Nothing will happen if you press Ctrl + X while altering a cell's contents.

Use the shortcut of double-clicking to swiftly browse a spreadsheet.

Pressing Ctrl + V in Microsoft Excel and other spreadsheet applications will paste anything from the clipboard into the cell that is now selected. Ctrl + V will paste several cells starting from your present position if you've copied more than one cell.

 After deleting worksheet(s), how many worksheets can you "undelete" using the Undo command? Select an answer

Step 1: Answer

a)      none

Step 2: Explanation

Checking your computer's Trash bin before beginning the process of recovering a deleted file in Excel is often advantageous. This is due to the fact that most files are moved to the Trash folder when they are deleted, and if you haven't recently cleared your Trash folder, there's a chance your file may still be there.

How many scroll bars will appear on the screen if you split the screen both horizontally and vertically? Select an answer:

Step 1: Answer

4

Step 2: Explanation

Split screens can be used to simultaneously display two different portions of the same worksheet.

Your screen can be divided into two or four distinct portions. This enables you to simultaneously see various worksheet sections. Windows can be divided both vertically and horizontally. The worksheet's centre should contain both horizontal and vertical split bars. A duplicate of the worksheet needs to be placed in each of the four quadrants made by the split bars. Additionally, the right side of the screen should have two vertical scrollbars, and the bottom of the screen should have two horizontal scrollbars.

What does the solid blue line indicate in Page Break Preview mode? Select an answer:

a)      the boundary between data that that will and won't print

b)      the orientation of the page

c)      the total volume of data in the spreadsheet

d)      the maximum file size of the dataset

Step 1: Answer

The boundary between data that that will and won't print

Step 2:

The page breaks are indicated by the blue line or lines. Simply move them where you want the pages to split by dragging them up, down, left, or right. If a line is dashed, Excel inserted that line automatically. If the blue line is solid, the user has modified it.

**List down any two types of computer crimes that occur over cyber space. Also discuss very briefly the methods that can be used to minimize the ill effects of listed crimes.**

**Step 1:**

Cybercrime, often known as computer crime, is the use of a computer to advance illicit activities like fraud, the trafficking of child pornography and other intellectual property, identity theft, and privacy violations. Either the computer was the intended victim of the crime or it was employed in its commission. A victim of cybercrime may experience security and financial problems.

Step 2: **Two types of computer crimes that occur over cyber space**

DDoS attacks

These are used to flood a website with traffic from many sources in order to render an online service unavailable and bring the network down. Malware is installed on consumer computers to establish large networks of compromised devices known as botnets. Once the network is down, the hacker enters the system.

Identity Theft

When a criminal obtains access to a user's personal information, they commit this cybercrime in order to steal money, access private information, or engage in tax or health insurance fraud. Additionally, they are able to open a phone or internet account in your identity, organise a criminal activity using your name, and apply for government benefits using your name. They could accomplish this by stealing into users' accounts to discover their passwords, obtaining personal data from social media, or sending phishing emails.

Step 3:

While it is impossible to stop hackers from attempting to start a DDoS, careful preparation and preventive steps lessen the likelihood and potential consequences of an assault.

Maintaining a high level of network security is necessary to thwart any DDoS attack attempt. The ability to recognise a DDoS early on is crucial to controlling the blast radius because an assault only has an impact if a hacker has enough time to accumulate requests.

Watch out for the Red Flags

You can prevent further harm if your security staff can rapidly recognise the signs of a DDoS attack.

An illustration of a DDoS is:

poor communication.

sluggish operation.

high demand for a single endpoint or page.

Crashes.

unusual traffic originating from a small number of IP addresses, either one or more.

an increase in visits from persons who share a profile (system model, geolocation, web browser version, etc.).

Keep in mind that not all DDoS assaults include heavy traffic. A brief, low-volume attack often passes unnoticed as a random occurrence. However, these attacks might be a prelude to or distraction from a riskier intrusion (such as ransomware).

Continuous Network Traffic Monitoring

Continuous monitoring (CM), which analyses traffic in real-time, is a great way to find DDoS activity traces. Benefits of CM include:

With real-time monitoring, you can identify DDoS attempts before they become full-scale attacks.

The group can get a solid understanding of typical network activity and traffic patterns. The crew can more easily spot strange behaviours once they are familiar with how routine operations look.

The detection of early warning indicators of an assault that takes place on the weekend or after work is ensured by round-the-clock surveillance.

Do not over broadcast on networks

To increase the impact of a DDoS attack, the hacker is likely to send requests to every device connected to your network. By restricting network broadcasting between devices, your security team can block this strategy.

A high-volume DDoS attack can be stopped by limiting (or, if possible, turning off) broadcast forwarding. You can also think about telling staff members to turn off the echo and chargen services when possible.

Utilize the Cloud to Stop DDoS Attacks

The DDoS threat must be countered with on premise gear and software, while cloud-based mitigation does not have the same capacity restrictions. Even a massive volumetric DDoS attack can be scaled and handled with simplicity by cloud-based defence.

DDoS mitigation can be outsourced to a cloud service provider. The following are some of the main advantages of using a third-party vendor:

Cloud service companies provide comprehensive cybersecurity with the best firewalls and threat monitoring tools.

More bandwidth is available on the public cloud than on any private network.

Data centres with copies of data, systems, and equipment offer high network redundancy.

Strategies for Avoiding Identity Theft

These days, it may be impossible to protect your private information without running the risk of a malfunction. However, there are several easy precautions you may take to avoid falling victim to identity theft. The Houston Police Department is offering some straightforward but crucial tips so that you can safeguard your name and reputation.

Discard personal documents and statements. Credit card statements, solicitations, and other documents containing private financial information should be torn up or, if you'd rather, shred.

Protect your mail. Get a P.O. box, lock your mailbox, or rapidly empty it to prevent thieves from stealing credit card pitches. Never send checks or bill payments via mail from your house. Both the payee's identity and your mailbox are vulnerable to theft.

Keep your Social Security number private. Never carry your card or any other card that might contain your number about with you, such as a health insurance card. Never include your number on checks. Due to the fact that it allows them access to your bank accounts and credit report, it is the main target for identity thieves.

Avoid creating a paper trail. Never leave receipts from an ATM, credit card, or petrol station behind.

Keep your credit card close at all times. Concerned about credit card theft? Always keep an eye on your card, or if you can't, use cash to make purchases.

Be aware of who you are dealing with. Never respond to anyone who calls you and requests personal or financial information; instead, ask them who they are, what business they work for, and why they are calling. Before providing any personal information, if you believe the request to be authentic, get in touch with the business and double-check the information you were given.

Be warier when sharing private information. If information like your Social Security or driver's licence number is requested, make sure it is definitely necessary. Inquire about their privacy policy and make it clear that you don't want your information shared with anybody else to anyone who asks for your Social Security number.

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How does SQL allow implementation of the entity integrity and referential integrity constraints described in Lesson 3?

Step 1:

The goal of entity integrity is to make sure that each row of a table has a primary key value that is both distinct and non-null, which is the same as saying that each row in a table represents a single instance of the entity type that the table is representing.

Foreign key constraints or referential integrity requirements. A logical rule governing the values in one or more columns in one or more tables is known as a foreign key constraint, also known as a referential constraint or a referential integrity constraint. For instance, a group of tables presents details about the suppliers to a company.

Step 2:

Using the PRIMARY KEY and UNIQUE clauses, SQL enables the implementation of entity integrity. The FOREIGN KEY clause is used to preserve referential integrity.

SQL allows you to provide the PRIMARY KEY and UNIQUE parameters to ensure object integrity. A table can have more than one unique index but only one primary key. That example, for one of the candidate keys, you can specify the PRIMARY KEY specification, and for the remaining keys, UNIQUE.

A foreign key must match a primary key or be null in order to maintain referential integrity. This constraint preserves the connection between the rows in the parent and child tables between which it is given. It indicates that a proper reference must be made from a row in one table to another table.

What about referential triggered actions?

Step 1:

SQL referential trigger action

It indicates that before entering a row into a table with a foreign key column, a row with a key must already be present in the table.

Step 2:

The SET NULL, CASCADE, and SET DEFAULT clauses allow the designer to define referentially triggered operations. Rejecting an update or deletion operation is the default response.

Referential integrity actions are brought about via physical modifications to the unique value rather than logical ones. Even though the two values are semantically equivalent, changing the primary key value from SAMPLE-VALUE to sample-value will start a referential integrity action in a case-insensitive database.

**25/7**

How might you establish precise and measurable specifications for intangible needs such as "the front suspension looks great"? How might you explain a situation in which customers' perceptions of the competitive products ( as in Exhibit 6-7) are not consistent with the values of the metrics for those same products ( as in Exhibit 6-6)?

Step 1:

The metrics serve as a means of converting customer requirements into precise, quantifiable specifications. Consequently, it is further ensured that following the requirements would lead to the satisfaction of the client's needs.

The needs expressed by the customer are frequently not interpretable as a measure. For instance, the need to say that "the front suspension looks wonderful" or that "the seat fitted on a bike should instil pride." The examples that follow illustrate a necessary requirement for greatness in the fad-based market. The pride that follows cannot be described in terms of quantitative things.

Step 2:

Establishing a survey that can be distributed to consumers in the target market is a useful strategy for turning intangible wants into specifications. Customers of mountain bikes, for instance, could be asked to rate a new design on a scale of 0 to 10 based on how amazing they believe it looks.

Step 3:

Practical rather than theoretical considerations may prevent a team from always being able to connect a customer need to a single measure. The measurements must be simple to assess in order to be effective. Some measures (such as mass, length, temperature, etc.) are simple to evaluate while others are quite challenging (taste, feel, mood). It is ideal when the team can translate a client need into a set of metrics that can be assessed objectively as opposed to leaving this to the metric's judgement. But nearly usually, when a list of wants is converted into easily measurable metrics, there are more measures than there are needs.

**What is the “2-deep” rule? What is the purpose of a logical fiber map?**

Step 1:

A typical rule for fibre distribution is that it should only go two deep in a building. The primary distribution and the intermediate distribution, which feed the horizontal distribution to the work area, are the only distributions that should be present in a building, according to this.

Step 2:

A logical fibre map, which demonstrates how the fibre is connected and data is dispersed around a campus, is used. Physical fibre maps are yet another type of map frequently used to depict the distribution of fibre. The fibre network's planning and documentation depend on both types of maps.

What are the typical maximum lengths for (a) multimode and (b) single-mode fiber?

Step 1:

Multimode permits many concurrent light modes, whereas single mode fibre is meant to propagate a single light mode. The bandwidth, signal stability, and signal transmission distance are all impacted by this differential, which we'll discuss later. Additionally, the construction of single mode and multimode wires varies.

Step 2:

a)Compared to single-mode optical fibre, multi-mode optical fibre requires less expensive communication equipment. 100 Mbit/s for distances up to 2 km (100BASE-FX), 1 Gbit/s for distances up to 1000 m, and 10 Gbit/s for lengths up to 550 m are typical transmission speed and distance limits.

b)Fiber single mode distance limit

It depends on a number of factors for a specific fibre type (such single-mode G652), including the wavelength employed, the bit rate (assumed to be digital transmission), and the necessary BER, which is highly dependent on the modulation method. The unamplified limit for common NRZ-OOK lines using G652 fibres is roughly 100 kilometres.

 What is FDDI?

Step 1:

A local area network standard for data transmission is called Fiber Distributed Data Interface. It was later specified to use copper cable in which case it may be known as CDDI, standardised as TP-PMD, also known as TP-DDI. It uses optical fibre as its standard underlying physical medium.

Step 2:

In networks with heavy traffic and mission-critical requirements for speedy and efficient data transmission, FDDI is mostly used. Anywhere that uses a big network and needs a lot of bandwidth uses FDDI.

A collection of ANSI and ISO standards called Fiber Distributed Data Interface (FDDI) is used to transmit data through fibre optic cables in local area networks (LANs). It can be used in extensive LANs that can reach up to 200 kilometers in diameter.

Because of its dependability and throughput, FDDI is crucial for connecting LANs within an enterprise using backbone networks.

A network standard called FDDI (Fiber Distributed Data Interface) uses fibre optic connections to create a local area network (LAN) with a maximum range of 200 kilometres (124 miles). Token ring protocol is the foundation of the FDDI protocol. Thousands of users can be supported by an FDDI LAN.

What is the primary performance issue in a fiber optic transmission link?

Step 1:

Two crucial factors that affect the optical fibre transmission performance are attenuation and dispersion.

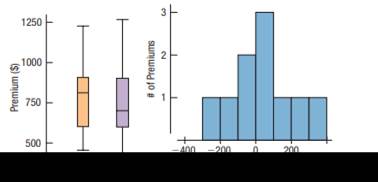
1. Attenuation

When light travels through optical fibres, a process known as attenuation occurs where the optical signal power decreases as the transmission distance rises in accordance with the exponential law. In an optical fibre communication system, the distance between repeaters is substantially determined by the optical fiber's attenuation value.

2.Dispersion

When an optical signal travels via an optical fibre, dispersion is the extension of the pulse. When dispersion reaches a specific level in an optical fibre communication system, the optical signal will become distorted and further produce inter symbol interference due to the front and rear pulses' overlap. The bandwidth and range of fiber-optic communications are constrained by optical fibre dispersion.

**In we saw summary statistics for 10 drivers’ car insurance premiums quoted by a local agent and an online company. Here are the displays for each company’s quotes and for the difference (Local - Online):**



a) Which of the summaries would help you decide whether the online company offers cheaper insurance? Why?

Step 1:

You could determine whether the online company of insurance is more affordable using the histogram. Instead of the distribution of each set of prices, we are interested in the price difference.

Step 2:

A histogram is a representation of statistical data that makes use of rectangles to illustrate the frequency of data items in a series of equal-sized numerical intervals. The independent variable is represented along the horizontal axis and the dependent variable is plotted along the vertical axis in the most popular type of histogram.

b) The standard deviation of PriceDiff is quite a bit smaller than the standard deviation of prices quoted by either the local or online companies. Discuss why.

Step 1:

Drivers are likely to receive comparable quotations from each company because insurance rates are based on risk, making the variances between them quite minimal.

Step 2:

Insurance companies can customise plans and prices to suit the needs of potential consumers by basing price determination on the risk they assume. In risk-based pricing, which is popular in markets for home, auto, and other insurance, customers are provided with varying costs depending on the risk.

c) Using the information you have, discuss the assumptions and conditions for inference with these data.

There are two price quotes. They were for a randomly selected group of fewer than 10% of the clientele of the agent, and the histogram of differences appears to be roughly normal.

**The ENIAC, a precursor to the ISA machine, was a decimal machine, in which each register was represented by a ring of 10 vacuum tubes. At any time, only one vacuum tube was in the ON state, representing one of the 10 decimal digits. Assuming that ENIAC had the capability to have multiple vacuum tubes in the ON and OFF state simultaneously, why is this representation “wasteful” and what range of integer values could we represent using the 10 vacuum tubes?**

Step 1:

The Electronic Numerical Integrator and Computer, or ENIAC, is regarded as the country's first operating electronic digital computer.

The ENIAC, which was completed in 1945, was the first programmable, electrical, general-purpose digital computer. These features were available on other computers, but the ENIAC offered them all in one convenient package. It could solve "a vast class of numerical problems" through reprogramming and was Turing-complete.

It's interesting to note that the ENIAC was decimal, not binary! The digits 0 through 9 were represented by 10 vacuum tubes.

Step 2:

Each day or two, ENIAC lost one vacuum tube. It was difficult to find and replace the broken tube because there were over 18,000 of them. However, the maintenance crew eventually honed the ability to solve a problem in just 15 minutes.

This format is inefficient because it takes ten tubes to express just one decimal digit from 0 to 9. These same tubes could be used as binary bits if any number of them could be turned on simultaneously. We can represent 2 to the power of 10 patterns, or 1024 patterns, with ten bits. These patterns can be used to represent integers ranging from 0 to 1023.

**23/7**

\*\* What are the challenges posed by global information systems and management solutions for these challenges?

Step 1:

An information system that is created and/or used globally is referred to as a global information system (GIS). Any information system that aims to supply all measurable data globally within a certain context is referred to as a global information system (GIS).

A distributed data-processing system that spans international borders is what is referred to as a global information system. One illustration of a worldwide information system is the SABRE (sabre.com) airline reservation system.

Step 2:

Diversity in terms of culture, politics, and languages highlights distinctions in organisational culture and business procedures and promotes the growth of disjointed local information systems that are challenging to combine.

List and describe the major management issues in developing international systems.

Step 1:

The structure of interactions that take place on an international scale is referred to as the international system. These include intergovernmental organisations (NGOs), multinational corporations (MNCs), and both state and non-state actors in their respective roles and interactions.

Step 2:

determining shared user requirements

introducing modifications to corporate procedures

coordinating software releases and application development

Promoting local users' support of international systems

 Identify and describe three principles to follow when organizing the firm for global business.

Step 1:

The production and selling of goods and services between nations is referred to as global business, sometimes known as international business. The intricacies, politics, and dynamics of conducting business in a global market can also be included under this definition.

Step 2:

Utilize comparative advantage to organise value-adding activities. For the lowest cost and greatest impact, marketing and sales should be positioned where they can be carried out most effectively.

Create and run system units at the regional, national, and international levels of corporate operations.

Create a Global Chief Information Officer (CIO) post at the global headquarters to oversee the development of global systems.

 Identify and describe three steps of a management strategy for developing and implementing global systems.

Step 1:

Define the essential business procedures

\*Establishing a concise list of crucial core business processes is the first step. Identify these processes' premier centres of expertise.

You can rank them once you comprehend a company's business procedures. After that, you can choose which operations should be local and regional and which should be core applications that are globally coordinated, created, and deployed.

\*Determine the Core Systems to Coordinate

The second strategic step is to take control of the fundamental systems and declare them to be really global. The definition and implementation of global systems come at a very high cost, both financially and politically. So, keep the list as short as possible, leaning toward minimalism and letting experience be your guide.

\*Select a strategy from incremental, comprehensive, or evolutionary

Avoid using a piecemeal strategy.

Due to lack of visibility, hostility from those who stand to lose from transnational development, and inability to persuade senior management that the transnational systems are worthwhile, these initiatives will undoubtedly fail. Avoid big-picture strategies that attempt to do everything at once. These also frequently fall short due to a lack of ability to concentrate resources.

An alternative strategy is to gradually develop global applications from current ones while having a clear and specific vision of the global capabilities the business should have in five years.

Step 2:

Make the Benefits Clear It is critical that senior management at the corporate headquarters and overseas division managers fully comprehend the advantages that will accrue to both the business and specific units.

For better administration and cooperation, use global systems. The value of this contribution cannot be simply quantified, and no capital planning methodology will account for the benefit. It is the capacity to transfer production in reaction to national disasters, swap suppliers on short notice from one region to another, and utilise excess capacity in one region to satisfy burgeoning demand in another.

A significant improvement in supply, distribution, and production operations.

Global systems imply international clients and marketing.

Define cooptation and explain how can it be used in building global systems.

Step 1:

Cooptation is described as including the opposition in the design and implementation of the solution while retaining control over the change's scope and direction. Encourage local users to support the global system with this significant victory.

A person who wins election to a home owners association and changes the bylaws to grant himself the authority to make decisions without the support of the other board members is an example of co-opt.

Step 2:

There are a few choices here. One is to give each country unit the chance to create one transnational application, initially in its own country and subsequently globally.

Create new, transnational centres of excellence or a single, central centre of excellence. These centres will carry out initial identification, form business and systems analyses, and complete all design and testing.

**The Windows XP disc contains which two tools for checking hardware and software compatibility?**

1. The HCL and the HAL
2. The HCL and the Windows Catalog
3. The Windows Catalog and the Upgrade Advisor.
4. The Upgrade Advisor and the HCL.

Step 1: Answer

C. The Windows Catalog and the Upgrade Advisor.

Step 2: Explanation

A significant update to Microsoft's Windows NT operating system is Windows XP. For business users and residential users, it is the immediate replacement for Windows 2000 and Windows Me, respectively. An operating system called Windows XP enables you to use many kinds of software or programmes.

The Upgrade Advisor, a feature of Windows XP Professional, examines a machine and generates a report on hardware and software compatibility. This report details the mistake and highlights any incompatibility problems that are discovered. In addition, the majority of errors include a link to more information online.

The Windows Catalog and the Upgrade adviser, which determine hardware and software compatibility, are both found on the Windows XP disc.

Your new CISO wants to implement a mobile device strategy. All staff have mobile devices, and you need something quickly implemented that is not very expensive. Which of the following strategies is the *best*one for your organization?

**A.**BYOD

**B.**CYOD

**C.**COPE

**D.**IDEA

Step 1: Answer with Explanation

Answer: BYOD

Explanation:

Bring your own device, or BYOD, is without a doubt the most well-known policy on our list and the most widely used deployment strategy for companies. In accordance with a BYOD policy, staff members are allowed to use their own electronic devices while at work. The organisation must install an agent or programme that enables them to control the security of the device from a central management system after the device has been approved by the enterprise (such as an enterprise mobility management solution).

Step 2: Explanation for incorrect option

A company will offer a selection of pre-approved mobile devices as part of a CYOD (choose your own device) policy, and employees can select one of them. Before the worker chooses one of these devices, they are normally set up with security procedures and business apps. Depending on the CYOD policy, the user may purchase the gadget and own it immediately, or the business may provide employees with a stipend to help with expenses while preserving ownership.

According to the COPE (corporate-owned personally enabled) business model, a company gives its employees mobile computing devices and permits them to use them just though they were their own personal laptops, tablets, or smartphones.

Smartphones are typically provided by employers for use at work, however basic features like voice conversations, messaging, and personal applications are allowed with certain restrictions on usage and flexibility. The term "COPE" refers to a mobility programme where the end user is permitted to use the device for non-enterprise purposes while the balance is tipped in favour of the enterprise's needs for applications, integration, and security.

A type of block cypher encryption using symmetric keys is known as the International Data Encryption Algorithm (IDEA). IDEA works with 64-bit blocks and a 128-bit key. In essence, it converts a block of 64 bits of plaintext into a block of 64 bits of cipher text. This input plaintext block is broken up into four 16-bit-long sub blocks.

**\*\* Which of these sequences represents the correct pathway to image formation in the brain?**

**O a Retina > Optic Nerve > Optic Tract > Optic Chiasm > Pretectum > Visual Cortex**

**O b. Retina > Optic Nerve > Optic Chiasm > Optic Tract > Lateral Geniculate Nucleus > Visual Cortex**

**O c Retina > Optic Tract > Optic Chiasm > Optic Nerve > Superior Colliculus > Visual Cortex**

**O d Retina > Optic Tract > Optic Chiasm > Optic Nerve > Lateral Geniculate Nucleus > Visual Cortex**

Step 1: Answer

 b. Retina > Optic Nerve > Optic Chiasm > Optic Tract > Lateral Geniculate Nucleus > Visual Cortex

Step 2: Explanation

Consider your vision as the driver, and the visual pathway as a highway with your neurons acting as the cars. Ideally, the channel from your optic nerve to your occipital lobe's main visual cortex is efficient and smooth, with predictable curves and orientations. However, occasionally that path is broken, forcing the driver to make adjustments.

The optic nerve is the conduit through which nerve impulses go from each eye to the numerous brain areas that process these visual signals.

The Visual Route. The retina, optic nerves, optic chiasm, optic tracts, lateral geniculate bodies, optic radiations, and visual cortex make up the visual pathway. Since the retinae are actually extensions of the diencephalon, they have their embryological roots in the central nervous system.

In people with albinism, the retinogeniculate projection, which connects the retina to the lateral geniculate body, has a distinct structural structure. Significantly more retinal ganglion cell axons (nerve fibres) decussate at the optic chiasm in albinism.

\*\*The sphere of security shows how access controls can be implemented to defend against threats. Firewalls have been a significant control mechanism to control the flow of information. **Select and discuss a firewall type from this week’s reading. Include what factors you would include in a brief to your organizational leadership in selecting this firewall for your organization’s network.**

Step 1:

An organization's previously set security policies are used to monitor and filter incoming and outgoing network traffic through a firewall, a network security device. A firewall is essentially the barrier that stands between a private internal network and the open Internet at its most basic level.

Firewalls control traffic at a computer's ports, which are entry points where data is sent to and from external devices. Such a statement might read, "Source address 172.18.1.1 is allowed to reach destination 172.18.2.1 through port 22." Consider port numbers as the rooms in the home and IP addresses as the houses.

Step 2:

Firewall are important because:

Because they are still widely used and have had a significant impact on contemporary security practises, firewalls are significant. When networks needed new security techniques to accommodate escalating complexity, they initially appeared in the early days of the internet. Since then, firewalls have evolved into the client-server model, which serves as the foundation for network security in contemporary computing. To examine traffic and reduce dangers, the majority of devices utilise firewalls or technologies that are quite similar to them.

Both corporate and consumer settings employ firewalls. Together with other cybersecurity tools, modern enterprises combine them into a security information and event management (SIEM) strategy. They may be implemented within a network to provide segmentation and protect against insider attacks, or at the network perimeter of an enterprise to protect against external threats.

Step 3: Firewalls' Importance for Organizational Security

Firewalls are intended to be the first line of security against cyberattacks for an organisation. A firewall safeguards numerous potentially vulnerable internal applications from harm by limiting the traffic that breaches the network boundary to just approved traffic.

Firewalls can prevent harmful software from being downloaded and installed on users' PCs. In order to defend against distributed denial of service (DDoS) assaults, in which a hacker floods your network with undesired traffic, they can be utilised as a component of a multi-layer cyber security plan.

In other words, you require a firewall if you connect to the internet and run a business. According to a 2019 article, 58 percent of all hack victims are small enterprises, or more than half.

Step 4:

Business class firewall

"Next-generation" firewalls are the most widely used business-grade firewalls. They are able to recognise and stop more sophisticated intrusions and attacks. Additionally, they offer a great deal more precise control and configuration options for security measures at the port, protocol, and application levels.

The improved security technology that these products offer is the main benefit of a next-generation firewall. An NGFW can use threat intelligence data to identify and stop unknown hazardous malware from entering a network. The threat landscape is always shifting.

The third generation of firewall technology includes NGFWs, which can be implemented in either hardware or software. By imposing security policies at the application, port, and protocol levels, it is able to recognise and thwart complex assaults.

In order to boost security effectiveness, a next generation firewall (NGFW) goes one step further and offers more advanced features than those offered by conventional firewalls. A company may defend its network and data centres from a wide range of threats using next-generation firewall technologies.

The needs for cybersecurity can vary greatly between different businesses. Financial sector companies frequently choose customised, best-of-breed solutions to safeguard themselves against the most recent threats and are required to have the finest security possible to ensure regulatory compliance. Operational Technology (OT) firms, such as those in manufacturing and critical infrastructure, are frequently the target of more sophisticated or older assaults, and they are also subject to rigorous availability requirements that complicate the repair of cybersecurity incidents. Providing secure remote access, supporting high-performance computing, safeguarding cloud environments, and securing specialised systems are additional areas where businesses could have particular security demands (such as medical Internet of Things devices).

Even though every firm has varied security demands, a network firewall is one security measure that applies across all business sectors. A modern next-generation firewall offers a variety of capabilities that make it capable of significantly enhancing a company's security posture and reducing its susceptibility to cyber threats, regardless of the industry in which it works.

**22/7**

\*\*An HR software sales rep is talking to a prospect for the first time about a premium software package. At the beginning of the call, the prospect asks. “How will your product help my business?” What should the rep do first?

1. Explain the software’s unique features relative to the basic software package
2. Ask more about their business needs
3. Describe how the software has helped other businesses
4. Ask what they dislike about their current software

Step 1: Answer

Ask more about their business needs

Step 2: Explanation

Simply said, a sales representative promotes a company's brand while selling their goods or services. From the initial lead outreach until the actual purchase, they manage client connections and function as the primary point of contact.

A prospect is a potential customer who has the means to acquire your product but hasn't done so yet but is interested in it. The prospect becomes a client once they make the desired purchase, which is always the ultimate result.

The rep should start by outlining the issues that the prospects are experiencing and the solutions that the product will offer.

A sales representative is essentially a person engaged by a corporation to speak about or preach about the solutions the company offers and to present what the company does. In other terms, a sales representative manages the company's products and brand.

What is the set of possible values for a column?

a. Domain

b. Table

c. SQL

d. Index

Step 1: Answer with Explanation

Answer: Domain

Explanation:

The collection of all conceivable independent values that a function or relation may take is known as its domain. It is the compilation of every potential input. The collection of all potential dependent values that a function or relation can generate from its domain values is known as its range.

Step 2: Explanation for incorrect option

All of the data in a database is stored in tables, which are database objects. Data is logically arranged in tables using a row-and-column layout akin to a spreadsheet. Each column denotes a record field, and each row denotes a distinct record.

Structured Query Language is known as SQL. A database can be communicated with using SQL. It is the accepted language for relational database management systems, claims ANSI (American National Standards Institute).

A table or view's table or view's columns are used to create keys in an index. These keys are kept in a structure (B-tree) that enables SQL Server to quickly and effectively locate the row or rows that correspond to the key values. The term "B-tree" is frequently used in SQL Server manuals to describe indexes.

 A consistent database is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A. One in which all tables have foreign keys

B. One in which all tables are normalized

C. One in which all data integrity constraints are satisfied

D. One in which all SQL statements only update one table at a time

Step 1: Answer

C. One in which all data integrity constraints are satisfied

Step 2: Explanation

In database systems, consistency refers to the condition that any database transaction that modifies affected data must do so only in ways that are permitted. Data written to a database must be legitimate in accordance with all established rules, including constraints, cascades, triggers, or any combination thereof, for the database to be considered consistent.

By creating rules, consistency in databases is ensured. Any modification to data published to the database must only be made in accordance with the constraints, triggers, variables, cascades, and other restrictions created by the rules established by the database developer.

When all requirements for data integrity are satisfied, the database is said to be in a consistent state. A transaction must move the database from one consistent state to another in order to obtain a consistent database state.

The \_\_\_\_ contains business data extracted from the operational database and from external data sources

A. Data store

B. Data visualization tool

C. Data dictionary

D. ETL tool

Step 1: Answer with Explanation

Answer: Data store

Explanation: Data stores are repositories for organising and storing collections of data in a durable manner. These repositories can be anything from simple files and emails to more complex store types like databases. A database management system controls a collection of bytes known as a database.

Step 2: Explanation for incorrect option

Tools for data visualisation are computer programmes that display information visually, such as in graphs, charts, or heat maps, for the purpose of data analysis. These tools make it simpler to comprehend and use vast amounts of data.

Data elements utilised or recorded in a database, information system, or as a component of a research study are given names, definitions, and properties in a data dictionary.

The process of extracting, transforming, and loading (ETL) is used to transform unprocessed data into knowledge that may be used for meaningful business intelligence (BI). An ETL tool is a device that automates this procedure by doing the following three crucial tasks: data extraction from underpinning data sources.

The ANSI has defined standards that govern SQL database transactions. Transaction support is provided by two SQL statements: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and ROLLBACK.

A. RETRIEVE

B. ASSIGN

C. UPDATE

D. COMMIT

Step 1: Answer

D. COMMIT

Step 2: Explanation

Through the use of the two statements COMMIT, which saves changes to disc, and ROLLBACK, which restores the prior database state, SQL offers support for transactions. Multiple SQL statements or database requests make up a SQL transaction. Every database request is the result of multiple I/O database operations. All transactions that alter the database are recorded in the transaction log. The transaction log information is used for rollback (recovery) purposes.

**What is the limiting factor in the time required to transfer a file using TFTP?**

Step 1:

The File Transfer Protocol (FTP) is a software tool for exchanging files over the Internet. The Trivial File Transfer Protocol (TFTP) is less powerful but easier to use. When directory visibility and user authentication are not necessary, it is employed.

A client may download a file from or upload a file to a remote site using the trivial file transfer protocol (TFTP), which is a straightforward lockstep file transfer protocol. One of its main applications is when nodes are first booting from a local area network.

Step 2:

TFTP may transfer a maximum of 512 bytes per client-server round trip using its stop-and-wait protocol. The maximum TFTP throughput is then calculated by dividing 512 bytes by the distance travelled between client and server. Assuming a 3 ms round-trip time, the maximum throughput on an Ethernet is roughly 170,000 bytes/sec.

**\*\*A few organizations have recently tried to minimize employee use of email when communicating with colleagues. Specifically, these companies have banned the use of email (except for special circumstances) on Fridays.**

Step 1:

Despite the fact that email has transformed company communication and increased efficiency, it also carries concerns, which have forced businesses to pay attention and make efforts to restrict email usage among employees. Email is a strong tool for connecting with co-workers, clients, and suppliers since it is quick, easy, and inexpensive.

Email is one of the information and communication technologies that businesses use the most. It may be used to expedite business operations and transactions, facilitate information sharing, boost staff efficiency and productivity, and improve connections with stakeholders.

Emails offer a quick and simple method of communication. By just clicking the mouse, one can send a message to any person, anywhere in the globe.

Within the mail inbox, several folders and subfolders can be created to help with message organisation.

Because a single message may be sent simultaneously to numerous recipients, it is an efficient and affordable method of communication.

Step 2:

Email is a vital form of business communication that is quick, affordable, available, and simple to duplicate. Businesses can gain a lot from using email since it offers quick and easy means to send many types of electronic data.

Because email is casual, it may also be contagious, meaning that if it is not properly controlled, it can pose a number of problems to companies. Email communications can be forwarded to numerous recipients. The following are the main email dangers that can lead employers to think about restricting email use:

Confidentiality breach

A reduced reputation

Productivity decline

Legal responsibility

Damage to electronic files and IT systems

growing amount of IT network traffic

**Comment on the accuracy of the following statement: ‘The communication process is more effective when ambiguity is minimized.’**

Step 1: The above statement is correct

Step 2: Explanation

Ambiguity is a communication problem and a major reason why managing and completing projects is challenging. For instance, confusion over the employees of the business unit's function led to unneeded conflict in a significant business process improvement project. By eliminating wasted effort and encouraging teamwork with positive relationships, defining the roles of the PMO, business analysts performers from IT, training, and finance regarding decision-making, responsibility for specific tasks, including sign-offs, and turnaround time, minimised conflicts and generally improved productivity.

Complexity may be perceived as being increased through ambiguity. Uncertainty is increased by ambiguity. Ambiguity causes discomfort, which raises the risk of conflict and lower productivity.

Understand uncertainty and its sources before trying to overcome it. Apply the right strategies to address the causes, if possible eliminating them or lessening the likelihood that they will occur and lowering their impact.

Ambiguity is being vague. it is the failure to comprehend a situation or idea clearly.

Because clarity of thought is a core communication principle, ambiguity can hinder it. Ambiguity can have a detrimental impact on how the message is received and responded to.

Using unclear language can only cause uncertainty and misunderstanding on the part of the audience. By using alternatives or repeating the term, you can eliminate any misunderstanding. Open to numerous interpretations is the definition of ambiguous communication.

**The Treaties of Westphalia are often viewed as the beginning of modern international relations. Why are they a useful benchmark? What factors does this benchmark ignore?**

Step 1:

The Treaties of Westphalia marked the end of many states' use of religious power and the move to secular government, making them an important turning point in world history.

The pact granted the Netherlands and Switzerland freedom from Spain and Austria, respectively. The principalities of Germany preserved their independence. Brandenburg and Bavaria also benefited, but France obtained the majority of Alsace-Lorraine. Sweden gained land and received a monetary settlement.

The Thirty Years' War, one of the deadliest battles in European history, was put to an end by the Treaty of Westphalia, a peace agreement. Despite the fact that this conflict was ended by two independent treaties, historians frequently refer to them as either the Treaty of Westphalia or the Peace of Westphalia.

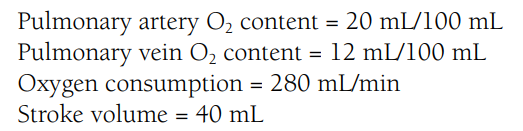
According to Mingst in her book, this change marked a fundamental shift in international relations because it permitted numerous governments to have their own authority and independence.

Step 2:

This measurement of the change in international relations, however, misses the important Thirty Years War, which took place just before the treaty was passed. Mingst draws attention to the fact that many people died in Europe as a result of the clear separation between two religious groups, which also contributed to the final adoption of the Treaty of Westphalia.

The Treaties of Westphalia marked the end of many states' use of religious power and the move to secular government, making them an important turning point in world history.

**An 82-year-old woman was admitted to the hospital with ascites, peripheral edema, and shortness of breath. Cardiac catheterization was ordered and the following values were obtained:**



What is the woman’s cardiac output?

a. 2.86 L/min

b. 3.5 L/min

c. 7.0 L/min

d. 8 mL/100 mL

e. 4500 mL/min

Step 1: Answer

b. 3.5 L/min

Step 2: Explanation

The Fick principle equation can be used to resolve this issue. Oxygen consumption is CO (Pulmonary vein content- Pulmonary artery content). Keep in mind that the pulmonary artery sends deoxygenated blood from the right ventricle (venous circulation) into the lungs whereas the pulmonary vein transports oxygenated blood into the lungs. The values can now be entered into our equation: CO = 20 ml/100 ml – 12 ml/100 ml / 280 ml/min. CO=280 ml/min, or 8 ml per 100 ml. In this situation, the oxygen content is 0.08 ml of oxygen per millilitre of blood, which is what we need to convert from millilitres of oxygen per 100 millilitres.

Let's return this to the equation. CO=280 ml/min/blood at 0.08 ml/ml = 3500 ml/3.5 L

Alice has a video clip that Bob is interested in getting; Bob has another video clip that Alice is interested in getting. Bob creates a web page and runs an HTTP server. How can Alice get Bob’s clip? How can Bob get Alice’s clip?

Step 1:

The topic of the query is two-way HTTP communication. It is necessary to explain how the two users share data with one another over HTTP.

Given: Bob is holding a clip that Alice wants.

Alice is carrying a clip that Bob desires.

After building a page, Bob launches an HTTP server.

Step 2:

The HTTP protocol is used to retrieve resources like HTML documents. It is a client-server protocol, meaning requests are made by the recipient, which is often the Web browser, and it serves as the basis for all data communication on the Internet. The various sub-documents that are retrieved, such as text, layout descriptions, photos, videos, scripts, and more, are combined to form a complete document.

In order to communicate, clients and servers exchange discrete messages (as opposed to a stream of data). Requests are messages sent by the client, which is often a web browser, and replies are messages delivered by the server in response.

Step 3:

To transfer videos between Alice and Bob via the web page that Bob created and that is running on an HTTP server, Alice must first open a TCP connection and send a request to Bob. If Bob accepts the request, the video will be transferred, and the connection will be closed once the transfer is complete.

An HTTP server stores video as a standard, uncomplicated file with a distinct URL. Client connects to server using TCP, then sends an HTTP GET request to that URL. The video file is sent by the server along with an HTTP RESPONSE. The video is now pulled into the client buffer and shown on the user's screen.

Step 4:

HTTP is two-way. Clients can use HTTP GET to send a data less request (although data may still be included in the URL or headers) or HTTP POST to send data, in which case the server will respond with both headers and data.

The provided resource's representation is requested using the HTTP GET technique. Data should not be included in GET requests; they should only be used to request data.

The World Wide Web supports the HTTP request mechanism known as PUT. The PUT method asks that the entity enclosed be saved under the given URI.

The HTTP PUT request method replaces a representation of the target resource with the request payload or creates a new resource.

**When an HTTP server receives a request message from an HTTP client, how does the server know when all headers have arrived and the body of the message is to follow?**

Step 1:

Data is transferred between a server and a client using HTTP messages. There are two kinds of messages: requests, which the client sends to the server to cause an action, and answers, which the server provides in response.

A blank line in an HTTP request message denotes the conclusion of the headers and the start of the message's body, if any.

Step 2:

The status line, or first line, of an HTTP response includes the following data: the version of the protocol, often HTTP/1.1. a code that denotes whether the request was successful or not. Status codes 200, 404, and 302 are frequently used. a status message.

The Request-Line, which is the first line of an HTTP request, starts with a method token, is followed by the Request-URI, the protocol version, and a CRLF. SP characters are used to demarcate the elements. Except for the final CRLF sequence, neither CR nor LF are permitted.

The server must parse and use the "Content-Length" header, which the client may supply, to identify when the request has ended. The server must be able to parse a chunked request if no such header was supplied but "Transfer-Encoding: chunked" was.

\*\*You have been asked to investigate the feasibility of prototyping in the software development process in your organisation. Write a report for your manager discussing the classes of project for which prototyping should be used, and setting out the expected costs and benefits of prototyping.

Step 1:

Design teams experiment by turning their ideas into physical prototypes, which might range from paper to digital. For the purpose of capturing design concepts and user testing, teams create prototypes with varied levels of realism. You may improve and evaluate your designs using prototypes, allowing your company to release the proper products.

When it comes to comprehending a concept or idea, the majority of individuals are visual. Rapid prototyping services aid in visualising the finished product, enabling the design team to understand the function and target market.

Step 2:

Prototypes and prototyping methods can be examined in four different ways:

• Interactivity describes how much the user can actually interact with the prototype; for example, watch-only or fully interactive; • Representation describes the form of the prototype, for example, sets of paper sketches or computer simulations; Precision describes the level of detail at which the prototype is to be evaluated; for example, informal and rough or highly polished; and • Evolution describes the expected life-cycle of the prototype, for example, throwaway or iterative.

Since prototypes have many functions, they take on various forms. A prototype can be a series of fast sketches on paper or a thorough computer simulation. Both are beneficial and aid the designer in various ways. Off-line and online representation are the two primary types that we identify.

Computers are not necessary for offline prototypes, commonly known as paper prototypes. Videos, cardboard mock-ups, paper sketches, and illustrated storyboards are among them. Off-line prototypes (of interactive systems) stand out for their rapid creation, common during the early design stages, and frequent discarding when they have served their function.

Computers are used to run online prototypes, often known as software prototypes. They consist of interactive video presentations, scripted software, apps created with interface builders, and computer animations. Online prototype development typically costs more, and it may call for the implementation of sophisticated interaction and/or visualisation techniques as well as the adherence to stringent performance requirements. Software prototypes are typically more useful later in the design process, when the fundamental design strategy has been decided.

Step 3:

In our experience, even at the very beginning of design, programmers frequently argue in favour of software prototypes. These programmers feel that writing code rather than making paper prototypes will save time and be more effective because they are already familiar with a programming language. We haven't come into a circumstance in which this is true in the 20 years we have been prototyping, in both academic and commercial settings.

First off, offline prototypes are speedy and extremely affordable. This makes it feasible to iterate very quickly and helps keep the designer from getting too wedded to the first idea. Offline prototypes make it simpler to explore the design space, look at various design options, and select the best solution. on-line based prototypes introduce an intermediary between the idea and the implementation, slowing down the design cycle.

Off-line prototypes, on the other hand, are less likely to limit the designer's thinking. Each programming language and development environment places restrictions on the interface, limiting innovation and the range of options that can be taken into consideration. The designer will probably limit the interface in accordance if a specific tool makes it simple to construct scroll bars and pull-down menus but difficult to develop a zoomable interface. Even if the developer chooses to use a common set of interface widgets, taking into account more options typically yields a more inventive design.

Finally, and perhaps most critically, anyone, not just programmers, can construct off-line prototypes.

Step 4:

The following four types of prototyping are frequently employed in the modern software industry:

Rapid prototyping (Throwaway)

evolutionarily based modelling

iterative prototyping

radical prototyping

Rapid prototyping

Rapid prototyping is also referred to as "throwaway prototyping" because it only intends to use the prototype for a little period of time, like one sprint in the Agile development methodology. During that time, it might go through numerous cycles of evaluation, change, and feedback. It becomes a reference for the designers and developers to use after all the stakeholders are happy. The prototype is abandoned when the race is finished and a new one is created for the following sprint.

Rapid prototyping

A functional piece of software, not just a simulation, distinguishes an evolutionary prototype from the conventional idea of a software prototype. Beginning with a product that merely satisfies known system requirements constitutes evolutionary prototyping. It won't fulfil all of the client's requirements, but it's a nice place to start. As the stakeholders' understanding of these criteria grows, more features and functions can be introduced. That is how this prototype is "evolving,"

Incremental prototyping

Enterprise software with numerous modules and components that may only be tangentially related to one another benefits from incremental prototyping. In incremental prototyping, numerous little prototypes are constructed concurrently. The various prototypes are assessed and improved separately, combined into a comprehensive whole, and then examined for consistency in vocabulary, behaviour, and look-and-feel.

With incremental development, there is a chance that the prototypes could look and feel so differently that the modules will appear to be entirely different software applications. To achieve consistency, the design team must establish certain guiding principles in advance and keep the designers on a leash.

Radical prototyping

For the creation of online applications, extreme prototyping is more prevalent.

Web apps include the following:

Service layer Communications Services Presentation Layer Displayed on the user's browser

Business sense

Authorization and identification

Other auxiliary services

Three stages comprise extreme prototyping:

In order to replicate the presentation layer, create HTML wireframes. There isn't much interaction on these webpages. They are thorough enough to display the different user journeys through the programme.

Create completely functional HTML pages based on the wireframes and connect them to a simulated services layer.

The services layer should be coded and applied.

Step 5:Benefits of prototyping

The ability to modify a system early in its development, the chance to suspend work on a system that is not working, and the potential to create a system that more closely satisfies user wants and expectations are the three main benefits of prototyping.

Early and frequent user feedback, which analysts may utilise to tweak the system and make it more responsive to actual demands, is essential for successful prototyping. Early adjustments save money compared to changes made later in the project's development, as with any systems effort. You'll see how the agile method of development employs extreme prototyping in the later section of the chapter, which necessitates on-site user feedback during each iteration.

In most computers an interrupt is recognized only after the execution of the instruction. Consider the possibility of acknowledging the interrupt at any time during the execution of the instruction. Discuss the difficulty that may arise.

Step 1:

An interrupt is a signal sent by a computer's internal programme or a device connected to the computer that instructs the operating system to pause and determine what to do next.

The CPU halts running the active programme whenever an interrupt occurs. The option to halt the handler or service procedure is then presented.

The CPU will check for interruptions to be handled after each instruction cycle. The system will proceed to the next instruction cycle provided by the instruction register if there is no interrupt present.

Step 2:

We would have to save numerous pieces of system state to accomplish this:

instruction step counter's value.

the contents of momentary registers.

the current memory operations state.

The step counter and temporary registers could likely be saved by the CPU into a set of "save" registers, which the interrupt handler may push into a stack and then restore to continue the instruction.

Some of the earlier steps would need to be redone. These kinds of circumstances would require the control unit to be capable of handling them.

In reality, this is a typical circumstance. In virtual memory systems, page faults rather than interruptions as a whole.

Consider the case where an instruction is successfully fetched, but it refers to an operand that is not stored in main memory. In order to fetch the page into main memory, a page fault trap is instantly triggered.

Step 3:

How to deal with interruptions

Interrupts can be handled by processors in two different ways.

Disable interrupt: While processing one interrupt, the processor will ignore all other interrupts. After the first interrupt has been handled, the other interrupts are verified. Interrupts are dealt with sequentially in this process.

Set priorities so that higher priority interruptions can take the place of lower priority interruptions. In this case, the CPU will handle the high priority interrupt before returning to the previous interrupt on which it was previously working.

\*\*Write a paragraph on examples of abstraction that you encounter in your day-to-day life. For example, driving a car is an example of abstraction, you don't need to understand how a car works under neat

Step 1:

The object-oriented programming notion of abstraction "shows" only necessary properties and "hides" extraneous data. Abstraction's fundamental goal is to shield people from pointless information.

There are two different types of abstraction: data abstraction and control abstraction. Data abstraction refers to concealing data specifics, whereas control abstraction refers to concealing implementation details. Both data and functions can be abstracted when using an object-oriented approach.

Step 2:

The following are some points about the abstraction

Driving a car is an example of abstraction, whereas the internal mechanisms or components are considered to be encapsulated.

The same manufacturer developed a new vehicle, but most of its features were carried over from the previous model, introducing the idea of inheritance.

The idea of data concealing is used if the internal implementation is hidden.

Abstraction has the advantage of allowing each user to interpret the information in accordance with their own needs, preventing user annoyance from irrelevant information.

Since only the interface is displayed, the operating of the car is isolated from the internal implementation of the car. Abstraction is a technique for doing this.

Step 3: Real life Example

The programmer strives to make sure that the entity is named in a way that makes sense and that it will have all the necessary elements included and none of the extraneous ones during the abstraction process. An illustration of abstraction in the real world might be as follows: You (the object) have scheduled a blind date and are deciding what to say to them so that they will recognise you at the restaurant. You choose to provide your location, height, hair colour, and jacket colour in addition to these other details. All of this information will make the process of having your date find you easier.

You must provide all of that data. The information about you that isn't pertinent to this situation, however, includes your social security number, your love of obscure movies, and the items you brought to "show and tell" in fifth grade. These facts aren't pertinent because they won't aid your date in finding you. However, given that entities can have countless abstractions, you might eventually employ them in another process.

Abstraction can be seen in action when a coffee maker is used to make coffee. To brew coffee, you must understand how to operate your coffee maker. You must supply water and coffee beans, turn it on, and choose the type of coffee you want.

In our everyday lives, we all use an ATM to withdraw cash, transfer money, access our minimum statements, etc. But when you input an ATM card for any type of action, we are unaware of what is taking place internally in the machine.

What is a molecular clock? What assumption underlies the use of a molecular clock?

Step 1:

Based on the quantity of base changes in orthologous genes, a molecular clock is a technique for calculating the real time of evolutionary events.

Based on the hypothesis that particular DNA sequences or the proteins they encode spontaneously alter at consistent rates, it is a molecular measure of evolutionary change through time that is primarily used to determine how long ago two related animals separated from a common ancestor.

For example, base changes occur in the gene that codes for the protein alpha-globin, which is a part of haemoglobin, at a pace of 56 alterations per base pair every billion years. The gene could be utilised as a molecular clock if this rate is dependable.

Step 2:

It is predicated on the idea that the genomic areas under comparison will continue to evolve at the same rate.

The foundation of molecular clocks is the idea that genetic change may be simply characterised as a function of time. The characteristics of a perfect molecular clock include rate constancy through time, rate homogeneity across lineages, taxonomic breadth and applicability, and data accessibility.

The molecular clock rooting method is predicated on the idea that the rate of evolution for the target nucleotides is constant. The most common units of measurement are substitutions per site per year or substitutions per site per million years.

Review Concept 17.5. Then explain how numerous base changes could occur in an organism’s DNA yet have no effect on its fitness.

Step 1:

The genome has numerous sections that do not contain gene codes; mutations that change the base sequence in these areas may accumulate through drift without having an impact on an organism's fitness. Some mutations could even occur in the genome's encoding regions without significantly affecting the genes or proteins.

What type of alternate processing facility generally contains all of the hardware, software, and data necessary to assume primary data processing responsibility for the organization in the event of a disaster?

Step 1: Answer with Explanation

Answer: Warm site

A warm site is a form of disaster recovery strategy that ensures an organisation will have a location with the necessary software and hardware to function within a reasonable amount of time in the case of a disaster.

A warm site and a hot site differ primarily in that a warm site typically has the necessities to function, but lacks the precise hardware that an organisation would have otherwise used.

Step 2: Explanation for incorrect option

A cold site is a form of disaster recovery plan where an organisation will have access to office space in the case of a natural or human disaster, but it will be necessary for the company to provide and install its own equipment. A cold site has the benefit of often being more cost-effective, but it will take longer for a business to resume normal operations.

A hot site is a form of disaster recovery plan that provides an organisation with a location that is fully stocked with everything it needs to resume operations almost immediately after a disaster.

For use on smartphones, tablets, and other portable devices, mobile sites are created particularly. These websites are designed to function well on small screens, load quickly, and provide consumers with clear contact information to encourage them to get in touch with the business as soon as possible.

What government information security classification involves data that may not directly impact national security if disclosed?

Step 1: Answer with Explanation

Answer: confidential

Explanation:

When information is deemed to be classified, a classification level must be given to it. The proportional significance of a piece of classified information to national security is indicated by its classification level, which also establishes the precise security standards that must be met for that piece of information. An effective categorization system must have clearly defined classification levels.

Step 2: Explanation for incorrect option

Information that may reasonably be expected to compromise national security if disclosed without authorization is considered confidential.

Information that may reasonably be expected to cause extraordinarily grave harm to the national security would be classified as "Top Secret."

Information that warrants/requires administrative control and protection against public or other unauthorised exposure but is not classified for grounds of national security is known as sensitive but unclassified (SBU) information.

Information that could reasonably be expected to result in substantial harm to the nation's security upon unauthorised disclosure shall be considered "secret."

**\*\*Sources of delay that can be introduced between WWW broadcasting at the time and the processors in distributed system setting their internal clock**

Step 1: Answer

First, there is the atmospheric signal propagation delay.

Second, while the computers equipped with WWV receivers struggle to connect to the Ethernet, there may be a collision delay.

On the LAN, there is third-order packet propagation delay. Fourth, each CPU experiences a delay once the packet arrives as a result of internal queueing delays and interrupt processing.

Step 2: Explanation

Atmospheric signal propagation delay.

GNSS signals travelling through the Earth's atmosphere are slightly stretched and moving at a slower pace due to atmospheric refraction. The neural atmospheric delay in the troposphere and the ionosphere delay in the ionosphere are terms used to describe the delays of GNSS signals.

Collision delay.

A collision occurs when two devices connected to the same Ethernet network try to send data at precisely the same time on a half-duplex Ethernet network. The two transmitted packets "collision" and are both discarded by the network. On Ethernets, collisions are commonplace.

Packet propagation delay

The packet must pass through the medium once it has been transmitted to the transmission medium in order to reach its destination. Therefore, propagation delay refers to the amount of time it takes for the final bit of a packet to reach its destination.

Explain why network operating systems were phased out when distributed operating systems gained popularity

Step 1:

A network operating system (NOS) is a type of computer operating system (OS) that is primarily designed to handle workstations, personal computers, and, in some cases, older terminals connected to a local area network (LAN).

A distributed operating system (DOS) is a sort of operating system that is essential. Many central processors are used in distributed systems to support various real-time applications and users. As a result, jobs for data processing are split across the processors.

It uses a single communication channel to connect several computers. Additionally, each of these systems is equipped with its own processor and memory. These CPUs can also communicate over high-speed buses or telephone lines.

Step 2:

The main difference between the two operating systems is that in Network OS, each system can have its own operating system, whereas in Distributed OS, each machine has a single shared operating system.

NOS was phased out due to its inability to control more operators in a network. It does not deliver a distributed service across the network's hosts. As a result, when Distributed Operating System (DO/S) became popular, Network Operating System (NOS) was phased out.

When is compaction of secondary storage beneficial from the File Manager’s perspective? Give several examples. List some problems that could be a result of compaction, and explain how they might be avoided.

Step 1:

Compaction refers to the shrinking or combining of hardware in order to make better use of physical memory space.

Compaction of secondary storage:

Compaction of secondary storage is advantageous from the standpoint of the file manager because of the following:

• The file manager is in charge of secondary storage upkeep.

• When compared to memory compaction, secondary storage compaction can take seconds, while disc compaction can take hours.

• In general, compaction is prompted by user complaints about having to wait a long time to retrieve data from files.

The files are scattered over the disc, generating a long chain of connections that must be viewed in order.

Step 2:

Disk compaction can take several hours compared to memory compaction, which can take seconds. As a result, it should be done infrequently. Compaction is usually prompted by user complaints about excessive wait times while getting data from files scattered over the disc, generating a long chain whose links must be retrieved in order.

Data files and databases that grow with time are good examples of files that must be compacted on a regular basis.

If the system crashes while compaction is in progress, the files in transit may be lost. This could be avoided by performing a full backup of the disc to be compressed before beginning the process. This, however, would increase the overhead.

Why is disabling the interrupts in a multicore operating system not considered to be an efficient approach?

Step 1:

When interruptions are disabled, other programs are effectively stopped from running. When interrupts are disabled, the CPU is unable to switch processes, and programs can use shared variables without being accessed by another process.

Disabling interruptions requires a change in the way the processor handles instructions, which means it can't be done while instructions are being run. Before the processor can turn off interrupts, the pipeline must be "flushed," meaning all in-flight instructions must be completed.

Step 2:

In multiprocessor systems, interrupts are insufficient because disabling interrupts only prevents other processes from running on the processor where interrupts were disabled; there are no restrictions on what processes can run on other processors, so the process disabling interrupts cannot guarantee mutually exclusive access to program state.

List the different identifiers that label a computer.

IP (internet protocol) address

An IP address is a numerical designation provided to each device connected to a computer network that communicates using the Internet Protocol. It's a unique number that's linked to a particular machine or computer network. An IP address is used for two purposes: identifying a host or network interface, and addressing a specific location.

UUIDs

Universally Unique Identifiers, are 128-bit numbers made up of 16 octets and 32 base-16 letters that can be used to identify data across a computer system. Microsoft created this specification, which was later standardised by both the IETF and the ITU.

WWPN

It stands for "World Wide Port Name," and it's a unique identification for each Fibre Channel port that's connected to a Storage Area Network (SAN). A WWPN is a unique and persistent identifier for each port on a Storage Device. In a Fibre Channel fabric, a World Wide Node Name, WWNN, or WWnN, is a World Wide Name assigned to a node (an endpoint, a device).

A Media Access Control address (MAC address) is a hardware identifier that allows each device on a network to be uniquely identified. It is primarily assigned by the manufacturer. They're frequently seen on the network interface controller (NIC) card of a device.

The MAC address is a 12-digit hexadecimal number with a colon or hypen separating every two digits in most cases (an octet),

How does a computer know its IP address?

Step 1:

The internet protocol address (IP address) is a numerical identifier that is connected with a certain computer or computer network. When computers are connected to the internet, the IP address allows them to send and receive data.

Step 2:

The Dynamic Host Configuration Protocol (DHCP) is a network service that assigns them. Network gear, such as routers or dedicated DHCP servers, are commonly used to run DHCP. A leasing system is used to issue dynamic IP addresses, which means the IP address is only operational for a certain time.

How does a computer know its Ethernet address?

Step 1:

This address is the unique identifier that enables a networked computer to connect to the Internet. The ethernet address is used to associate a "IP address" with a specific computer; without it, no servers, websites, email, or other services may be accessed.

Step 2:

A physical address, commonly known as a MAC/Ethernet address, is assigned to each node in a LAN. This address is 6 bytes (48 bits) long and is unique to each node on the LAN. It is burned on the Ethernet card (also known as the network interface card). Ethernet is a protocol that uses byte counts.

What is a MAC address?

Step 1:

A media access control address is a one-of-a-kind identifier assigned to a network interface controller for use as a network address in intra-network communications. Most IEEE 802 networking technologies, such as Ethernet, Wi-Fi, and Bluetooth, employ this technique.

Step 2:

A MAC address is a hardware identifying number that allows each device on a network to be uniquely identified. Every network card, such as an Ethernet or Wi-Fi card, comes with a unique MAC address that cannot be modified.

What is the service that relates Internet Domain Names to IP addresses?

Step 1:

DNS

DNS converts domain names to IP addresses, allowing browsers to access resources on the Internet. Each Internet-connected device has a unique IP address that other machines use to locate it. DNS servers minimise the need for humans to memorise IP addresses like 192.168

Step 2:

The Domain Name System (DNS) is a hierarchical and decentralised naming system for computers connected to the Internet or other Internet Protocol networks. Domain names are linked to various types of information by resource records in the DNS.

What is the service that relates IP addresses to MAC addresses?

Step 1:

On the internet, both MAC Address and IP Address are used to uniquely identify a system. The chip manufacturer provides the MAC address, while the Internet Service Provider provides the IP address.

Step 2:

The ARP protocol can be used to retrieve the MAC address. The RARP protocol can be used to recover an IP address. The MAC Address is provided by the chip maker. The IP Address is provided by the Internet Service Provider, or ISP.

There are reasons for machine designers to want all instructions to be the same length. Why is this not a good idea on a stack machine?

Step 1:

A stack is a data structure that is used by computers that use Stack-based CPU Organization. The stack consists of a collection of data words. It employs the Last In First Out (LIFO) access mechanism, which is the most common on most processors.

Step 2:

The address field in an instruction is not used by a stack-based computer. To evaluate an expression, it must first be translated to Postfix Notation, which is reverse Polish Notation.

Because different types of instructions have distinct formats, the length of instructions for a stack-based design would change over time.

The number of addresses in an instruction determines the length of the instruction.

A computer has 32-bit instructions and 12-bit addresses. Suppose there are 250 two-address instructions. How many one-address instructions can be formulated? Explain your answer.

Step 1: Answer

24576

Step 2: Explanation

Because an instruction is made up of an opcode and an address.

The 24 bits of the 12 bit two address instruction will be reserved, and the remaining 8 bits will be used for the opcode.

The total amount of opcodes that an 8-bit processor may create is 2 8 = 256.

Because 250 two-address instructions have already used 250 possible opcode patterns, there are only 6 more to assign to one address instruction, i.e. 256 - 250.

 6 (possible opcode)\*2 12 (bit pattern possible owing to one address instruction).=24576

The total number of address instructions that can be used is 24576.

What is a job

Step 1:

A job is the unit of work that a computer operator (or a programme called a job scheduler) provides to the operating system in some computer operating systems.

Step 2:

A job could, for example, be the administration of an application programme, such as a weekly paycheck programme. When a job is run in batch mode (rather than interactive mode), it is referred to as batch processing. When time-sensitive interactive work is not being done, the operator or job scheduler provides the operating system a "batch" of jobs to do (payroll, cost analysis, employee file updating, and so on), which are conducted in the background.

What part of the operating system manages jobs?

Step 1:

The process manager quickly allocates each process to the processor so that they can all be completed in a short amount of time. When a process is running, it has complete control of the CPU. However, the OS must reclaim control of designating the next process in line at some point.

Step 2:

Process manager responsibilities include the following:

1) Handle jobs as they are entered into the system by the Job Scheduler.

2) Use the Process Scheduler to manage each process within those jobs.

What is job control?

Step 1:

Job control refers to the capacity to pause (suspend) and resume the execution of processes at a later time. This function is commonly used by a user through an interactive interface provided by the operating system kernel's terminal driver and Bash.

Step 2:

Job control refers to the management of multiple tasks or jobs on a computer system, ensuring that each has sufficient resources to perform correctly, that competition for limited resources does not result in a deadlock in which two or more jobs are unable to complete, resolving such situations when they arise, and terminating jobs that are not performing as expected for any reason.

What is the difference between running a job in the foreground and running a job in the background?

Step 1:

Processes in the foreground and background Foreground processes are those that require a user to start them or interact with them. Background processes are those that run without the intervention of a user. By default, programmes and commands execute in the foreground.

Step 2:

The foreground job is the process that is connected to the terminal. Because it can communicate with the user via the screen and keyboard, a job is said to be in the forefront.

A Unix process can be operated in the background and detached from the terminal. Background jobs cannot communicate with the user since they are not connected to a terminal. If the background operation requires user interaction, it will come to a halt and wait for the terminal to be reconnected.

Jobs that do not require user involvement while running (such as sorting a huge file) can be run in the background, allowing the user to access the terminal and continue working without having to wait for a long job to finish.

By default, programmes and commands execute in the foreground. Place an ampersand (&) at the end of the command name you used to start the process to make it run in the background.

How do you run a job in the foreground? How do you run a job in the background? How do you move a job from the foreground to the background?

Step 1:

If you want to restart a suspended job, you must first determine whether you want it to run in the foreground or in the background. Using the jobs command, find the job ID of the suspended job, and then use bg (to execute the job in the background) or fg (to run the job in the foreground) (to run the job in the foreground).

Step 2:

You must enter the command you want to run in the background, followed by an ampersand (&) symbol at the end of the command line. Run the sleep command in the background, for example. The shell returns the command's job ID (in brackets) as well as the corresponding PID.

Step 3:

Using CTRL-Z and the bg command, send the current foreground job to the background. As shown below, you can send an already running foreground job to the background: The current foreground job will be suspended if you press 'CTRL+Z.' To have that command run in the background, type bg.

Step 1:

The principle that users and programmes should only have the privileges they need to fulfil their tasks.

Step 2:

The idea of least privilege applies to access control and asserts that an individual should only have the access privileges required to accomplish a specified job or task.

Flashlight applications are a famous illustration of this. These apps merely turn the device's LED on and off, and they don't need access to phone data like location, contacts, calls, or SMS messages. The principle of least privilege should also be considered in this circumstance.

The notion of least privilege keeps viruses from spreading across your network. An administrator or superviser with access to a large number of additional network resources and infrastructure might possibly infect all of those systems with malware.

Identify several issues associated with the correct creation and use of a lock file.

Step 1:

A file locking mechanism restricts access to a computer file, or a portion of a file, by allowing only one user or process to alter or delete it at a given moment and preventing reading of the file while it is being modified or destroyed.

Step 2:

The existence of the lockfile can be ignored by a programme.

During lock-create, there is a race condition on creation; both processes create files and access resources.

It is solely for informational purposes. If an application chooses to access the resource despite the lockfile's existence, the system will not block it.

Race situations will occur if the implementation is not accurate. The right implementation does not test for the lockfile's presence separately, but always tries to build it (atomic operation).

Identify several issues associated with the correct creation and use of a temporary file in a shared directory.

Step 1:

Temporary files in Windows are garbage files that are only used for a short period of time and then become obsolete once the work at hand is accomplished. Temporary files are used to temporarily store data while a file is being generated, processed, or utilised.

Step 2: Answer

Other processes should not be able to read temp files; temp filenames should be random, and permissions should only allow the owner to delete them.

A symbolic link to a sensitive file could be used in place of the temp file (passwd).

Another process must not be able to access the temporary file. An attacker might guess the temporary file's name and create it in the time between the application checking if it exists and creating it. The application might be redirected, and an existing file would be overwritten. To avoid race circumstances, it's best to employ secure system calls.

Briefly explain the following terms associated with network threats or security defense in a distribu-  
ted computing system:

a.Denial of service (DoS)

step 1:

A denial-of-service attack is a type of cyber-attack in which the perpetrator attempts to render a computer or network resource unavailable to its intended users by temporarily or indefinitely interrupting the services of a host connected to a network.

A Denial-of-Service (DoS) attack is one that attempts to bring a machine or network to a halt, rendering it unreachable to its intended users. DoS attacks work by inundating the target with traffic or delivering it information that causes it to crash.

Step 2:

For example, denials of service are common during Black Friday deals, when thousands of users are clamouring for a bargain. They can, however, be harmful. In this example, an attacker is attempting to exhaust the site's resources in order to prevent legitimate visitors from accessing it.

b.Trojan horse

step 1:

A Trojan Horse is a type of malware that masquerades as legitimate software and infects your computer, altering your files and data. Some Trojan Horses have the potential to offer hackers access to your personal data. Continue reading to learn about the most frequent Trojan Horse Viruses.

A Trojan horse is a type of malware that can harm your data or computer network by destroying, stealing, or otherwise harming it. This malicious software, commonly referred to as a Trojan, is frequently disguised as a legal computer programme. Once downloaded and installed on your computer, it allows hackers to monitor your internet activities, access and copy files from your hard drive, edit and delete your data, slow down your machine's performance, and even steal your personal information.

An example of how a Trojan horse could be used to infect a computer is as follows: An official-looking email containing an attachment is sent to the victim. The attachment contains malicious code that starts running as soon as the victim clicks on it.

c.Network worm

step 1:

The worm can, for example, carry ransomware, viruses, or other malware, all of which can harm afflicted computers. In the event of a blackmail assault, these can, for example, remove or encrypt files on the PC.

An Internet worm is a sort of harmful software (malware) that duplicates itself and spreads copies throughout its network. These self-contained virtual viruses circulate via the Internet, infect computers, and proliferate without the intervention of and without the knowledge of computer users.

Morris Worm, Storm Worm, SQL Slammer, and other worms are examples. Morris created a few lines of code to determine the size of the internet, but the codes contained faults that wrecked the host computers and caused millions of dollars in damage.

D .Service spoofing

step 1:

Spoofing is a term used in cybersecurity to describe when fraudsters appear to be someone or something else in order to gain a person's trust. Gaining access to systems, stealing data, stealing money, or spreading malware are the most common motivations.

Spoofing usually consists of two parts: the spoof itself, such as a forged email or website, and the social engineering component, which encourages victims to act. Spoofers may, for example, write an email posing as a trusted senior coworker or manager, requesting that you transfer money online and offering a compelling explanation for the request. Spoofers typically know how to pull the right threads to get a victim to do what they want — in this case, authorising a fraudulent wire transfer – without raising suspicion.

Step 2:

When an email is sent from a bogus sender address and asks the receiver to give sensitive information, this is an example of spoofing. This email may also include a link to a malicious website with malware.

e.Authorization

step 1

The process by which a server evaluates whether a client has permission to use a resource or access a file is known as authorization. Authentication is frequently used in conjunction with authorization so that the server knows who the client is who is requesting access.

Step 2:

The process of granting someone access to a resource is known as authorization. Of course, this description may appear cryptic, but many real-life scenarios can help you understand what authorisation implies and how to apply those notions to computer systems. A good example is house ownership.

f.Authentication

step 1:

The process of ascertaining whether someone or something is who or what they claim to be is known as authentication. Authentication technology checks if a user's credentials match those in a database of authorised users or in a data authentication server to offer access control for systems.

Something the user knows, something the user is, and something the user has are the three categories in which someone can be authenticated. Identification and real authentication are two independent aspects of the authentication process. The user's identity is sent to the security system during the identification step.

Step 2:

Passwords are the most commonly used type of authentication for websites and applications when it comes to protecting your information online. Passwords, on the other hand, are one of the least secure modes of user authentication out there.

g.Data integrity

step 1:

Integrity refers to the consistency, accuracy, and reliability of data throughout its lifecycle. It must not be changed in transit to retain integrity, and measures must be taken to ensure that data cannot be manipulated by an unauthorised person or programme.

Step 2:

Data integrity is a concept and a procedure that assures that an organization's data is accurate, full, consistent, and valid. Organizations that follow the method ensure not only the integrity of the data, but also that the data in their database is accurate and correct.

Data integrity processes, for example, may be referred to as error checking and validation methods.

h.Confidentialit

step 1:

One of the most important aspects in cybersecurity is confidentiality. Simply defined, confidentiality protects confidential information from unwanted disclosure. Confidentiality is a joint duty between technologists and the rest of the organisation.

Step 2:

Data Confidentiality is concerned with preventing information from being disclosed by ensuring that access to the data is restricted to those who are authorised or by portraying the data in such a manner that its semantics are only accessible to those who have access to crucial information (e.g., a key for decrypting the enciphered data).

For example, a computer file's secrecy is preserved if only authorised users have access to it, while unauthorised users are denied access.

Which files are used to store group information?

step 1: Answer with Explanation

The /etc/group is a text document which characterizes the gatherings to which clients have a place under Linux and UNIX working framework. Under Unix/Linux different clients can be arranged into gatherings. Unix document framework consents are coordinated into three classes, client, gathering, and others.

Step 2: Explanation of incorrect option

The /etc/group is a text record that characterizes the group on the framework.

A shadow password file , otherwise called/etc/shadow,, is a framework record in Linux that stores scrambled client passwords and is open just to the root client, keeping unapproved clients or pernicious entertainers from breaking into the framework.

/etc/gshadow contains the shadowed data for bunch accounts. This record should not be discernible by ordinary clients assuming secret word security is to be kept up with.

Special groups are groups with GID numbers typically under the numeric value of \_\_\_\_\_.

Step 1:

Answer: 1000

Step 2: Explanation

A normal Linux framework will have many default bunch accounts. These default bunch accounts normally have GID values under 1000, making it simple for a director to perceive these as unique records.

Also, assuming you add new programming to the framework, more gatherings might be added as programming sellers utilize both client and gathering records to give controlled admittance to documents that are important for the product.

If the system is using UPG, the group name of the user account named jake should be \_\_\_\_\_.

Step 1: Answer

jake. UPG

step 2: Explanation:

Client private gatherings (UPGs) are a framework design saying that permits numerous clients of a framework to team up on documents with no consent bother. It requires no activity with respect to the end-client to fill in true to form.

framework utilizing a plan called client private gathering (UPG), and that implies that Jake likewise has his own confidential gathering, additionally named jake. UPG appears to be legit when you check authorizations out.

Step 1: Generation of mobile network

The five generations of mobile networks are 1G, 2G, 3G, 4G, and 5G, where G stands for Generation and the number signifies the generation number. 5G is the most recent iteration, while 1G networks are no longer in use. GSM, UMTS, LTE, and NR are cellular technologies that enable 2G, 3G, 4G, and 5G, respectively.

Step 2: 4G and 5G

After 3G and before 5G, 4G is the fourth generation of broadband cellular network technology. A 4G system must support the ITU's IMT Advanced capabilities. Modified mobile online access, IP telephony, gaming services, high-definition mobile TV, video conferencing, and 3D television are some of the potential and present applications.

Fifth-generation wireless (5G) is the most recent iteration of cellular technology, designed to boost the speed and responsiveness of wireless networks dramatically.

Step 3: Packet switching technology

The transfer of small chunks of data across many networks is known as packet switching. These data chunks, or "packets," make data transfer faster and more efficient. When a user transfers a file across a network, it is frequently sent in smaller data packets rather than all at once.

Step 4:

Circuit-switching enables voice calls and text messages using dedicated circuits in 2G and 3G mobile networks; packet-switching is more efficient and uses shared circuits to enable IP-based mobile data in all mobile networks, as well as IP voice calls and texts in 4G LTE and 5G NR networks.

Step 6:

The whole network of LTE (4G) is packet switched, with no support for circuit switched networks. As a result, when using the LTE (4G) network, voice and SMS services must be moved to a packet switched network.

To satisfy users, the voice service in 5G is also packet-switched, and the service should be of equal or better quality than in 4G. Voice capability is required for a 5G smartphone to connect to a mobile network.

Step 7:

 4G LTE and 5G NR networks lack circuit-switched nodes, they are data-only networks.

Packet-switching is used to provide voice, text, and data services. Voice over LTE (VoLTE) is a technology that uses the packet-switched component of the network to offer voice calls and SMS in 4G LTE networks.

Voice over New Radio (VoNR), a comparable technology for 5G networks, works on the same premise as VoLTE to provide voice and text services across the packet-switched portion of the network.

The type of 5G network implementation, i.e. non-standalone or standalone, determines whether a mobile network uses VoLTE or VoNR. Whether a mobile network uses an LTE core network (EPC) or a 5G core network affects VoLTE and VoNR technologies.

Packet-Switching (PS) is a technique that allows mobile networks to send and receive data without using the radio network resources for each user on a permanent basis.

PS provides data bursts in packets at various intervals, sharing the available channel capacity with several users.

These packets have a 'header' that carries the packet's destination information and a payload that contains the actual data or information being transferred.

These headers are used by switching nodes to detect the source and destination of packets, allowing data packets to be delivered to the desired subscribers (devices) through the most efficient route.

Step 8: Conclusion

Mobile networks use circuit-switching and packet-switching as two essential communication techniques to provide voice, SMS, and data services to their consumers.

The older of the two approaches used in 2G and 3G networks for making and receiving voice calls and sending and receiving text messages is circuit-switched.

Hence, Circuit-switched voice (voice and SMS over 2G and 3G networks) and packet-switched voice services in 4G and 5G networks are the major technological network migration steps.

This transformation enables service providers to give consumers, businesses, and industries with more useful and advanced voice and communication services.

Step 1:

Information security refers to the methods and methodologies used to secure confidential, private, and sensitive information or data in print, electronic, or any other form against unauthorised access, use, misuse, disclosure, destruction, modification, or disruption.

Both sensitive and public data are protected by information security. It ensures the public's trustworthiness and accessibility. It is both confidential and provides the necessary amount of confidentiality. Personal information, business, professional, official, and state secrets are all examples of confidential information.

Step 2:

lowering the risk of data breaches and IT system attacks implementing security mechanisms in order to prevent unauthorised access to sensitive data Preventing service disruptions, such as denial-of-service attacks. defending IT systems and networks from unauthorised access.

Information security may secure an organization's technology and information assets by avoiding, detecting, and responding to both internal and external threats.

The organization's information security strategy is the responsibility of both senior management and IT, while in smaller organisations, this responsibility will likely fall to risk and security, data and compliance, and IT and information security managers and directors (sometimes this is just one person).

It's critical to raise employee understanding of information security issues through training and activities in order to support the information security strategy. In order to meet security requirements, organisations must also enforce their information security policies and review them on a regular basis.

Threats and weaknesses must be assessed and analysed. This entails putting in place and enforcing control measures and procedures to minimise risk, and auditing to measure the performance of controls.

Explain why someone who used the same password for several sites would need to change all those passwords. In your opinion, was LinkedIn negligent in protecting its main asset? Explain

Step 1:

Passwords are your computer's and personal information's first line of defence against unwanted access. Your computer will be safer from hackers and bad malware if you use a strong password. For all accounts on your computer, you should use strong passwords.

Step 2:

According to a new Google study, internet users should cease using the same password for different websites unless they want their data to be stolen, their identity stolen, or worse. When you use the same password for multiple websites, you are yourself vulnerable to hackers having access to your personal information.

If you use the same password for all of your accounts, a single password breach anywhere puts them all at risk. Hackers will also be able to access your other internet accounts.

Using the same password for many accounts is akin to having a single key that unlocks all of your doors. Every door is vulnerable if a bad actor obtains or replicates the key. Make it difficult to access your information if one of your accounts is compromised.

Step 3:

There are various effects on Linkedln's popularity and credibility, including a significant loss of money, regulators imposing massive fines for violating privacy laws and guidelines, and a significant loss of revenue in cleaning up and upgrading the data. The lack of security and failure to identify the intrusion would have severely harmed Linkedln's trust and discouraged potential users from joining, resulting in lower-than-expected ad revenue. Millions of dollars were spent cleaning up the damage and investing in IT infrastructure as a result of the incident. As a result, the security compromise was more than just a public relations disaster.

Linkedln was encrypting data with an out-of-date method. As a result, they were unable to detect the data breach, but IT security specialists were able to do so ahead of them.

linkedln took a sloppy approach to data security. The data was Linkdln's most valuable asset, and failing to preserve it made no sense for business. In the business world, IT security assumes responsibility for providing cyber protection for data. When LinkedIn became aware of hacking and data breaches, nearly 6.5 million user passwords were leaked, resulting in millions of dollars in losses and violations of privacy. The entire information was then published on the Russian website.

Step 1:

In computing, multiprocessing is a method of operation in which two or more processors in a computer process two or more different portions of the same programme at the same time (set of instructions).

Parallel processing is a computing technique that uses two or more processors (CPUs) to perform different sections of a larger operation. The amount of time it takes to run a programme can be reduced by splitting out distinct sections of a task over numerous processors.

Step 2:

Multi-processing

The employment of two or more central processing units (CPUs) within a single computer system is known as multiprocessing. The word also refers to a system's ability to accommodate several processors and/or the ability to distribute jobs among them.

Multiprocessing is the process of running multiple processes on a single processor.

Parallel Processing

Parallel processing in computers is the division of programme instructions among many processors with the goal of performing a programme in fewer time. Only one programme ran at a time on the first computers.

Parallel processing refers to the use of many processors to complete a task.

Multiprocessing is a processing technology in which a single computer has numerous processors or processing cores, each of which performs a separate task.

Processing in parallel A processing approach in which numerous processors or processing cores in a single computer work together to speed up the completion of a single task.

Multiprocessing operating systems allow multiple programmes to run at the same time. UNIX is a multiprocessing operating system that is widely used. Multiprocessing refers to the simultaneous usage of two or more Central Processing Units (CPUs). Because most new computers include dual-core processors or two or more processors, they are referred to as multiprocessor computers.

Parallel processing is the utilisation of many CPUs to run a programme at the same time. Parallel processing, in theory, makes a programme execute quicker by utilising multiple engines (CPUs). The majority of computers have only one CPU, although some models have multiple CPUs. Computers with tens of thousands of CPUs are also available. It is feasible to accomplish parallel processing with single-CPU machines by joining them in a network.

Discuss some of the technical and nontechnical issues that might come up in trying to establish a large grid computing project such as the World Computing Grid.

Step 1:

Step 2:

The first problem is that there is no clear standard to follow.

The first thing that needs to be worked out in order to hide the diverse properties of different resources in a grid environment is a standard.

The most significant goal for the Global Grid Forum (GGF) has been standardisation since its inception. Until date, more and more people have recognised Open Grid Systems Architecture (OGSA), and more and more voices from industry have advocated for Web Services Resource Framework (WSRF). Even so, there are still distinct tones for future grid computing standards.

The more grid applications produced without broadly acknowledged standards, the more resource islands will arise.

Grid computing's challenges include the following:

In order to establish the Grid, a large amount of heterogeneous hardware is utilised, and these devices are not maintained by just one person, but by several system administrators in each of the companies.

Grid follows the problems that must be overcome in order to fully utilise the grid's potential.

There is no clear standard:-

Grid computing employs a variety of standards, although not all grids adhere to the same ones. For instance, all grid operating systems such as Linux, Apache, and others. My SQL is based on the standards of WSRF, UDDI, WWW, SOAP, and XML. Without WSRF, Oracle 10g Enterprise cannot be implemented. Gridmiddleware is developed by IBM and is based on J2EE. In grid computing, we can't run many operating systems on the same computer at the same time.

Gridcomputing vs. Distributed Computing:

Grid computing entails resource sharing, dynamic virtual organisation, and peer-to-peer computing.

The Grid aims to make access to computer power, scientific data archives, and experimental equipment as simple as access to information on the Web.  Same all facilities provide the grid computing.so it is a challenge for grid computing.

Lack of grid-enabled software: The software that enables grid computing is insufficient, and there is only limited software on the grid. Many pieces of software do not have copyright issues or licence source code. There is a need for more companies to develop grid-enabled versions, more developers to work on grid development, and more open source software to be developed.

Grid is used to share resources between different types of services. -Grid is used to share resources between different sites and grid hosts. As a grid platform, it manages a large amount of data. There are a lot of sites and multiple servers grouped there, thus the infrastructure is quite complicated. It makes it harder to share hardware resources within a virtual organisation.

Difficult to develop:-

Grid programming employs Java and XML, as well as webservices such as WSDD, WSDL, UDDI, WSRF, and GT3 development standards. It is a question of who will be building grid applications. Basically, senior computer science experts and enterprise developers have access to this.

What is 3D printing? Discuss what you think the future is for 3D printing.

Step 1:

3D printing, also known as additive manufacturing, is a technique for building a three-dimensional object layer by layer from a computer-generated model. 3D printing is an additive method that involves building up layers of material to form a three-dimensional object.

Additive manufacturing, also known as 3D printing, is the technique of creating three-dimensional solid items from a computer file. Additive manufacturing technologies are used to create 3D printed objects. An object is built in an additive technique by laying down successive layers of material until the object is complete.

Step 2:

It is being used by the automobile industry to quickly prototype new car models. In industries like aerospace, 3D printing is utilised to create spare and replacement parts.

Molds in dentistry, prosthesis, and 3D printed models for intricate surgeries are all examples of 3D printing applications in healthcare.

What the future may bring. While 3D printing may not yet have taken over the whole manufacturing business, researchers forecast significant growth, with the market valued at 32.78 billion USD by 2023. The 3D printing sector is expected to be worth $32.7 billion by 2023, according to analysts.

As 3D printing becomes more mainstream, it will become more accessible and easier for inventors and creatives to realise their visions. Inventors are already finding it much easier to create prototypes thanks to 3D printing. In the future, the manufacturing process could be carried out by 3D printing as well.

 Identify and briefly discuss the advantages and disadvantages of solid state secondary storage devices compared with magnetic secondary storage devices

Step 1:

Solid-state storage (SSS) is a type of computer storage media that does not have any moving parts and saves data electrically. Silicon microchips are used to create solid state storage. SSDs utilise less power and emit less heat than spinning hard disc drives or magnetic tape since they have no moving parts.

Hard disc drives, for example, are magnetic storage devices. CD, DVD, and Blu-ray discs are examples of optical storage devices. USB memory sticks and solid state drives are examples of solid state storage devices.

Step 2:

SSD access time is 35 to 100 microseconds, which is roughly 100 times faster than a hard drive. This quicker access speed allows programmes to operate faster, which is especially important for programmes that frequently access huge amounts of data, such as your operating system.

HDD - A typical HDD accesses data in 5,000 to 10,000 microseconds.

In the end, SSD triumphs in this category. A solid-state drive (SSD) is substantially faster than a hard disc drive (HDD).

Price

SSD - A solid-state drive costs more per MB (megabyte) than a hard disc drive. One or more HDDs may be included in desktop PCs with SSDs for secondary storage.

HDD - HDDs are significantly less expensive than SSDs, especially for drives larger than 1 TB (terabyte).

Bottom line: HDD wins in this category. Although SSDs have come down in price, an HDD is always going to be cheaper.

SSD with High Reliability - The SSD has no moving parts. The SSD stores data in flash memory, which delivers superior performance and reliability than a hard disc drive.

HDD - Because HDDs have moving parts and magnetic platters, they wear down and fail more quickly as they are used.

The bottom line is that SSD is the winner in this category. An SSD is more reliable than an HDD because it has fewer moving parts.

Although big SSDs are available, anything over 3 TB is normally out of most people's pricing range.

Hard disc drives (HDD) - Several terabyte hard disc drives are available at relatively low rates.

In the end, HDD is the clear winner in this area. Although massive SSD solutions are available, larger and more economical HDDs are more common.

Power

SSD - SSDs require less power than regular HDDs, resulting in cheaper energy bills over time and, in the case of laptops, longer battery life.

HDD - The HDD consumes more power than an SSD due to all of the parts necessary to spin the platters.

SSD creates no noise because it has no moving parts.

HDD - Because of its spinning platters and rotating read/write heads, an HDD can be one of your computer's loudest components.

physical sizes

SSDs come in three physical sizes: 2.5", 1.8", and 1.0", increasing the amount of storage capacity available in all sorts of PCs.

HDD - For desktops and laptops, HDDs are typically 3.5" and 2.5" in size, with no possibilities for anything smaller.

Heat

SSD - The SSD generates less heat due to its lack of moving parts and the nature of flash memory, extending its longevity and dependability.

HDD - Moving parts generate additional heat, which can slowly damage electronics over time, so the more the heat, the more wear and damage potential.

Magnetism

SSD - Magnetism has no effect on SSDs.

Because a hard drive relies on magnetism to write data to the platter, strong magnets might be used to wipe data from an HDD.

Are Load Balancing and NAS devices necessary in an IaaS solution? Explain your answer.

Step 1:

Load Balancing and NAS devices are necessary in an IaaS solution.

Explanation: IaaS (Infrastructure as a Service) is a type of cloud computing service which offers virtualized computing resources over the Internet.

Step 2:

IaaS providers make all of the computer hardware resources available to customers, who are then responsible for installing and operating the systems, which they may typically accomplish over the Internet.

Step 3: The following services are provided by the IaaS provider:

Computing as a Service contains virtual central processing units and virtual main memory for the virtual machines (VMs) that are provided to end customers.

Back-end storage is provided by the IaaS provider for storing files.

Networking components for virtual computers, such as routers, switches, and bridges, are provided by Network as a Service (NaaS).

Load balancers are devices that help with load balancing at the infrastructure layer.

Load Balancing is a term used to describe the process of balancing

Sites on the internet are subjected to a wide range of network traffic requirements.

Every day, Google, Yahoo!, Amazon, and Microsoft receive millions of user visits.

The sites utilise a method known as load balancing to distribute the requests across many servers in order to accommodate such web requests.

Load balancing is a technique that involves a server routing traffic to multiple servers, which then share the workload.

Step 4: NAS

Cloud NAS (network attached storage) is remote storage that may be accessed as if it were local over the internet. A third-party service provider normally hosts the storage and charges the consumer a fee based on capacity and bandwidth.

Cloud-based NAS devices show cloud-based storage as mountable devices, which can be replicated in the cloud to suit a company's data redundancy requirements.

Good scalability

Availability: good as long as the LAN and NAS devices work.

Performance: limited by speed of LAN, traffic conflicts, inefficient protocol

 Management: OK

Connection: homogeneous vs. heterogeneous

. What is an Initialization Vector (IV)? What is its significance?

Step 1:

An initialization vector (IV) is a random number that can be used to encrypt data with a secret key. This number, also known as a nonce, is only used once every session.

Step 2:

A secret key is used in conjunction with a constantly changing number to encrypt data. Initialization vectors (IVs) are used to avoid a text sequence that is similar to a prior sequence from encrypting using the same exact ciphertext.

Packets, for example, have address fields that are normally fixed in place within the packet header. When attackers repeatedly access the same encrypted data, it gives them information about how to interpret its original values.

What are the problems with symmetric key encryption?

Step 1:

Symmetric key encryption is a way of scrambling data by encrypting and decrypting it with the same key. Asymmetric encryption, often known as public key encryption, uses various keys to encrypt and decrypt information. You must keep the key secret with symmetric key encryption, also known as secret key encryption, whereas asymmetric encryption allows you to share the encryption key with everyone because you retain the decryption key to yourself.

Step 2:

The most significant disadvantage of symmetric key encryption is that you must be able to communicate the key to the entity with whom you are sharing data. Encryption keys aren't just plain text strings like passwords.

They're essentially meaningless blocks. As a result, you'll need a secure method of delivering the key to the other party. Of course, you generally don't need to use encryption in the first place if you have a secure mechanism to communicate the key. With this in mind, symmetric key encryption is particularly beneficial for encrypting your personal data rather than distributing encrypted data.

If your security is compromised, you will experience more damage.

When someone obtains a symmetric key, they can decode anything that has been encrypted with that key. When two-way communications are encrypted by symmetric encryption, both sides of the conversation are vulnerable. Someone who obtains your private key can decode communications sent to you, but they won't be able to decipher messages sent to the other person because they are encrypted with a different key pair.

What is the idea behind meet-in-the-middle attack?

Step 1:

Meet-in-the-middle is a well-known plaintext attack that can drastically reduce the number of brute-force variations needed to decrypt text encrypted with several keys. An intruder can acquire access to data far more easily as a result of such an attack.

A double DES, for example, transforms plaintext inputs into ciphertext outputs using two encryption keys. This encryption algorithm performs two encryption phases using its two unique keys.

Step 2:

MitMs, in particular, aim to lessen the amount of difficulty required to carry out the assault in its original form. MitMs can be as simple as separating the target message into two pieces and addressing each one separately. It could imply converting an attack that takes X amount of time into one that takes Y time and Z space. The goal is to drastically reduce the amount of time and effort required to undertake a brute-force attack.

Explain the main concepts in DES.

Step 1:

The National Institute of Standards and Technology (NIST) published the Data Encryption Standard (DES), a symmetric-key block cypher (NIST).

Step 2:

Because the Data Encryption Standard (DES) has been discovered to be vulnerable to extremely powerful attacks, its popularity has been on the wane.

DES is a block cypher that encrypts data in 64-bit blocks. This implies that 64 bits of plain text are fed into DES, which outputs 64 bits of ciphertext. Encryption and decryption employ the same algorithm and key, with slight variations. The key is 56 bits long.

How can the same key be reused in triple DES?

Step 1:

The usage of a double-length DATA key made up of two 8-byte DATA keys is supported by a variant of the triple DES algorithm. The first 8-byte key is reused in the final encoding step in this method. Triple-DES encryption may not be available on your processor due to export constraints.

Step 2:

Rather of employing a single key as in DES, 3DES uses three 56-bit keys to perform the DES algorithm three times: The plaintext is encrypted using key one. The text that was encrypted by key one is decrypted using key two. The text decrypted by key two is encrypted using key three.

 Explain the principles of the IDEA algorithm

Sep 1:

IDEA was created at ETH Zurich, a research university in Zurich, Switzerland, and is widely regarded as safe. The IDEA cypher encrypts text under the notion that security in IDEA is based on ignorance of the secret key rather than keeping the algorithm secret.

Step 2:

IDEA operates on 64-bit blocks and employs a 128-bit key. It converts a 64-bit block of plaintext into a 64-bit block of ciphertext in essence. This plaintext input block is broken into four 16-bit subblocks. It consists of a set of eight identical transformations, each of which is referred to as a round, as well as an output transformation referred to as a half-round. Similar to the 16-bit plaintext block, the ciphertext block is also the exact same size.

A block cypher works in round blocks, with each round including a portion of the encryption key, known as the round key, and additional mathematical operations. The ciphertext for that block is generated after a specific number of rounds.

Distinguish between differential and linear cryptanalysis.

Step 1:

Cryptanalysis is the process of converting or decoding non-readable to readable communications without having access to the real key. OR, to put it another way, it's a method of accessing the plain text of a communication without having access to the key.

Step 2:

|  |  |
| --- | --- |
| Linear cryptanalysis | Differential cryptanalysis |
| Linear cryptanalysis operates on a single bit at a time (one bit at a time). | Differential cryptanalysis is capable of analysing multiple bits at once. |
| The ciphertext assault is a significant disadvantage in linear cryptanalysis. | Plain text assault is a significant disadvantage in differential cryptanalysis. |
| Linear cryptanalysis is a technique for quickly determining the linear relationship between plaintext bits, ciphertext bits, and unknown key bits. | The use of differential cryptanalysis is to get clues about some critical bits, reducing the need for an extensive search. |
| The internal structures of a single input are referred to as subsets of input attributes. | Because the input properties are varied, the underlying structure of each particular input is irrelevant. |

What are the special guidelines for naming relationships?

Step 1:

-verbal phrase

-verbal phrase

-descriptive and creative

-It is not necessary to consider names with unclear meanings.

Step 2: Explanation

Naming Relationship Types

In a meaningful clause, use a verb that connects the two entity kinds (e.g., "the customer places an order"). Use an active verb, such as the one found in the process name that connects the entity types. Create an inverted name that relates the two entity types in the opposite order (e.g., ORDER placed by CUSTOMER). In most cases, the verb in the inverted name is passive. Memberships in relationships should be called similarly.

The memberships of both connections should be named.

Both relationship memberships should be named because it is useful to be able to read a relationship from both.

Avoid being confined by time constraints.

In addition to explaining what action is being taken, what else should a relationship definition explain?

Step 1:

In the context of databases, a relationship is a situation in which one table has a foreign key that references the primary key of the other table. Relationships enable relational databases to partition and store data in various tables while also connecting distinct data pieces.

Step 2:

The glue that holds the tables together is relationships. They're used to link tables that have similar information.

The strength of a relationship is determined by how a connected entity's primary key is defined. If the primary key of the associated entity does not contain a primary key component of the parent entity, the relationship is weak, or non-identifying.

Explain the distinction between entity type and entity instance.

Step 1:

With the Entity Data Model, the entity type is the essential building block for expressing the structure of data (EDM). An entity type in a conceptual model represents the structure of top-level notions like customers or orders. A template for entity type instances is an entity type.

A physical instantiation of an entity type defined in a model is called an entity instance.

Step 2:

An entity type is a group of entities with similar characteristics. A single instance of an entity type is referred to as an entity instance. STUDENT is an entity type, and John Smith is an entity instance, for example.

Entity Type: An entity type is a group of entities that have a common attribute.

Entity Instance: A single occurrence of an entity is referred to as an entity instance.

Step 3:

Make and Model of Your Car = Entity Type

Entity Instance = Your Automobile

Another example would be your next-door neighbor's car, which is the same make and model as yours.

So BMW 5 Series is the entity type.

All bmw5 series cars are represented as entity instances.

The entity type is a programming term that refers to a group of objects. This is a blueprint. A cookie cutter, to be precise. Dogs Entity instance, for example, is an extremely particular class reference. Waggy, your dog, for example.

Why is it recommended that every ternary relationship be converted into an associative entity?

Step 1:

Ternary relationship: A ternary relationship is a relationship that exists simultaneously between instances of three different entity kinds, each having its own set of attributes.

Associative entity: An associative entity is a type of entity that connects instances of one or more entity types and has a unique property that describes the relationship between those instances.

Step 2:

To more effectively describe participation limits, it is best to convert a ternary connection to an associative entity. To begin, we establish a new associative relationship. The three primary key properties for the participating entities make up the relation's default primary key (sometimes additional attributes are required to form a unique primary key)

These properties then serve as foreign keys, referencing the specific primary keys of the entity types involved. Any associative entity type attributes become attributes of the new relation.

Step 1:

A Karnaugh map (K-map) is a visual method for minimising Boolean expressions that does not need the usage of Boolean algebra theorems or equation manipulations. A K-map can be compared to a more advanced version of a truth table.

Step 2:

"By utilising humans' pattern-recognition skills, the Karnaugh map avoids the need for complex calculations." As a result, a Karnaugh map is less useful today than it was when human simplification was the only option: a computer programme is better than a human at complicated calculations and bookkeeping, but worse at pattern detection.

Step 1:

In Boolean algebra, the sum of product form is a type of statement in which different product terms of inputs are added together. This product is a Boolean logical AND, and the sum is a Boolean logical OR, rather than an arithmetical multiply. We must first learn about the minimum term in order to better comprehend SOP.

Step 2:

For example, if we multiply 2 by 3, the outcome is 6, because 2\*3 = 6, and hence "6" is the product number.

Step 1:

The parity generator is a transmitter combination circuit that takes an original message as input and generates the parity bit for that message, and the transmitter in this generator transmits messages with their parity bit.

Step 2:

Parity Checker, on the other hand, is a circuit that checks the parity in the receiver. In digital systems, a combined circuit or device of parity generators and parity checkers is often used to detect single bit errors in transmitted data.

Step 1:

An octet is a term that refers to a series of eight items in a row. An octet is a musical ensemble made up of eight instruments or voices, or a work produced for such a group.

Step 1:

Data can flow from LED 1 to LED 2 when the Select Switch is set to B. The enable status is what it's called. Because a NAND gate can only generate a 1 output if both inputs are 0, this circuit functions as it does. The inputs to one NAND are set to 1 when the Select Switch is set to A.

Step 2:

When the control signal is high, an Enable will allow an input signal (shown in green) to pass through to the output (shown in red). When the control signal is set to low, it prevents a signal from passing.

Step 1:

The "Don't Care" conditions allow us to replace an empty cell in a K-Map to build a wider grouping of variables than would be possible without them. A "Don't Care" cell can be treated as 1 or 0 when constructing groups of cells, or it can be ignored entirely. In the 8421 code, for example, input states 1001, 1010, 1011, 1100, 1101, 1110, and 1111 are invalid, while the output is don't care.

Step 1:

A floating input is essentially an unused input with a value that has no bearing on the circuit's operation. For example, if one of the inputs in a multi-input OR circuit is floating, the OR circuit will fail. Then the floating input must be set to zero.

Step 1:

The output logic state is undefined and the output voltage is unpredictable when the supply voltage falls below VPOR. When VDD is less than VPOR, the uncertain output voltage appears at the output (RESET) of an active-low Voltage Supervisor.

Step 1:

Contention is a means of sharing a broadcast medium through media access. Any machine on the network can transmit data at any time when the network is in contention (first come-first served). When two computers try to send data at the same time, the system fails.

Step 1:

A programmable logic device (PLD) is an electrical component that can be used to create reprogrammable digital circuits. Unlike digital logic built using fixed-function discrete logic gates, a PLD has an unknown function at the time of construction.

Step 2:

PLDs are integrated circuits (ICs) with a high number of gates and flip flops that may be programmed using simple software to execute a specific logic function or the logic for a complex circuit. Unlike a logic gate, which has a predetermined function, a PLD's function is unknown at the time of creation.

Step 1:

TTL (transistor-transistor logic) is a type of digital logic in which bipolar transistors interact with direct-current pulses. On a single integrated circuit, several TTL logic gates are generally manufactured (IC). TTL ICs are commonly identified by four-digit numbers that begin with 74 or 54.

Step 2:

TTL (transistor-transistor logic) is a type of integrated circuit that uses bipolar transistors to maintain logic states and switch. The capacity of the gate's inputs to rise to the logical "1" if left disconnected is one of the most notable aspects of transistor-transistor logic signals.

Step 1:

CMOS. A complementary metal-oxide semiconductor (CMOS) is made up of two semiconductors that act in opposite (complementary) directions when coupled to a shared secondary voltage. As a result, turning on one transistor turns off the other, and vice versa.

Step 2:

Microprocessors, microcontrollers, memory chips (including CMOS BIOS), and other digital logic circuits are all built using CMOS technology.

\_\_\_\_\_ variables provide an easy way to share large amounts of data among all the functions in a program.

Step 1: Answer

Global

Step 2: Explanation

 The top of the programme is frequently specified as a global variable. In other words, global variables are variables that are defined outside of a function. Both inside and outside the function, Python allows you to access global variables.

Everyone can utilise global variables, both inside and outside of functions.

Local variables can only be accessed within the function or block in which they are defined, whereas global variables can be accessed across the entire programme.

Unless you explicitly initialize numeric global variables, they are automatically initialized to \_\_\_\_\_.

Step 1: Answer

Zero

Step 2: Explanation

Global variables are variables defined outside of any function. They are not restricted to any one function. Global variables can be accessed and modified by any function. At the moment of declaration, global variables are set to 0 by default. In most cases, global variables are written before the main() method.

The initialization of all members of an is guaranteed to be 0. If a static storage duration object is not explicitly initialised, it is implicitly initialised as if every arithmetic type member is assigned 0 and every pointer type member is allocated a null pointer constant.

If a function has a local variable with the same name as a global variable, only the \_\_\_\_\_ variable can be seen by the function.

Step 1: Answer

Local

Step 2:

When a global and a local variable with the same name are both in scope (that is, accessible), your code can only access the local variable.

In C and C++, we can use the Extern and Scope resolution operators to access global variables if there is a local variable with the same name.

What button must be included with every form?

Step 1:

The Button element is represented by the tag button. An interactive element operated by a user with a mouse, keyboard, finger, voice command, or other assistive device is called a button. It then performs a programmable action, such as submitting a form or opening a dialogue, after being activated.

Step 2:

Every Web fill-in form should have two fundamental buttons: Submit and Clear.

Step 3:

The submit button is defined by the input type="submit">, which submits all form values to a form-handler. In most cases, the form-handler is a server page with a script for processing the submitted data. The form's action element specifies the form's handler.

Definition and Application The reset button is defined by the input type="reset">, which resets all form values to their initial values.

How do you change the default button image for the submit button?

Step 1: Default button image in HTML

Image button HTML Image result for what is the default button image in HTML

The type attribute of an input> element can be used to create picture buttons in an HTML document. The only difference between image buttons and submit buttons is that you can keep the picture of your choice as a button.

Step 2:

CSS can be used to change the default button in HTML to an image. Using the appropriate CSS selector, the required button is chosen. After that, the background property may be changed to contain a background image and the image type can be changed as needed. The button's border can easily be removed to show only the image.

What input type lets the user attach a file to the form data?

Step 1:

The user can select one or more files from their device's storage using input> elements with type="file." The files can then be uploaded to a server or changed using JavaScript code and the File API once they've been chosen.

Step 2:

The value attribute of a file input holds a DOMString representing the path to the selected file (s). The value reflects the first file in the list of files selected by the user if the user selected several files. The HTMLInputElement.files property of the input can be used to find the other files.

What is the security problem with the password input type?

Step 1:

Using input type="password"> on HTTP-enabled web pages is dangerous because hackers can steal user data. The HTTPS protocol ensures that user data is protected.

The input type="password"> password input element is used to register users on websites. Normally, special characters such as stars or dots are used to replace the text typed in by the user in this field for security purposes.

Step 2:

Unprotected use of user data includes the following options:

A hacker can alter the form code and add a script that intercepts data while submitting it via the HTTP protocol. Additionally, in the form where the user's personal information will be delivered, a different address can be supplied.

When a user's data is sent over the network using the HTTP protocol, the information is sent in an unencrypted format. In this instance, the system administrator, Internet provider, and others may be able to intercept the user's password.

Even though the main page is transmitted via HTTPS, putting the form inside frames broadcast over HTTP. The frame code can be stolen and manipulated with this option.

What are the two types of select lists?

Step 1:

A select list is a form element that allows the user to choose one or more alternatives from a list. A mixture of HTML tags is used to generate choose lists. Select lists can be nested within elements or used on their own.

Step 2:

To allow the user to select multiple options, checkboxes and multiple-selection select lists can be used.

Step 3:

To allow the user to select more than one option, checkboxes and multiple-selection select lists can be used. From a usability standpoint, checkboxes are usually easier (most—if not all—users will know how to pick multiple checkboxes, whereas not as many users will know how to select multiple alternatives from a select list). However, there may be situations when a choose list is preferable to checkboxes, whether for aesthetic reasons or for other reasons.

What attributes let you specify the width and height of the element?

Step 1:

The height and width attributes are used to specify an element's height and width.

Padding, borders, and margins are not included in the height and width values. It determines the height and width of the region within the element's padding, border, and margin.

Step 2:

The element's height, in pixels, is specified by the height attribute.

Padding, borders, and margins are not included in an element's height.

The element's width, in pixels, is specified by the width attribute. The width attribute is only used with "image" input types for input elements.

Step 1:

Schedulers are specialised computer programmes that manage process scheduling in a variety of ways. Their primary responsibility is to choose which jobs to submit into the system and which processes to run.

Step 2:

Types of Schedulers

The following are the three types of schedulers available:

Long Term Scheduler

Short Term Scheduler

Medium Term Scheduler

Step 3:

The following are the main differences between long-term, medium-term, and short-term schedulers:

|  |  |  |
| --- | --- | --- |
| **Long term scheduler** | **Medium term scheduler** | **Short term scheduler** |
| A work scheduler is a long-term scheduler. | Swapping schedulers is a process that takes place in the medium term. | A CPU scheduler is a short-term scheduler. |
| Long-term speed is slower than short-term speed. | The speed of a medium-term scheduler is somewhere between that of a short-term and that of a long-term scheduler. | The speed of the short term is the fastest of the two. |
| Long term controls the degree of multiprogramming. | Multiprogramming is reduced in the medium term. | The degree of multiprogramming is less controllable in the short term. |
| In the time sharing system, the long term is almost negligible or minimal. | The time-sharing scheme includes the medium term. | A minimal time sharing system is also known as short term. |
| Long-term processes are selected from the pool and loaded into memory for execution. | In the medium term, the process can be reintroduced into memory and execution can continue. | Short-term processes are those that are ready to run. |

Describe the Goal, Question, and Metric model.

Step 1:

The Goal Question Metric (GQM) approach is based on the assumption that in order for an organisation to measure in a meaningful way, it must first define goals for itself and its projects, then trace those goals to the data that will be used to operationalize those goals, and finally provide a framework for interpreting the data in relation to the stated goals.

As a result, it's critical to define, at least in broad terms, the organization's informational requirements, so that these requirements may be quantified wherever possible, and the quantified data can be examined to determine whether or not the objectives have been met.

Step 2:

The implementation of the Goal Question Metric approach results in the development of a measurement system that addresses a specific set of concerns, as well as a set of criteria for interpreting measurement data.

 Describe problem-solving techniques.

Step 1:

The act of describing a problem, discovering the origin of the problem, identifying, prioritising, and selecting potential solutions for a solution, and implementing a solution is referred to as problem solving.

Step 2:

Define the problem

  Diagnose the situation so that you can concentrate on the issue rather than the symptoms. Flowcharts can be used to identify the expected steps of a process, and cause-and-effect diagrams can be used to define and analyse root causes.

Generate alternative solutions

Before making a final decision, many different solutions to the problem should be considered. A common error in issue solving is to evaluate alternatives as they are given, resulting in the selection of the first acceptable answer, even if it is not the best match.  If we focus on trying to get the results we want, we miss the potential for learning something new that will allow for real improvement in the problem-solving process.

Evaluate and select an alternative

When selecting the optimal option, skilled problem solvers take into account a number of factors. They take into account the amount to which:

A certain solution will address the problem without generating any unintended consequences.

The alternative will be accepted by all parties involved.

The alternative is likely to be implemented.

The alternative works within the restrictions of the organisation.

Implement the solution and monitor its progress.

Leaders may be asked to direct others in implementing the solution, "sell" the solution, or support others with the implementation. Involving people in the implementation process is a good approach to get buy-in and support, as well as reduce opposition to future changes.

Feedback channels should be integrated into the implementation regardless of how the solution is implemented. This enables continual monitoring and comparison of actual events to expectations. If the solution remains in place and is adjusted to response to future developments, problem solving and the strategies used to create clarity are most effective.

. What is a fishbone diagram?

Step 1:

A cause and effect diagram, often known as a "fishbone" diagram, can aid in brainstorming and categorising ideas to find the reasons of an issue. A fishbone diagram is a graphic representation of cause and effect.

The fishbone diagram identifies a number of potential reasons for a certain impact or problem. It immediately categorises ideas into categories that are useful.

Step 2:

The actions indicated below should be followed by the team utilising the fishbone diagram tool.

Agree on the statement of the problem (also referred to as the effect). This is written on the "fish's" mouth. Make the situation as precise and specific as possible. Avoid framing the issue in terms of a solution (e.g., we need more of something).

Agree on the broad categories of the problem's causes (written as branches from the main arrow). Equipment or supply factors, environmental factors, rules/policy/procedure factors, and people/staff factors are all common types.

Make a list of all the likely causes of the issue. "Why does this happen?" you might wonder. The facilitator writes the causative component as a branch from the appropriate category (places it on the fishbone diagram) when each concept is presented. If a cause is related to several categories, it might be written in multiple places.

In each case, he asks, "Why does this happen?" Sub-causes branching off the cause branches should be written.

Continually asks "Why?" and generates deeper degrees of reasons, which are then organised into similar causes or categories. This will assist you in identifying and then addressing fundamental causes in order to avoid future issues.

What is a histogram and describe its applications?

Step 1:

A histogram is a graphical representation of statistical data that uses rectangles to illustrate the frequency of data items in equal-sized numerical intervals. The independent variable is plotted along the horizontal axis, while the dependent variable is plotted along the vertical axis in the most common type of histogram.

Step 2:

A histogram is a graphical representation of discrete or continuous data. In other terms, it visualises numerical data by displaying the number of data points that fall within a given range of values (referred to as "bins").

Histograms are primarily used to visually present and organise a huge number of measurements or numerical data in a user-friendly way. A histogram will show you where the majority of numbers on a measuring scale fall, as well as how much variation there is between them.

 What is a scatter graph?

Step 1:

Dots are used to indicate values for two different numeric variables in a scatter plot (also known as a scatter chart or scatter graph). The values for each data point are indicated by the position of each dot on the horizontal and vertical axes. Scatter plots are used to see how variables relate to one another.

Step 2:

Determine whether two variables have a link or correlation using a scatter plot. Are you trying to see if your two variables, when combined, mean anything? Making a scattergram with your data points will help you figure out if there's a possible link between them.

Step 1:

A bar graph is a Pareto graphic. The bars' lengths signify frequency or cost (time or money), and they're organised with the longest on the left and the shortest on the right. The chart clearly displays which scenarios are more important in this way.

A Pareto Chart is a graph that shows the frequency of flaws and their overall impact. Pareto charts can be used to identify which defects should be prioritised in order to get the largest overall improvement.

Step 2:

A Pareto chart can be used to determine the firm's problem. A Pareto chart is a form of graph that includes both bars and a line graph, with bars representing individual values in descending order and a line representing the cumulative total.

Step 1:

Electronic commerce (ecommerce) is a business strategy that allows consumers and businesses to buy and sell goods and services over the Internet. Ecommerce can be done on computers, tablets, smartphones, and other smart devices, and it operates in four key market categories.

A revenue model is a method for managing a company's income streams as well as the resources required for each one. A business model is a structure that outlines how various components of a firm, such as the revenue model and revenue streams, function together.

Step 2:

Electronic retailers (e-tailers), transaction brokers, market developers, content providers, community providers, service providers, and portals are all examples of e-commerce business models. Advertising, sales, subscriptions, free/freemium, transaction fees, and affiliate are the most common e-commerce revenue models.

Name and describe the principal e-commerce business models.

Step 2:

B2C – Business to consumer.

Business-to-consumer (B2C) refers to the process of selling products and services directly to customers who are the end-users of the company's products or services. The majority of businesses that sell directly to consumers are referred to as B2C businesses.

Step 3:

Amazon, Google, Facebook, Tencent, and other B2C corporations are examples.

B2B – Business to business.

Step 1:

Business-to-business (B2B), often known as B2B, is a type of transaction that occurs between businesses, such as between a manufacturer and a wholesaler, or between a wholesaler and a retailer. Business-to-business refers to transactions that take place between businesses rather than between businesses and individual customers.

Step 2:

In today's environment, B2B is more frequent than you might believe. Dropbox, GE, Xerox, and WeWork are excellent examples of modern-day B2B applications.

C2B – Consumer to business.

Step 1:

Consumer-to-business, or C2B, is a business paradigm in which the customer provides the firm with a service or product. This is the polar opposite of the traditional business-to-consumer (B2C) paradigm, in which a corporation sells goods and services to customers in exchange for a service.

Step 2:

Referral schemes, compensated testimonials, and data sharing are examples of C2B models.

C2C – Consumer to consumer.

Step 1:

Consumer to consumer (C2C) is a business model in which third-party organisations facilitate transactions between private customers for items or services without involving a business on either end of the transaction. The majority of C2C transactions are now handled through online businesses.

Step 2:

eBay, an online auction site, and Amazon, which serves as both a B2C and a C2C marketplace, are two of the most well-known examples of C2C. Since its inception in 1995, eBay has been a huge success, and it has always been a C2C company.

Name and describe the e-commerce revenue models.

Advertising: A website earns money by drawing in a huge number of visitors who are subsequently exposed to adverts.

Sales: Companies make money by selling things, information, or services to their clients.

Subscription: A website that provides material or services charges a monthly fee for access to any or all of its offerings.

Free/Freemium: a company provides basic services or content for no charge, but charges a fee for advanced or high-value features.

Transaction fee: Fee for enabling or executing transactions: the firm earns a fee for enabling or executing transactions.

Affiliate: Web sites are compensated as "affiliates" for referring visitors to other sites in exchange for a commission.

What is the role of m-commerce in business, and what are the most important m-commerce applications?

Step 1:

M-commerce (mobile commerce) refers to the purchase and sale of products and services via wireless handheld devices such as smartphones and tablets. M-commerce is a type of e-commerce that allows customers to access online purchasing platforms without having to use a computer.

Step 2:

List of Important M-Commerce Applications

Banking. iMobile is an application that was developed by ICICI Bank that allows users to complete all internet banking transactions through their mobile phone.

M-commerce for Retail.

Mobile Marketing.

Mobile Ticketing.

Reservations.

Entertainment.

Healthcare.

Office Communication.

Step 3:

Location-based apps, such as discovering hotels and restaurants, monitoring local traffic and weather, and offering customised location-based marketing, are particularly well-suited to m-commerce. Mobile bill payment, banking, securities trading, transit schedule updates, and digital content downloads, such as music, games, and video clips, are all done on mobile phones and handhelds. M-commerce necessitates wireless portals and micropayment-capable digital payment systems.

Step 4:

1. Payments and finance

This form of m-commerce service and application is one of the most user-friendly. Paying for something through a smartphone app is becoming more common. Customers who use Google Pay or Apple Pay don't need to carry a wallet because their payment information is stored on their phone. Not every generation has adopted this as a payment method, but it will soon be the norm alongside – or possibly in place of – cash and credit. Customers also desire account access, deposits, and transfers from their finance institutions' mobile apps, such as credit unions and stockbrokers.

Catalogs

M-commerce is transforming the way retailers and even wholesalers conduct business. Customers can download a free app that acts as an augmented reality catalogue from IKEA. Customers may snap photos of their room and use the augmented reality software to superimpose furniture onto it, allowing them to "test before they buy." Customers may get a better knowledge of a product in their area with this technology, which can help firms reduce the rate of refurbishment and returns. This not only enhances the consumer experience, but it also benefits many organisations' financial lines.

3. Marketing

How might various m-commerce services and applications aid in brand awareness or serve as a marketing tool for your company? Consider running a bookstore or a fast-food joint. What if you could reach out to your customers using location-based mobile marketing while they were in your store? Using SMS apps to send coupons to visiting customers or your branded app to announce a flash sale or in-store discount is a terrific way to let your m-commerce app do some of the heavy lifting for you.

Tickets and entertainment

Phones are the keys to the world nowadays. You may use an app to unlock your front door with wi-fi or date-enabled door locks, as well as use it as your airline or concert ticket pass. This not only provides greater convenience for your customers, but it also has a lower environmental impact, which can benefit your business.

Games and entertainment

Mobile games such as Pokemon Go and Harry Potter have altered the landscape of mobile entertainment. More people are interested in gaming as a result of the augmented-reality landscape. These games fill a gap in the pop culture market by allowing users to participate in a universe they enjoy while simultaneously gaming socially with others. In-app purchases or selling advertiser space and time are two ways for game makers to monetise their apps.

Healthcare

In the field of healthcare and wellness, one of the most groundbreaking types of m-commerce services and applications is healthcare and wellness. To begin, US pharmacies such as Walgreens and CVS have pharmacy-specific apps that allow consumers to complete prescriptions online and pay for them more conveniently via pickup or delivery. Apps like Lemonaid Health make it simple to get medicines without having to visit a doctor. Other firms, such as Says and Teladoc, use a simple app interface to allow patients to meet with doctors using only their cellphones. These apps let consumers get the medical treatment they need on demand by providing affordable and no-wait appointments.

Step 1:

Outsourcing is a business practise in which a company hires a third party to perform services or make commodities that were previously performed in-house by the company's own employees and personnel. Outsourcing is a cost-cutting strategy used by businesses to reduce costs.

Step 2: What Encourages Companies to Outsource?

According to a Deloitte survey, the most prevalent motivations for outsourcing are:

reducing costs

greater focus on core business.

Solving capacity issues

improving quality.

Accessing the pool of talents and skills

Because of lockdown and quarantine procedures, demand for outsourcing services has surged in recent years.

Step 3

There are numerous reasons why businesses outsource. There is no single reason why outsourcing makes sense in many circumstances. Depending on where a company is in its development, a variety of factors may apply. It could be a mix of elements in many circumstances, like as talent and cost, or capacity and time to market. But one thing is certain: when done correctly, outsourcing may help businesses become much more efficient. Let's look at some outsourcing instances to show why it's a good idea to outsource.

Step 4: Example

Google

Google began as a simple search engine and has now grown into a giant corporation that provides hardware and software services in addition to advertising services and employs people all over the world. Google has nearly become a metaphor for the internet as a whole, and its name has become a verb used by everyone when talking about searching online.

Google, on the other hand, recognises that, despite its scale, it cannot accomplish everything. To that purpose, they've outsourced development labour, as well as email support for AdWords and other products. Google is taking this a step further by offering phone help in addition to email support. These personnel are effortlessly integrated into their in-house support staff, resulting in faster response times at a lower cost to clients. All of these factors combine to make Google an excellent outsourcing case for demonstrating the benefits of outsourcing.

Step 5:

Outsourcing is used for a variety of reasons, including gaining access to a larger pool of talent and expertise, resolving capacity challenges, improving quality, and lowering prices.

What are the key areas of risk when a firm enters into an outsourcing effort? How can these risks be reduced by following an effective outsourcing process?

Step 1:

Outsourcing is a business practise in which a company hires a third party to perform services or make commodities that were previously performed in-house by the company's own employees and personnel. Outsourcing is a cost-cutting strategy used by businesses to reduce costs.

Step 2: Key areas of risk when a firm enters into an outsourcing effort

1. Control Issues

Outsourcing's greatest danger is a loss of control.

When a business operation that was previously handled by an in-house team is outsourced to an external agency, you lose a lot of control. And when the service provider mismanages it, it might have an impact on the quality of the outsourced service.

Furthermore, the level of control is determined by the vendor's geographic distance.

In-person meetings and inspections become more challenging when the distance between you and your customers grows, forcing you to rely on virtual communication services.

This can make tracking performance and productivity difficult. Collaboration with overseas providers is also made more challenging.

This can Outsourcing Risk Be Managed

Consider what obligations you're willing to delegate to an outsourcing business before hiring one. To achieve so, you'll need a well-thought-out strategy.

Several project management measures can be included, such as:

Make meeting schedules.

Keep track of key performance indicators (KPIs) and metrics.

Determine who should be contacted.

2. Barriers to Communication

It is more difficult to connect over phone and video conferences than in person — especially in offshore outsourcing — regardless of the type of video conferencing solution you are utilising.

But there are scheduling challenges to consider with time, even if you work around it.

This can Outsourcing Risk Be Managed

Here are some ideas for bridging the communication gap:

Establish a set of core business hours.

Make good use of project management software.

Establish standardised communication formats.

Make use of appropriate escalation procedures.

3. Unforeseen and Hidden Costs

Outsourcing is primarily used to obtain a competitive edge through cost savings and profitability. However, it becomes a concern if it results in any hidden costs.

Compare vendor pricing with current in-house development costs, as well as any other expenses, before outsourcing a service. This provides a general estimate of the vendor fees.

This can Outsourcing Risk Be Managed

The first step is to explicitly identify the requirements for an outsourced project. This will ensure that the business process runs well and that errors are avoided.

You must also pay special attention to every detail and cost estimate provided by your outsourcing partner.

Finally, use staff productivity management software such as Time Doctor to precisely clock in the work hours of each outsourced employee.

You'll be able to see how long your jobs took and even track overtime hours so you can pay the vendor appropriately. Additionally, you can generate payrolls at any moment using Time Doctor's payroll administration tool.

4. Concerns about privacy and security

When you outsource to a service organisation, you are exposing your business assets to an external in some way.

That is why you must be concerned about privacy, intellectual property, and data security. Copyrights, patents, trade secrets, and other issues are all involved.

Though the chances of a third-party organisation stealing or leaking vital information or trade secrets are slim if you employ a reputable vendor, there's always the risk. This risk is amplified when you hire someone from another country who does not follow your country's laws.

How Can This Outsourcing Risk Be Managed?

To safeguard your organisation from this security risk, draught an unbreakable outsourcing contract or SLAs (service level agreement) with the help of an international lawyer.

5. Outsourcing Out a Key Product

It's a big decision to outsource your main product.

You become reliant on an outside vendor if you hire an offshore company to work on your primary project. While outsourcing saves money and makes the task easier, you eventually lose your product knowledge and key competency.

As a result, rather than exporting your entire product, it's better to recruit experts like engineers or analysts who can lead your team to develop it.

Step 1:

The database strategy. The usage of a database management system (DBMS) provides facilities for querying, data security and integrity, and permits simultaneous access to data by a number of different users, which is an upgrade over the shared file solution.

Step 2: Database Approach Characteristics

Manages Information

Because information is always useful for whatever activity we do, a database always takes care of its information. It keeps track of all the information we need. We become more purposeful users of our data when we manage information using a database.

Easy Operation Implementation

All actions, including as insert, remove, update, and search, are performed in a flexible and user-friendly manner. These operations are fairly straightforward to accomplish using a database. These operations can be performed by a user with limited knowledge. This feature of a database increases its power.

Multiple Views of Database

A view is essentially a subset of the database. A view is created and dedicated to a specific system user. Users of the system may have differing perspectives on the same system. Every view only shows data that is relevant to a single user or a group of users. It is the users' obligation to be aware of how and where their personal data is stored.

Information for a Specific Purpose

A database is a collection of data with a defined purpose. A database for a student management system, for example, is used to keep track of a student's grades, fees, and attendance. This information is used to keep track of students' progress.

It has Users of Specific Interest

There is usually some indented group of users and apps that these user groups are interested in in a database.

In a library system, for example, there are three users: the college's formal administration, the librarian, and the students.

. Represent Some Real-World Applications

A database is a representation of some characteristics of real-world applications. In the real world, any change is reflected in the database. If we make any updates to our real-world apps, such as railway reservation system then it will be reflected in database too.

Take, for example, a railway reservation system; we have in mind certain specific applications for keeping track of attendance, waiting lists, train arrival and departure times, specific days, and so on for each train.

Self Describing nature

A database is self-descriptive in that it describes and narrates itself at all times. It describes the entire data structure, as well as the constraints and variables.

It distinguishes it from classic file management systems, which did not include definition as part of the application software. When needed, users and DBMS software refer to these definitions.

 Logical Relationship Between Records and Data

The records and data in a database are linked in a logical way. As a result, a user can access various records based on their needs.

Shelter Between Program and Data

If a user altered the structure of a file in a traditional file management system, all the programmes that used that file had to be changed as well. The application programmes define the structure of data files.

So there you have it, the basic characteristics of a database approach.

Step 3:

|  |  |
| --- | --- |
| File system | DBMS |
| A file system is software that maintains and organises files on a computer's storage media. | A database management system (DBMS) is software that manages databases. |
| A file system may include redundant data. | There is no redundant data in DBMS. |
| It does not provide data backup or recovery in the event that it is lost. | It provides data backup and recovery, even if the data is lost. |
| In the file system, there is no efficient query processing. | In DBMS, efficient query processing is available. |
| It is less complicated than a database management system. | When compared to the file system, it is more difficult to handle. |
| The file system has a lower level of data consistency. | Because of the normalisation procedure, the data is more consistent. |
| In comparison to DBMS, file systems offer less security. | When compared to file systems, DBMS provides additional security mechanisms. |
| It is less expensive than a database management system. | Its price is higher than that of a file system. |
| There is no such thing as data independence. | Data independence exists in DBMS. |
| Data can only be accessed by one user at a time. | Data can be accessed by multiple people at the same time. |

Which of the following types of custom PCs requires an HDMI output?

Step 1:

HDMI has become the industry standard for high-definition connectors, and many new PCs contain an HDMI output. The issue is that older PCs do not have HDMI ports.

HDMI outputs "feed" audio and video signals into digital devices' HDMI inputs, where they are received and processed. A Blu-ray player's HMDI output, for example, might be linked to an HDMI input on an A/V receiver or to a TV's HDMI port directly.

Step 2: Answer with Explanation

Answer option A Home theater PC (HTPC).

To connect successfully to the HDMI port on a television, the video card must have a high-definition multimedia interface (HDMI) output.

Step 3: Explanation for incorrect option

Because it can connect a monitor to a PC's specialised graphics card and offers greater resolutions, refresh rates, and bandwidth than HDMI, DisplayPort is particularly useful (and sometimes required) for PC games. HDMI

A client device connected to a virtual machine (VM) that hosts desktops and programmes is referred to as a virtual workstation. These virtual machines run on hypervisor software that is installed on a single piece of powerful hardware.

The combination of computer-aided design (CAD) with computer-aided manufacturing (CAM) is known as CAD/CAM (CAM). Both of these tasks necessitate the use of sophisticated computers. CAD software aids designers and draughtsmen, whereas CAM in the production process "reduces personnel costs."

How many pins are inside a SATA data connector?

Step 1:

Serial ATA (SATA) is a computer bus interface that connects mass storage devices such as hard disc drives, optical drives, and solid-state drives to host bus adapters.

Serial ATA has supplanted Parallel ATA as the preferred IDE technology for linking storage devices within a computer. SATA storage devices are substantially faster than PATA storage devices at transmitting data to and from the rest of the computer.

Step 2: Answer with Explanation

SATA cables are 7-pin cables that are long. Both ends are flat and thin, with one of them frequently angled at a 90-degree angle to help with cable management. One end connects to a SATA port on the motherboard, and the other (such as the angled end) connects to the back of a storage device like a SATA hard drive.

Hence option B 7 is the answer

    What is the delay in the RAM’s response to a request from the memory controller called?

Step 1:

When a memory controller tries to access data from a memory module, memory latency or CAS (column address strobe) latency occurs. While the memory module reacts to the memory controller, there is a little delay, commonly measured in nanoseconds. The speed at which the memory controller (northbridge) functions is set. If the CPU requests too much data from the chip at once, the memory controller may experience increased latency.

Step 2: Answer with Explanation

The delay in data transmission that happens as data transfers between computer RAM and the processor is referred to as random access memory latency (RAM latency). The length of time it takes for the CPU to retrieve data from the RAM is referred to as RAM latency.

 What are the essential ingredients of a symmetric encryption scheme?

Step 1:

Plaintext  
Encryption algorithm

Secret key  
Ciphertext  
Decryption algorithm

Step 2:

Any readable data — including binary files — in a form that can be seen or used without the use of a decryption key or decryption device is known as plain text. Any message, document, file, or the like that is not meant to be encrypted is referred to as plaintext.

The mechanism used to transform data into ciphertext is known as an encryption algorithm. The encryption key will be used by an algorithm to alter the data in a predictable fashion, such that even though the encrypted data appears random, it can be decrypted using the decryption key.

A private key, also known as a secret key, is a cryptographic variable that is used to encrypt and decode data using an algorithm. Only the key's generator and those authorised to decrypt the data should have access to the secret key.

Ciphertext, also known as cyphertext, is a type of encryption in which plaintext units are substituted by substitutions as part of an algorithm. Single, pairs, or triplets of letters (or a combination of these) are replaced but retained in the same order when using a substitution cypher.

Decryption algorithm: Decryption is the process of converting encrypted data back to its original form. In most cases, it's a reversal of the encryption process. Because decryption requires a secret key or password, it decodes the encrypted information so that only an authorised user can decrypt the data.

What is cryptanalysis? Summarize the various types of cryptanalytic attacks on encrypted messages.

Step 1:

Cryptanalysis is the technique of examining cryptographic systems for flaws or information leakage.

Cryptoanalysts, for example, aim to decipher ciphertexts without having access to the plaintext source, encryption key, or encryption algorithm; they also attack safe hashing, digital signatures, and other cryptographic procedures.

Step 2:

Types of Attacks

* Known-Plaintext Analysis (KPA) : In this type of attack, some plaintext-ciphertext pairs are already known. ...
* Chosen-Plaintext Analysis (CPA) : ...
* Ciphertext-Only Analysis (COA) : ...
* Man-In-The-Middle (MITM) attack : ...
* Adaptive Chosen-Plaintext Analysis (ACPA) :

Step 3:

Known-Plaintext Analysis (KPA): Some plaintext-ciphertext pairs are already known in this sort of attack. In order to find the encryption key, the attacker maps them. This assault is simpler to execute because a large amount of data is already available.

CPA (Chosen-Plaintext Analysis): In this sort of attack, the attacker selects random plaintexts, obtains the accompanying ciphertexts, and attempts to decrypt the data. It's similar to KPA in that it's easy to execute, but the success rate is low.

COA (Ciphertext-Only Analysis): In this form of attack, the attacker only knows a portion of the ciphertext and attempts to deduce the encryption key and plaintext. It is the most difficult to implement, but it is also the most likely attack because just ciphertext is required.

Man-In-The-Middle (MITM) attack :

The attacker intercepts the message/key between two communicating parties through a secured channel in a Man-In-The-Middle (MITM) attack.

ACPA (Adaptive Chosen-Plaintext Analysis)

It is a variant of CPA. After obtaining ciphertexts for certain plaintexts, the attacker requests the ciphertexts of further plaintexts.

List the parameters of a symmetric block cipher for greater security.

Step 1:

A symmetric cypher is one that encrypts and decrypts using the same key. Asymmetric or symmetric cyphers or algorithms exist. Symmetric ones employ the same key (sometimes referred to as a secret key or private key) to convert plaintext into ciphertext and vice versa.

Step 2:

The symmetric block cypher is determined by the parameters and design elements used.

• Block size: Larger block sizes provide more security but slow down encryption and decoding.

• Key size: A larger key size provides more security, but it may slow down encryption and decoding. In current algorithms, the most frequent key length is 128 bits.

• Number of rounds: A symmetric block cipher's essential is that a single round provides insufficient security, but numerous rounds provide increased security. 16 rounds is a common size.

• Subkey generation algorithm: A higher level of complexity in this process should make cryptanalysis more challenging.

• Round function: Once again, increased complexity equates to better cryptanalysis resistance.

• Fast software encryption/decryption: As a result, the algorithm's speed of execution and hardware implementation become a factor.

 What is a block cipher? Name the important symmetric block ciphers.

Step 1:

A block cypher is an encryption method that encrypts a block of text using a deterministic algorithm and a symmetric key, rather than encrypting one bit at a time like stream cyphers. AES, for example, is a popular block cypher that encrypts 128-bit blocks with a key length of 128, 192, or 256 bits.

Step 2:

The symmetric block cyphers Data Encryption Standard (DES) and Advanced Encryption Standard (AES) are both used to encrypt data. IBM created the DES block cypher in 1975, which consisted of 64-bit blocks and a 56-bit key.

Step 3:

DES is a symmetric key block cypher that uses a 64-bit block size and a 64-bit key size. It is vulnerable to some types of attacks, hence it isn't widely used.

The Advanced Encryption Standard (AES) is a symmetric block cypher that the United States government has chosen to safeguard confidential information. AES is used to encrypt sensitive data in software and hardware all over the world. It's critical for government computer security, cybersecurity, and data security.

There are two applications for public-key cryptography:

Step 1:

1) Encryption with the recipient's public key (the message is encrypted with the recipient's public key and can only be decoded with the recipient's private key)

The approach of encrypting data with two separate keys and making one of the keys, the public key, available for anybody to use is known as public key encryption or public key cryptography. The private key is the other of the two keys.

Step 2:

Every user's public key is stored in the Public Key Register. If B wants to transmit a confidential message to C, B uses C's public key to encrypt the message. When C receives the message from B, it can use its own Private key to decrypt it.

Because users never have to transmit or reveal their private keys to anyone, public key cryptography remains the most secure protocol (over private key cryptography). This reduces the odds of cyber criminals discovering an individual's secret key during transmission.

2)Digital signature

A mathematical algorithm is frequently used to confirm the validity and integrity of a message using a digital signature, which is a sort of electronic signature (e.g., an email, a credit card transaction, or a digital document).

Public key cryptography, often known as asymmetric cryptography, is used to create digital signatures. Two keys are produced using a public key algorithm like RSA (Rivest-Shamir-Adleman), resulting in a mathematically connected pair of keys, one private and one public.

List four general categories of schemes for the distribution of public keys.

Step 1:

The key distribution of public keys is done by public key servers in public key cryptography. When someone generates a key pair, they keep one key private and upload the other, known as the public key, to a server where anyone can use it to send the user a private, encrypted message.

Step 2:

There are four different types of systems for distributing public keys.

 Public Announcement:

Publicly available directory

Public-key authority

Public-key certificates

Step 3:

 Public Announcement:

The public key is broadcasted to the rest of the world. A forgery is a serious flaw in this strategy. Anyone can build and transmit a key that pretends to be someone else. Can impersonate the claimed user until the forgery is found.

Publicly Available Directory: The public key is kept in a public directory in this case. Here, directories are trusted, with features such as Participant Registration, access, and the ability to change values at any time, as well as entries such as name and public-key.

The Public Key Authority is comparable to the directory, but it increases security by tighter control over how keys are distributed from the directory. It necessitates that users be aware of the directory's public key.

A public key certificate can be compared to a passport in terms of digital security. It is issued by a reputable institution and serves to identify the bearer. A Certificate Authority is a reputable institution that issues public key certificates (CA). The CA is comparable to a notary public.

What are the essential ingredients of a public-key directory?

Step 1:

Plaintext  
Encryption algorithm

Secret key  
Ciphertext  
Decryption algorithm

Step 2:

Any readable data — including binary files — in a form that can be seen or used without the use of a decryption key or decryption device is known as plain text. Any message, document, file, or the like that is not meant to be encrypted is referred to as plaintext.

The mechanism used to transform data into ciphertext is known as an encryption algorithm. The encryption key will be used by an algorithm to alter the data in a predictable fashion, such that even though the encrypted data appears random, it can be decrypted using the decryption key.

A private key, also known as a secret key, is a cryptographic variable that is used to encrypt and decode data using an algorithm. Only the key's generator and those authorised to decrypt the data should have access to the secret key.

Ciphertext, also known as cyphertext, is a type of encryption in which plaintext units are substituted by substitutions as part of an algorithm. Single, pairs, or triplets of letters (or a combination of these) are replaced but retained in the same order when using a substitution cypher.

Decryption algorithm: Decryption is the process of converting encrypted data back to its original form. In most cases, it's a reversal of the encryption process. Because decryption requires a secret key or password, it decodes the encrypted information so that only an authorised user can decrypt the data.

What is a public-key certificate?

Step 1:

A public key certificate, also known as a digital certificate or an identity certificate, is an electronic document that proves a public key's validity.

The certificate contains information about the key, information about the subject's identity, and the digital signature of an institution that has verified the contents of the certificate (called the issuer).

If the signature is valid and the programme inspecting the certificate trusts the issuer, it can interact securely with the certificate's subject using that key.

Step 2:

A public key infrastructure (PKI) system uses encryption technology to secure messages and data, and public key certificates are an element of that system. One public and one private encryption key are used in a public key certificate.

The public key is available to anybody who wants to verify the certificate holder's identity, whereas the private key is a one-of-a-kind key that is kept private.

This allows the certificate holder to digitally sign papers, emails, and other information without being able to be trying to impersonate by a third party.

What are the requirements for the use of a public-key certificate scheme?

Step 1:

A user can obtain a certificate by securely presenting his or her public key to the authority. The certificate can then be published by the user. Anyone who requires this user's public key can receive the certificate and use the accompanying trustworthy signature to validate its validity. A participant's certificate can also be used to send key information to another participant. Other parties can confirm that the authority issued the certificate.

Step 2: On this scheme, we can impose the following requirements:

Any participant can read a certificate to determine the name and public key of the certificate's owner.

Any participant can verify that the certificate originated from the certificate authority and is not counterfeit

Only the certificate authority can create and update certificates.

Any participant can verify the currency of the certificate.

\*\*What is the main access control threat to Ethernet LANs?

Step 1:

Ethernet is the most widely utilised technology in wired local area networks (LANs). A local area network (LAN) is a group of computers and other electronic devices that share a limited space, such as a room, office, or building. A wide area network (WAN), on the other hand, covers a huge geographical area.

Access control is a crucial part of data security since it determines who has access to and uses company data and resources. Access control policies ensure that users are who they say they are and that they have proper access to firm data through authentication and permission.

Step 2:

Any intruder can go up to any wall jack in a corporate building and plug in a notebook computer.

What is the main access control threat to wireless LANs?

Step 1:

A wireless LAN is a computer network that uses wireless communication to connect two or more devices to establish a local area network inside a defined area, such as a house, school, computer lab, campus, or office building.

Step 2:

Hackers can compromise the security of your home Wi-Fi by utilising a technique known as DNS (Domain Name Server) hijacking and potentially cause you a great lot of harm. They can send your traffic to a website they control, enabling you to unintentionally give a criminal your credit card number or Facebook login details.

Why is the access control threat to wireless LANs more severe?

Step 1:

A wireless network allows devices to remain connected to the network while roaming without being attacked by wires. Wi-Fi signals are amplified by access points, so a device can be far away from a router and still connect to the network.

Step 2:

Because it is impossible to block physical access to wireless networks, they are particularly vulnerable to attacks. The sole advantage they have in this regard is that an attacker must be physically close to the network, limiting the number of possible assailants.

Bypassing the border firewall, the attacker gains access to the network.

. Is eavesdropping usually a concern for wired LANs, wireless LANs, or both?

Step 1:

An eavesdropping assault, also known as a sniffing or spying attack, is when a computer, smartphone, or other connected device steals information while it is transferred over a network. The attack uses unsecured network communications to get access to data as it is sent or received by the user.

Listening to your neighbours' fight through a vent in your apartment is an example of eavesdropping. Wiretapping or intercepting e-mail or cell phone calls can be used to get access to private electronic communications.

Step 2:

Intruders can intercept and read genuine traffic on both wired and wireless LANs once they get access. Encryption is uncommon on an Ethernet LAN, although direct access to Ethernet wire or wall plugs is difficult.

However, unless the traffic is securely encrypted, wireless LAN radio transmission makes eavesdropping straightforward.

Wireless traffic is frequently encrypted in ways that are childishly simple to crack using hacker software that can be downloaded easily from the internet.

Step 3:

Both, but wireless LANs more so.

Because it is a precondition for other malicious attacks, eavesdropping attacks have become one of the most serious risks in wireless networks. The majority of current research is on developing anti-eavesdropping techniques.

 Why is 802.1X called Port-based Access Control?

Step 1:

Port-based network access control allows the functioning of a system's port(s) to be regulated in order to ensure that only authorised systems have access to its services.

IEEE 802.1X is an IEEE standard for network access control based on ports. It's a networking protocol that's part of the IEEE 802.1 group. It gives devices that want to connect to a LAN or WLAN an authentication mechanism.

Step 2:

When an organisation authenticates a user's identity and authorises them for network access, 802.1X is a network authentication protocol that unlocks ports for network access. The user's identification is established using their credentials or certificate, which the RADIUS server verifies.

Step 3:

Because the user's PC is connected to the workgroup switch through UTP to a specific port.

It controls access to each switch port individually, by default disabling all ports until the user is authenticated.

Where is the heavy authentication work done?

Step 1:

When a server wants to know exactly who is accessing their information or site, it uses authentication. When a client wants to know that the server is the system it purports to be, authentication is used. The user or machine must confirm its identity to the server or client during authentication.

Step 2:

Rather than on the switch, the major authentication work is done on a central authentication server.

. What are the three benefits of using a central authentication server?

Step 1:

For the web, the Central Authentication Service (CAS) is a single sign-on protocol. Its goal is to allow a user to access various applications while only having to provide their credentials (user ID and password) once.

The usernames and passwords that identify the clients logging in are stored on an authentication server, which may also hold the algorithms for token access (see authentication token).

Step 2:

Cost reductions, stability, and quick modifications are all advantages of using a central authentication server

Which device is the verifier?

Step 1:

Verifier definitions. someone who stands up for someone else or for the truth of a statement.

The computer, the computer, will not be able to obtain access until it has verified its identity.

Step 2:

All users who have logged in with a username and password are considered Authenticated Users. Everyone includes both password-protected users and non-password-protected accounts like Guest and LOCAL SERVICE.

Which device is called the authenticator?

Step 1:

An authenticator is a tool for verifying a user's identity, often known as digital authentication. By demonstrating that he or she has possession and control of an authenticator, a person can gain access to a computer system or application. The authenticator can be a simple password in the most basic example.

Step 2:

Answer: workgroup switch

It is a low-capacity switch on a local area network (LAN) that serves the needs of a workgroup, or a small group of workers that are generally geographically located. In a public wide area network, a workgroup switch is the LAN counterpart of an edge switch (WAN).

Step 1:

Workers with information as their primary capital are known as knowledge workers.

Step 2:

Programmers, physicians, pharmacists, architects, engineers, scientists, design thinkers, public accountants, lawyers, editors, and academics are just a few examples of professionals who "think for a living."

Knowledge workers, rather than completing physical activities for a living, think about how to solve complicated problems, develop new services or products, or present research findings in a specified manner, such as a report or a blog post.

Step 3:

In his book The Landmarks of Tomorrow, published in 1959, business expert Peter Drucker coined the term "knowledge work."

 Name your two favorite mobile devices. For each device, discuss how it has influenced your work or personal life.

Step 1:

Any mobile computer or a variety of other electronic devices with portable functionality might be considered a mobile device. Smartphones, tablets, laptop computers, smart watches, e-readers, and handheld gaming consoles are all examples.

Step 2:

Smartphone

Smartphone technology makes people's life easier and has provided billions of people with several benefits.

Smartphones are small enough to fit in anyone's pocket. Smartphones are currently used for payments, financial transactions, navigation, calling, face-to-face communication, texting, emailing, and everyday scheduling. Aside from other aspects, using cellphones for daily tasks can save a lot of time and make it easier for people to achieve their goals.

Smartphones have also evolved into a source of entertainment for many individuals. People nowadays view movies, TV shows, and listen to music via wireless technology, particularly smartphones. In truth, smartphones have improved people's lives.

As a result, people save money and time by utilising cellphones, and the quality of life has improved as a result of these devices.

Despite the advantages, excessive smartphone use can lead to addiction, which can have a severe influence on human health. Smartphone addiction can also contribute to sadness, tension, anxiety, and a lack of social connection in certain people. Furthermore, excessive smartphone use can squander time.

Laptop computer

With just one click, laptops have made it easy to connect with individuals all around the world. Laptops have expanded the use of social media sites such as Facebook, Instagram, Skype, and other similar services. You can use these websites on your smartphone, but using them on a laptop is a very different storey.

Laptops have influenced and advanced our lives and will continue to do so in the future. Tablets and smartphones are posing a greater threat, but let's look at 13 ways laptops have improved our lives and continue to do so. We'll study how laptops for everyday work have improved and simplified our lives.

Communication

With just one click, laptops have made it easy to connect with individuals all around the world. Laptops have expanded the use of social media sites such as Facebook, Instagram, Skype, and other similar services. You can use these websites on your smartphone, but using them on a laptop is a very different storey. You can check your homepage or make video calls at any moment, even if you're seated in a café.

Vlogging

Video blogs are a type of blogging, vlogging, or vlog, in which you create a video and express your material verbally rather than writing it. A laptop is the perfect instrument for a vlogger due of its many functions and portability.

Online Marketing

If you're a blogger, you're probably already familiar with affiliate marketing. It's one of the most important ways for a blogger to make a lot of money, and laptops are the most practical option for a marketer. It allows you to be more flexible in your work. You can work from anywhere in the world if you want to. Tablets and desktop computers do not allow for this.

Graphic designing

Logo design, web theme design, cover design, and videography are all required for a website to function properly. Laptops are the best option accessible for every aspect of graphic design. Not just because they are portable, but also because they include high-end features and specs that are difficult to find in a little tablet.

In general, laptops have improved our lives in a variety of ways. Every step of the journey, from social media to larger business negotiations, necessitates the use of a laptop. Laptops have advanced and become increasingly crucial since 1981. The most significant advancement in this advanced electronic device is yet to come.

 List and describe several opportunities and challenges brought about by globalization.

Step 1: Globalization

The process by which businesses or other organisations gain international influence or begin operating on a global scale, according to the official definition of "globalisation."

Globalization, to put it another way, is the free flow of information, technology, and goods between countries and customers. Business, geopolitics, and technology, as well as travel, culture, and the media, all contribute to this openness.

Step 2: Opportunities

Access to New Cultures

Globalization has made foreign culture, such as food, film, music, and art, more accessible than ever before. Because of this free flow of people, goods, art, and information, you can have Thai food delivered to your flat while listening to your favourite UK-based artist or watching a Bollywood movie on Netflix.

The Spread of Technology and Innovation

Because many countries throughout the world are always connected, information and technology advancements circulate swiftly. Because knowledge travels so quickly, scientific breakthroughs produced in Asia can be put to use in the United States in a matter of days.

Accessing New Markets

Globalization benefits businesses in many ways, including new customers and revenue streams. Companies interested in these advantages seek out flexible and inventive ways to expand their operations internationally. International Professional Employer Organizations (PEOs) make it easier than ever to promptly and compliantly hire personnel from other nations. This means that many organisations will no longer need to form a foreign entity in order to develop internationally.

Access to New Talent

Globalization allows organisations to find fresh, specialised expertise that is not available in their present market, in addition to new markets. Globalization, for example, allows corporations to look for tech talent in rising regions like Berlin or Stockholm rather than Silicon Valley. Again, International PEO enables organisations to legally employ individuals in other countries without the need to form a legal corporation, making global hiring easier than ever.

Step 3: Challengers

International Recruiting

HR departments face unknowns when recruiting across borders. First, firms devise a strategy for conducting interviews and thoroughly vetting individuals when thousands of miles distance them from headquarters. To make competitive offers, organisations must first understand market expectations for pay and benefits. To identify a good fit for the firm, HR staff must take into account issues such as time zones, cultural differences, and language barriers.

Managing Employee Immigration

Internally, immigration issues generate a lot of hassles, which is why 28% of US and UK tech leaders said it was one of their top challenges. Immigration regulations change frequently, and obtaining visas for foreign national employees can be extremely difficult in some nations. The United States, for example, is becoming more stringent in granting H-1B visas, and Brexit has cast doubt on the future of immigration to the United Kingdom.

Incurring Tariffs and Export Fees

Tariffs and export fees are another issue that both US and UK IT leaders mentioned in the report, with 29% agreeing that this is a problem for their worldwide operations. Depending on the market, acquiring products to sell in another country can be costly.

Payroll and Compliance Challenges

Managing abroad payroll and being compliant with changing employment and tax legislation is another major global growth stumbling block. When you're trying to manage business in numerous markets, this management duty becomes considerably more complex.

Local Job Loss and Immigration Issues

The political climates in the United States and Europe demonstrate that varied perspectives on globalization's effects exist. Many countries are tightening their immigration policies, making it more difficult for immigrants to find work in new places. The impression that immigrants fill domestic jobs or that corporations are relocating their operations abroad to save money on labour costs has fueled this surge in nationalism.

Step 1:

The wireless technology that connects computers, tablets, cellphones, and other devices to the internet is known as Wi-Fi. Wi-Fi is a radio signal transmitted from a wireless router to a nearby device, which converts the signal into data that can be seen and used.

The names 3G, 4G, and LTE are often used to describe smartphone data networks. This is a term used to describe a next generation of network technology. The third generation network, sometimes known as 3G, is the group's oldest technology. LTE stands for Long Term Evolution and refers to the fourth generation of data networks.

Step 2:

The key distinction between 3G and WiFi networks is their range.

WiFi only has a short range of coverage, often in the tens of metres, which is sufficient for a home or office. 3G, on the other hand, is a cellular network that provides connectivity to mobile phones. You can travel hundreds of kilometres without losing your connection, depending on where you are and the network coverage. This is possible because, despite the fact that a typical cellular tower only covers a few kilometres, the network can transfer communications from one mobile to the next.

The speeds of 3G and WiFi networks are another distinction.

WiFi usually has a substantially faster connection speed than 3G. Because, in most circumstances, a WiFi network is only used by a few individuals, whereas a 3G network is used by hundreds, if not thousands, of people in the area. There's also the matter of the user's distance from the access point. When using WiFi, the user is quite close to the tower, as opposed to 3G, when the user and the tower are separated by buildings and trees.

Another significant benefit of WiFi over 3G is cost.

A 3G plan is fairly costly, and you should opt for the more expensive unlimited plan unless you enjoy being surprised by your bill. WiFi isn't always free because you have to pay for the internet connection. However, the majority of businesses with internet access use it for other purposes. As a result, instead of paying two bills, you can just pay one.

What are the basic capabilities of a Web server?

Step 1: Web server

A web server is a computer or other piece of hardware that provides content or services to end users over the Internet. It is made up of three parts: a physical server, an operating system, and software that work together to speed up the HTTP (Hypertext Transfer Protocol) communication process.

Step 2: Basic capabilities of a Web server

A web server's primary responsibility is to show website content by storing, processing, and distributing webpages to users. Web servers provide SMTP (Simple Mail Transmission Protocol) and FTP (File Transfer Protocol) for email, file transfer, and storage, in addition to HTTP.

The web server's primary goal is to store, process, and distribute web pages to users. The Hypertext Transfer Protocol is used for this intercommunication (HTTP). These web pages are mostly static content that includes HTML documents, images, style sheets, test etc.

Web server hardware connects to the internet and allows data to be transferred with other connected devices, whilst web server software regulates how users access hosted content. The client/server concept is demonstrated through the web server operation. Web server software is required on all machines that host websites.

Web servers are used in web hosting, which is the storage of data for websites and web-based applications, often known as web apps.

What are the major technological advancements that are anticipated to accompany the Internet of the future? Discuss the importance of each.

Step 1:

. The following are some of the technical advancements that can be expected in the future: Because of fibre optics, Internet bandwidth is being increased: Fiber optic connections have largely supplanted coaxial cables as a means of transmitting more data with less interference, increased security, and increased speed.

When we look at the evolution of technology over the last ten years, we can clearly see how far we've come in terms of new technology and its uses in our daily lives and in business.

Step 2:

\*Future Technology: AI-enabled robots

In terms of people working alongside robots in 2022, current technology advancements appear promising.

There has been a lot of talk about AI stealing human employment, but experts have claimed that instead of stealing one job, AI is likely to create up to three new job chances.

This implies we'll be able to see great performance, efficiency, and precise strategy and planning across a wide range of industries.

\*IoT in the Home and at Work is Made Easier by Future Technology

IoT has recently had significant growth, and the future technology timeline predicts that it will experience a boom similar to the dotcom era.

Many companies are working on long-term IoT solutions for both consumers and enterprises, and a unified IoT ecosystem will emerge soon.

\*With the help of Future Technology, space tourism will be possible.

SpaceX has already taken the lead in building a long-term space tourism strategy, but there are other companies pursuing this path as well.

This is a tremendous driver in terms of job creation, new business routes inside the core business, and additional marketing and sales opportunities, all of which will have a significant influence on the top line of enterprises.

\* Self-driving cars because of Future Technology

Here's a popular future technology concept that's been extensively investigated and is on the verge of being implemented on a large basis.

Self-driving cars have gotten a big boost because of all the benefits they bring. With machines taking control, a seamless ecosystem of such cars may emerge, resulting in fewer accidents, shorter transit times, and less human weariness, all of which benefit corporate productivity. There's also the advertising opportunity, which allows folks who aren't focused on driving to focus on the advertising boards.

\*Drone ecosystem

Drones are gradually taking over, particularly for surveillance and mapping. Drones are also in high demand for military uses.

Drones are currently being used by corporations like Amazon and Jubilant Foodworks to deliver items and pizzas, respectively.

Drones may form the basic ecosystem of the entire logistics business by 2050, which is a fascinating glimpse into the future.

\*Virtual Reality

Virtual reality and augmented reality are now being investigated in a variety of fields. Academics, employee/customer onboarding, training, tourism, such as adventure sports, and overall immersive entertainment are all options to consider from a company standpoint. By 2050, we may expect to see a lot of these uses.

\* Medical advancement with AI and nanobots

Nanobots are being used widely in illness detection and treatment research, including direct drug delivery. In the year 2050, other futuristic technology ideas involve recording human memories and emotions. As a result, an AI-based artificial body that can live indefinitely as a natural human has been created.

Circuite switching network

Step 1:

Circuit switching is a network configuration in which a physical path is obtained and dedicated to a single connection between two network endpoints for the lifetime of that connection. Circuit switching is used in standard voice phone service. For the duration of a call, this reserved circuit is used.

Step 2: QoS parameter

The bit rate

mean error bit rate

transmission latency

are all QoS parameters connected with a constrained bit rate channel set up using a circuit switched network.

Step 3:

The probability of a bit being correpted during transmission across the channel in a discrete time interval is the mean bit rate (BER) of a channel.

As a result, for a constant bit rate channel, this corresponds to the likelihood of a bit bringing a defind number of bits.

The transmission delay of a channel is affected not only by the bit rate employed, but also by delays in the terminal/computer network interface (known as coding delay) and the propagation delay of the digital signal as it passes from source to destination across the network.

Step 4:

The transfer of small chunks of data across many networks is known as packet switching. These data blocks, or "packets," make data transit faster and more efficient. When a user transfers a file across a network, it is frequently sent in smaller data packets rather than all at once.‘

Step 5: Packet switching networks have a number of QoS parameters.

The maximum packet size

The mean packet trasfer rate

The mean packet error rate

The mean packet transfer delay

The worst case jitter

The transmission delay

Step 6

Although the bit rate of the interconnecting link impacts the rate at which packets are transferred across the network, the actual rate of packet transfer across the network is also variable due to the variable store and forward delay in each PSE/router. As a result, the mean packet rate is a measure of the average number of packets that are transferred across the network per second in a packet switched network.

The probability of a received packet containing one or more bit errors is known as the mean packet error rate, or PER.

The average packet transfer delay is calculated as Transmission delay (or store-and-forward delay, also known as packetization delay) is the time it takes to put all of the packet's bits onto the cable in a packet switching network. To put it another way, this is the delay induced by the link's data rate.

The worst case version of the delay is referred to as jitter.

The time it takes to push all of the packet's bits into the wire is known as transmission delay (or store-and-forward delay, also known as packetization delay). In other words, this is the delay caused by the data-rate of the link.

 Define the BER probability of a transmission line/channel. How does this influence the maximum block size to be used with the line/channel?

Step 1:

The mean bit rate (BER) of a channel is the chance of a bit being corrupted during transmission across the channel. As a result, for a standard bit rate channel, this equates to the likelihood of a bit being corrupted in a given number of bits.

In some applications, where bit errors are relatively few, their presence is allowed, whereas in others, it is critical that no residual bit errors be present in the received data.

Step 2:

For example, if the application involves speech, a single bit error will go unnoticed, but if the application involves the transfer of financial data, it is critical that the received data be error-free.

As a result, prior to transmission, the source information is usually separated into blocks, the maximum size of which is specified by the communication channel's mean BER.

101101

Step 1:

Follow these two steps to convert binary number 101101 to decimal:

Begin by multiplying one's place in 101101 by 20, tens place by 21, hundreds place by 22, and so on from right to left.

To get the decimal equivalent of 101101, add all of the products

Using the techniques above, this is the effort needed in converting 101101 to a decimal number (keep in mind that we start from one spot and work our way down...)

Step 2:

Decimal equivalent of "1" = 1 × 2^0 = 1

Decimal equivalent of "0" = 0 × 2^1 = 0

Decimal equivalent of "1" = 1 × 2^2 = 4

Decimal equivalent of "1" = 1 × 2^3 = 8

Decimal equivalent of "0" = 0 × 2^4 = 0

Decimal equivalent of "1" = 1 × 2^5 = 32

Decimal equivalent of "101101" = 3208401

101101 = 45

Here is the final answer, The binary number 101101 converted to decimal is therefore equal to:

45

(b) 101.011

Step 1:

To convert the binary number 101.011 to a decimal number, first convert the integral and fractional parts separately, then add them together to produce the equivalent decimal value, as shown below:

Multiply the ones place by 210, the tens place with 210, the hundreds place with 212, and so on from right to left in the integral part of a binary integer.

In the fractional part of binary number, multiply tenths place by 2^-1, hundredths place by 2^-2 and so on from left to right

Add them all together you got from step 1 & step 2 to get decimal equivalent of 101.011.

Step 2:

Using the techniques above, we convert the integral part 101 to a decimal number (keep in mind that we start at one place and work our way up...)

Decimal equivalent of "1" = 1 × 2^0 = 1

Decimal equivalent of "0" = 0 × 2^1 = 0

Decimal equivalent of "1" = 1 × 2^2 = 4

Decimal equivalent of "101" = 401

101 = 5

Step 3:

Now we'll convert the fractional part 0.011 to decimal form (remember, we start at the tenth place and work our way up.):

Decimal equivalent of "0" = 0 × 2^-1 = 0

Decimal equivalent of "1" = 1 × 2^-2 = 0.25

Decimal equivalent of "1" = 1 × 2^-3 = 0.125

Decimal equivalent of "0.011" = 00.250.125

0.011 = 0.375

Step 4:

Here is the final answer, The binary number 101.011 converted to decimal is therefore equal to:  
= 101.0112  
= 510 + 0.37510  
= 5.37510

Step 1:

We convert the integral and fractional parts of the binary number 0.01101. separately, then add them to generate the equivalent decimal value, as shown below:

In integral part of binary number, multiply ones place with 2^0, tens place with 2^1, hundreds place with 2^2 and so on from right to left.

In the fractional part of binary number, multiply tenths place by 2^-1, hundredths place by 2^-2 and so on from left to right

Add the results from steps 1 and 2 together to get the decimal equivalent of 0.01101.

Using the techniques above, we convert the integral portion 0 to a decimal number (keep in mind that we start at one place and work our way up...)

Step 2:

Decimal equivalent of "0" = 0 × 2^0 = 0

Decimal equivalent of "0" = 0

0 = 0

Now we'll convert the fractional part of 0.01101 to decimal form (remember, we start at the tenth place and work our way up..):

Decimal equivalent of "0" = 0 × 2^-1 = 0

Decimal equivalent of "1" = 1 × 2^-2 = 0.25

Decimal equivalent of "1" = 1 × 2^-3 = 0.125

Decimal equivalent of "0" = 0 × 2^-4 = 0

Decimal equivalent of "1" = 1 × 2^-5 = 0.03125

Decimal equivalent of "0.01101" = 00.250.12500.03125

0.01101 = 0.40625

Step 1:

Extensible Access Control Markup Language is an attribute-based [access control](https://www.techtarget.com/searchsecurity/definition/access-control) policy language or [XML](https://whatis.techtarget.com/definition/XML-Extensible-Markup-Language)-based language, designed to express [security policies](https://www.techtarget.com/searchsecurity/definition/security-policy) and access requests to information.

Web services, digital rights management, and enterprise security applications can all benefit from XACML. Extensible Access Control Language is another name for XACML.

Step 2: Answer with Explanation:

PEP (Policy Enforcement Point): This object guards the resource that the subject (user or application) is trying to access.

It creates a XACML request based on the subject's attribute, the requested action, the resource, and other information when it receives a request from the subject.

Hence option a PEP is the answer

Step 3: Explanation for incorrect answer

The terminology used with XACML policies are listed below.

Point of Administration for Policies (PAP). PAP is the point where access authorization policies are managed.

Point of Policy Decision (PDP). This is where access requests are compared to authorization policies before access choices are made.

Point of Policy Enforcement (PEP). User access requests are intercepted at the PEP, which then sends a decision request to the PDP.

Step 1:

A host is any hardware device that can connect to a network using a user interface, specialised software, a network address, a protocol stack, or another method. Computers, personal electronic devices, thin clients, and multi-functional devices are some examples, but not all.

Because it stands at the network's edge, a computer linked to a network is frequently referred to as an end system or end station. The end user interacts directly with a system that provides data or services.

Step 2:

There is no distinction. The terms "host" and "end system" are used interchangeably throughout this article. PCs, workstations, Web servers, mail servers, PDAs, Internet-connected game consoles, and other end devices are examples.

Protocol standards are necessary so that individuals can design interoperable networking systems and goods.

List several different types of end systems. Is a Web server an end system?

Step 1:

 A computer linked to a network is frequently referred to as an end system or end station. The end user interacts directly with a system that provides data or services.

End systems connected to the Internet are also known as online hosts because they host (or run) internet programmes like a web browser or an email retrieval tool.

Step 2:

Mail servers, web servers, and database servers are examples of these. Household goods (such as toasters and refrigerators), as well as portable, handheld computers and digital cameras, are all being connected to the internet as end systems with the rise of the internet of things.

PCs, workstations, Web servers, mail servers, PDAs, Internet-connected game consoles, and other end devices are examples. R2.

Step 3:

The end systems of the Internet include some computers with which the end user does not interface directly. Mail servers, web servers, and database servers are examples of these.

A web server is, thus, an end system.

The word protocol is often used to describe diplomatic relations. How does Wikipedia describe diplomatic protocol?

**Step 1:**

The term "protocol" has two different meanings. It is described as an international agreement that supplements or amends a treaty in the legal sense. The phrase refers to a system of rules, protocols, customs, and ceremonies that govern state-to-state contacts in the diplomatic sense. In general, protocol refers to the well acknowledged and accepted international civility system.

**Step 2:**

Diplomatic protocol establishes the formal and social conventions that govern official diplomatic relations, developing a unique etiquette within diplomacy and providing objective advice in diplomatic interactions between various players.

Step 1:

Answer with Explanation

SATA Drive 1 would be set to active. If you are unable to access disc management, you must first boot the system with WinRE(System Recovery option); then go to the command prompt; run the diskpart command; and type pick disc 1, select partition 1, and activate. A RAID 1 array is a two-drive mirroring array. In real time, the second drive keeps an exact copy of the first drive. If drive 1 does not automatically take over when drive 0 fails, you must make it active. Remember that an operating system partition must be set to active; otherwise, the computer will not be able to boot to it.

Hence answer is B.    Mark SATA Drive 1 as active.

Step 2: Explanation for incorrect answer

Replacing drive 1 is longer necessary because it did not fail. Replacing Drive 0 is required if you wish to reconstruct the system, but it is not required if you simply want to get the system to boot. It is unlikely that the array controller will need to be replaced. Replace the first drive if possible. Although it is possible (though uncommon) that both the drive and the controller fail at the same time, always start with the most likely cause (and never change out more than one device at a time)

  One of your customers reports to you that when typing on the laptop keyboard, the mouse pointer scrolls across the screen. Which of the following steps can resolve this?

Step 1: Answer with Explanation

Answer: D.  Disable the touchpad.

Explanation:

When the touchpad is activated or unlocked, the touchpad has the same capabilities as an external mouse. When the touchpad is deactivated or locked, it does not work, avoiding inadvertent movement of the mouse pointer with your palm while typing. When the mouse is disabled, it is necessary to use an external mouse.

Step 1:

In a typical office or large building, an access point is a device that generates a wireless local area network, or WLAN. An access point uses an Ethernet cable to connect to a wired router, switch, or hub and broadcasts a Wi-Fi signal to a specific region.

Step 2: Answer with Explanation

Root mode is an access point's only configuration mode that complies with the IEEE 802.11 standard. An AP's primary function is to act as a gateway to a distribution system. An access point's default option is root mode, which permits the AP to send and receive data between the DS and the 802.11 wireless medium.

An access point's default root configuration lets it to function as part of a basic service set (BSS). However, an AP can be configured in a variety of nonstandard ways.

Bridge mode: It is a mode that allows you to connect The access point is transformed into a wireless bridge.

Workgroup Bridge mode: The AP is transformed into a workgroup bridge.

Repeater mode: The access point serves as a repeater.

Scanner mode: The access point's radio is converted to a sensor radio, allowing it to be integrated into a WIDS architecture.

Not all vendors provide these modes because they are all considered nonstandard setups.

Hence option

1. Scanner
2. Bridge

E. Repeater are correct answer

 A network consisting of clients and two or more access points connected by an 802.3 Ethernet backbone is one example of which 802.11 topology? (Choose all that apply.)

Step 1:

An extended service set (ESS) is a wireless network made up of many access points that appears to users as a single, seamless network, such as one covering a home or business that is too big for a single access point to provide reliable coverage.

Hence option A,C are correct answer

Step 2: Explanation fot incorrect answer:

A Basic Service Set (BSS) is a self-contained ad hoc network with direct station-to-station traffic, receiving data from another station, and only filtering traffic based on the receiver's MAC address.

An Independent Basic Service Set (IBSS) creates an ad hoc, self-contained network with direct station-to-station traffic, receiving data from another station, and only filtering traffic based on the receiver's MAC address.

Ethernet Services are a set of Wide Area Networking (WAN) services that allow enterprises to connect non-adjacent locations to establish a unified and secure network environment.

Step 1:

unauthorized access control

Unauthorized access occurs when someone uses another person's account or other techniques to obtain access to a website, software, server, service, or other system. Unauthorized access, for example, is defined as someone guessing a password or username for an account that is not theirs until they acquire access.

Equipment failure

Any event in which equipment fails to achieve its intended purpose or mission is referred to as equipment failure. It could also indicate that the equipment has ceased working, isn't performing as expected, or isn't fulfilling the set goals.

Step 2: Explanation with answer

message authentication:

The characteristic that a message has not been modified while in route (data integrity) and that the receiving party can validate the message's source is known as message authentication or data origin authentication.

Hence message authentication is unauthorized access control

parity check

A parity check is a computer data check that ensures the total number of bits of value 1 (or 0) in each unit of information stays odd or even after being transferred from a peripheral device to memory or vice versa.

Hence parity check is equipment failure control

call-back device

A security feature that calls the dial-in user back to confirm that they are who they claim they are. They are given access after the callback has been completed and the username, password, and any other information has been verified. 2. A callback is another term for a phone call that has been returned.

Hence call-back device is unauthorized access control

echo check

The received data is returned to the source for comparison with the originally transmitted data in an echo check to determine the integrity of data transmission. Check for a synonym loop.

Hence echo check is equipment failure control

line error

This enables your phone line to accept the next connection from one of the channels we have available to dial for you. LINE ERROR occurs when this connection is not fully relinquished.

Hence line error is equipment failure control

data encryption

Data encryption is the process of converting plaintext (unencrypted) data into ciphertext (encrypted). Encrypted data can be accessed with an encryption key, while decrypted data may be accessed with a decryption key.

Hence data encryption is unauthorized access control

request response technique

The request–response or request–reply technique is one of the most fundamental ways for computers in a network to communicate with one another, in which the first computer sends a request for some data and the second responds to the request.

Hence request response technique is unauthorized access control

Step 1:

A number's parity indicates whether it has an odd or even amount of 1-bits. If the number has an odd number of 1-bits, it has "odd parity," and if it contains an even number of 1-bits, it has "even parity."

The number of bits with a value of one is tallied in even parity. If the number is odd, the parity bit is set to one, making the total number of ones in the set (including the parity bit) even.

Odd parity refers to parity checking mechanisms with an odd number of bits in each batch of transmitted bits. Odd data is when the total number of ones in the data plus the parity bit is an odd number of ones.

Step 2: Answer with explanation

 100101101

The number of one's equals five. Because the number of 1s is odd, either no error happened or an error occurred in an even number of bits due to the usage of odd parity. As a result, we are unable to determine whether or not an error happened.

100000001 The number of one's equals 2 .Since the number of 1s is even, this mistake occurs because odd parity is applied.

000000000

The number of one's equals zero. since the number of 1s is even, this mistake occurs because odd parity is applied.

111000000

The number of one's equals three. since the number of 1s is odd, either no error happened or an error occurred in an even number of bits due to the usage of odd parity. As a result, we are unable to determine whether or not an error happened.

011111111

The number of one's equals eight. since the number of 1s is even, this mistake occurs because odd parity is applied.

Decide whether the following statements are true or false:

Hardware address is another term for an IP address

Step 1: Explanation

A burned-in address, Ethernet hardware address, hardware address, or physical address is another name for a MAC address.

A MAC address is a one-of-a-kind hardware identification number assigned to a NIC (Network Interface Controller/Card), whereas an IP address is a number that helps you identify a network connection.

Step 2:

Answer: false

An IP address can uniquely identify any computer in the world

Step 1: Explanation

IP Addresses are a type of Internet Protocol. Every computer connected to the Internet has a unique identifier known as an IP Address. Internet Protocol (IP) is the language that computers use to communicate over the Internet.

Because every internet-connected device has an IP address, there are billions of IP addresses.

Step 2: Answer

False

A modem is needed for all connections to the Internet

Step 1: Explanation

To connect to the internet, you'll need a computer, an internet service provider, a modem, and communication software.

To connect to the internet, you'll need a computer, an ISP modem, and communication software.

Internet service providers (ISPs) provide internet connectivity. You must register for an account with an ISP. If you want to use your phone line to access the internet, you'll need a modem. It converts the language used by computers into a language that can be transmitted over a phone line and vice versa. Also necessary is communication software (browser and applications to connect to the ISP).

Step 2: Answer

false

Fibre optic cables are one of the fastest types of network connection

Step 1: Explanation

A data connection carried by a cable filled with thin glass or plastic fibres is known as fibre optic internet.

Data is transmitted through them in the form of pulsed light beams. Internet speeds are up to 20 times faster with fibre optics than with traditional cable at 1 Gbps

Fiber Internet makes use of fibre optic cable, which is made up of very thin glass strands that allow data to be delivered as light pulses. Fiber Internet has the ability to give Internet speeds that are nearly as fast as light since data can flow over fibre cable at nearly the speed of light.

Step 2: Answer

True

Local Area Networks always have at least one server

Step 1: Explanation

A Local Region Network (LAN) is a collection of computers or other devices connected by Ethernet or Wi-Fi inside a single, constrained area.

A client/server LAN is made up of numerous devices (clients) that are all connected to a single server. File storage, application access, device access, and network traffic are all managed by the server.

Step 2: Answer

True

Data transmitted over the Internet travels through several hosts before reaching its destination

Step 1: Explanation

A computer that is connected to a network is known as a host. A computer connected to a TCP/IP network, such as the Internet, is referred to as a router. Each host on such a network has its own IP address, allowing two hosts to talk directly with one another and one host to communicate with another via a switch.

The paths of different packets from the same message do not have to be the same. That is one of the factors that contributes to the Internet's robustness and speed.

Packets will be passed from one machine to the next until they arrive at their final destination.

The computer receiving the data assembles the packets like a puzzle, recreating the message as they arrive.

Step 2: Answer

True

Network switches are used to connect several networks together

Step 1: Explanation

Switches provide for quick in-network communication by intelligently routing data packets between devices, forming a tunnel between source and destination that is unaffected by other network traffic.

In a computer network, a switch is a device that connects other devices. To facilitate communication between different networked devices, multiple data connections are inserted into a switch.

Step 2: Answer

True

A peer to peer network has no centralised server

Step 1: Explanation

A group of computers is joined together with equal permissions and responsibilities for processing data in peer-to-peer (P2P) networking.

Each network system (also known as a peer or node) serves as both a client and a server. They are capable in the same way. Because there is no controlling server in the P2P network topology, there is no central point of storage.

Step 2: Answer

False

Servers perform jobs including user authentication

Step 1: Explanation

A server is a computer or system that across a network distributes resources, data, services, or programmes to other computers known as clients. In theory, computers are considered servers when they share resources with client machines.

An authentication server is a programme that allows an entity attempting to enter a network to be authenticated. A human user or another server could be this entity. A dedicated computer, an Ethernet switch, an access point, or a network access server can all house an authentication server.

Step 2: Answer

False

 Which of the following means the same as object?

Step 1: Explanation for correct answer

Answer: option c instance

An instance is a concrete embodiment of any object in object-oriented programming (OOP). A variety of changes can be made to an object. An instance is any realised variety of that item. Instantiation is the process of creating a realised instance. When a programme starts, it creates a new instance of the programme.

Hence option C is the answer

Explanation for incorrect answer

A class is a program-code template for building objects that includes starting settings for state (member variables) and behaviour implementations (member functions or methods).

A field is a type-independent variable defined directly in a class or struct. Fields are members of the type that contains them. Instance fields, static fields, or both can be found in a class or struct. Instance fields are unique to a type's instance.

A category is a simple algebraic structure that can be used to model items and their interactions.

Which of the following means the same as instance variable?

Step 1: Explanation for the correct answer

A field is a type-independent variable defined directly in a class or struct. Fields are members of the type that contains them. Instance fields, static fields, or both can be found in a class or struct. Instance fields are unique to a type's instance.

The terms field, member, member variable, instance variable, and property (in a limited sense) are all similar. They are variables in a class that are declared at the class level.

Hence option A is correct

Step 2: Explanation for incorrect option

An instance is a concrete embodiment of any object in object-oriented programming (OOP). A variety of changes can be made to an object. An instance is any realised variety of that item. Instantiation is the process of creating a realised instance. When a programme starts, it creates a new instance of the programme

A class is a program-code template for building objects that includes starting settings for state (member variables) and behaviour implementations (member functions or methods).

A category is a simple algebraic structure that can be used to model items and their interactions.

A program that instantiates objects of another prewritten class is a(n)

Step 1: Explanation for correct answer

Answer: option b client

Explanation: A programme or class that instantiates objects of another prewritten class is known as a class client.

Hence option b is the answer

Step 2: Explanation for incorrect answer

Objects are the first things that come to mind when creating a programme, and they're also the units of code that emerge from the process.

An instance is a concrete embodiment of any object in object-oriented programming (OOP). A variety of changes can be made to an object. An instance is any realised variety of that item. Instantiation is the process of creating a realised instance. When a programme starts, it creates a new instance of the programme

A graphical user interface (GUI) is a form of user interface that allows people to interact with electronic devices through visual indicators.

The relationship between an instance and a class is a(n) relationship.

Step 1: Explanation for correct answer

Answer: option b is-a

Two or more classes have different relationships. If a class Bulb inherits from another class Device, for example, we can say that Bulb has an is-a connection with Device, implying that Bulb is a device.

Explanation for incorrect answer

The Has-A relationship basically means that an instance of one class refers to another class's occasion or another occurrence of a similar class. A vehicle, for example, has a motor, while a dog has a tail.

Polymorphism, which means "many forms," happens when there are multiple classes that are related via inheritance.

Hostile code is typically defined as software or firmware that is incorporated in or injected into a system with the intent of causing harm.

Which of these does not belong with the others?

Step 1: Explanation for correct answer

Answer: option c object

Explanation:

Objects are the first things that come to mind when creating a programme, and they're also the units of code that emerge from the process.

Explanation for incorrect answer:

A variable is a value that can change depending on the program's conditions or the information provided to it.

An instance is a concrete embodiment of any object in object-oriented programming (OOP). A variety of changes can be made to an object. An instance is any realised variety of that item. Instantiation is the process of creating a realised instance. When a programme starts, it creates a new instance of the programme

A property or characteristic is referred to as an attribute. Your hair's colour, for example, is a feature. An attribute is a changeable property or characteristic of some component of a programme that can be adjusted to different values when using or programming computers.

A field is a type-independent variable defined directly in a class or struct. Fields are members of the type that contains them. Instance fields, static fields, or both can be found in a class or struct. Instance fields are unique to a type's instance.

The porcoess of acquiring the traits of one's predecessors is

step 1: Answer

inheritance

step 2: Explanation

Inheritance is a feature in Java that acquires properties from one class to another, such as the relationship between father and son. A class in Java can take on the characteristics and methods of another class. The sub-class, often known as the child class, is the class that inherits the properties.

Which of the following technologies allows two mobile devices to transfer data simply by touching them together?

Step 1: Explanation for correct answer

Answer: option b NFC

Explanation:

Near-field communication is a set of protocols that allow two electronic devices to communicate over a distance of 4 cm or less.

Near Field Communication (NFC) is a short-range wireless connectivity standard (Ecma-340, ISO/IEC 18092) that employs magnetic field induction to allow communication between devices when they are brought within a few centimetres of each other.

Hence option b is correct

Step 2: Explanation for incorrect option

USB

An industry standard that defines requirements for cables, connectors, and protocols for connecting computers, peripherals, and other computers, as well as for communication and power supply.

USB is used to connect computers to peripherals such as keyboards, mouse, printers, external storage, and mobile devices. It's also used to charge portable devices (see USB power).

Bluetooth

It is a wireless technology that allows data to be exchanged between devices over a short distance. The maximum connectivity range of most Bluetooth devices is roughly 30 feet, and that distance is reduced when impediments (such as a wall) are present.

Bluetooth allows you to share documents and connect with other Bluetooth-enabled devices on your mobile device.

WIFI

The wireless technology that connects computers, tablets, cellphones, and other devices to the internet is known as Wi-Fi. Wi-Fi is a radio signal transmitted from a wireless router to a nearby device, which converts the signal into data that can be seen and used.

What type of power connector is used for an x16 video card?

Step 1: Answer with Explanation

Answer: option C.  PCIe 6-pin

This connector is used to supply PCI Express expansion cards with an additional 12 volt power supply. The 6-pin PCI Express power cable was established because many video cards require more than the 75 watts given by the motherboard slot.

The 6-Pin Connector is the connector for x16 video cards. This means that the graphics card will use a PCI Express x16 slot and will be powered directly from the power supply (power supply unit).

Step 2: Explanation for incorrect answer

The Molex connector is used to power a computer's disc drive as well as other computer components like CD-ROMs, graphic cards, and so on. Molex connectors supply DC power to drives inside a computer enclosure.

One of the most common peripheral power connectors in computers is the SATA 15-pin power supply connector. All SATA-based hard drives and optical devices use this connector as standard. SATA power cables protrude from the power supply and are only intended to be used within the computer casing.

In today's computers, the ATX 24-pin power supply connector is the standard motherboard power connector. The connector is a Molex 39-01-2240 connector, sometimes known as a Molex Mini-fit Jr connector.

Which kind of current does a typical desktop PC draw from a wall outlet?

Step 1: Explanation for correct answer

Answer: option C.   Alternating current

Explanation:

The form of electrical energy that consumers generally utilise when plugging kitchen appliances, televisions, computers, fans, and electric lamps into a wall socket is alternating current, which is the form of electrical energy that is delivered to companies and houses.

Hence option C is the answer

Step 2: Explanation for incorrect answer

Direct current

Direct current has a wide range of applications, from battery charging to huge power sources for electronic systems, motors, and other devices. In the smelting of aluminium and other electrochemical processes, enormous amounts of direct-current electrical energy are used.

Neutral current

The electric charges of the particles stay unaltered in a weak nuclear interaction between a lepton (such as a neutrino) and a hadron (such as a neutron).

Drawing current."

They simply mean that the equipment is pulling or using electricity from the power supply when they say "drawing current."

Step 1: WEP

The IEEE Wireless Fidelity (Wi-Fi) standard 802.11b specifies the Wired Equivalent Privacy (WEP) security protocol. That standard is intended to provide a wireless local area network (WLAN) with security and privacy that is comparable to that of a traditional LAN.

WEP encrypts data packets as they are sent out from the access point or wireless network card using the RC4 algorithm. The packets delivered by the user's network card are decrypted as soon as they arrive at the access point. A distinct packet key will be used to encrypt each byte of data.

Step 2: Weakness of WEP

In 1997, Wired Equivalent Privacy (WEP) was added to the original 802.11 protocol to give the same level of confidentiality as a wired network.

The usage of Initialization Vectors in Wired Equivalent Privacy (WEP) is one of numerous security issues (IV).

Initialization Vectors (IVs) for Wired Equivalent Privacy (WEP) are 24 bits long. Only a 64-bit or 128-bit number, made composed of a 24-bit Initialization Vector (IV) and a 40-bit or 104-bit default key, can be used for encryption in Wired Equivalent Privacy (WEP). Because short keys are simple to crack, using them weakens the encryption strength.

For attackers, the Wired Equivalent Privacy (WEP) produces a detectable pattern.

Wired Equivalent Privacy (WEP) wireless networks are vulnerable to penetration because of the characteristics listed above.

Step 3: Answer

Hence option a. its usage creates a detectable pattern is the correct answer

The Ethernet address of an access point is its \_\_\_\_\_\_\_\_.

Step 1: Answer with explanation

Answer: option b BSSID

Explanation:

The BSSID stands for "Basic Service Set Identifier," and it is the MAC physical address of the wireless router or access point that the user is connecting to via WiFi. On a Windows system, run the command netsh wlan show interfaces | search "BSSID" to see the BSSID.

The MAC address of the radio interface to which the client device is currently connected is the BSSID. This can assist in determining the exact access point to which the client device is connected.

BSSIDs are unique identifiers for access points and their clients. Packets bound for WLAN devices must arrive at their intended destination.

Hence The Ethernet address of an access point is its BSSID

Step 2: Explanation for incorrect answer

The SSID, which stands for Service Set IDentifier. You'll notice a list of SSIDs if you open the list of Wi-Fi networks on your laptop or phone. SSIDs are broadcast by wireless routers or access points so that neighbouring devices may find and display any available network.

The SSID keeps the packets within the correct WLAN, even when overlapping WLANs are present.

 How would you distinguish data and information? Information and knowledge?

Step 1:Data

Data is a collection of unstructured facts and details such as text, observations, figures, symbols, and object descriptions. To put it another way, data serves no purpose and has no value in and of itself. Furthermore, data is expressed in bits and bytes, which are the fundamental units of information in computer storage and processing.

Step 2: Information.

Data that has been processed, organised, and structured. It gives data context and allows for decision-making. A single customer's sale at a restaurant, for example, is data; this becomes information when the firm can determine which meal is the most popular or least popular.

Step 3:

|  |  |
| --- | --- |
| Data | Information |
| Data is a collection of unorganised and unprocessed facts. | Processed, organised data is given in a meaningful context as information. |
| Data is a single unit that consists of basic resources that have no special meaning. | Information is a collection of material that has a logical significance when viewed as a whole. |
| Data is independent of information. | Data is the basis of information. |
| Bits and bytes are the units of measurement. | Time, quantity, and other meaningful units are used to measure information. |
| For decision-making, raw data is insufficient. | For decision-making, information is sufficient. |
| A student's test score is an example of data. | The information produced from the given data is the average score of a class. |

Information and knowledge

Step 1: Information

The phrase "information" refers to structured, organised, and processed material that is given in a context that makes it relevant and valuable to the person seeking it. Information is what happens when data becomes meaningful after being converted. It is anything that informs, in the sense that it answers a specific query.

Step 2: Knowledge

Knowledge is defined as familiarity and knowledge of a person, place, event, idea, issue, method of doing things, or anything else gained via learning, perceiving, or discovering. It is the state of knowing something with cognizance as a result of conceptual comprehension, research, and experience. Knowledge denotes a thorough theoretical or practical grasp of an entity, as well as the ability to apply it to a given task.

Step 3:

|  |  |
| --- | --- |
| Information | Knowledge |
| Information is data that has been refined. | The knowledge is useful information |
| Easily transferable | To transfer you require learning |
| Predictions cannot be made only on the basis of information. | If one has the necessary knowledge, one can make predictions. |
| It is possible to reproduce information. | It is hard to reproduce knowledge. |
| Knowledge is not required for every information. | All information is knowledge. |
| It is possible to reproduce information. | It is impossible to reproduce knowledge. |
| The term "information" refers to organised facts about someone or something gathered from a variety of sources such as the internet, newspapers, television, and so on. | Knowledge refers to a person's awareness or comprehension of a subject gained through education or experience. |

Identify at least six characteristics of valuable information

Step 1:

Information is valuable only when it is complete, accurate, timely and exclusive.

Step 2: Characteristics of Valuable Information

Accessible

Complete

Flexible

Secure

Timely

Accurate

Economical

Relevant

Simple

Verifiable

Step 3: Explanation

Accessible: Authorized users can easily access the information.

Complete: It has all of the necessary information.

Flexible: Information is important in different of situations.

Secure: Protected from unauthorised access.

Timely: When it was needed, it was delivered.

Accurate: Information that is devoid of inaccuracies.

Cost vs. benefit is a valid comparison.

Relevant: Information that is relevant to decision-makers.

Simple: Not difficult.

Verifiable: Check to see if the information is correct.

What is a computer-based information system? What are its components?

Step 1: computer-based information system

A CIS is a study of data storage and processing, as well as hardware and software. Speed and adaptability are two advantages of computerised information systems over manual information systems.

Step 2: components of computer-based information system

Hardware, software, network connection, and data — the initial four components of information systems – are all technologies that must operate effectively together.

Hardware

The physical components of an information system are referred to as hardware. Some are plainly visible or touchable, while others are hidden inside a device and can only be seen by opening the casing. Examples include keyboards, mouse, pens, disc drives, iPads, printers, and flash drives. The hardware that lies inside a computer case and is not normally visible from the outside are computer chips, motherboards, and internal memory chips.

Software

A set of instructions that tells the hardware what to do is known as software. Software is intangible, which means it can't be touched. Programmers write software by following a set of steps to enter a series of instructions that tell the hardware what to perform. There are various types of software, with the operating system and application software being the most common.

Data

Data is the third component. Data can be thought of as a collection of incontrovertible basic facts. Your initial name, driver's licence number, city of residence, a photograph of your pet, a recording of your voice, and your phone number, for example, are all examples of raw data. You can see and hear your data, but they don't provide you with any more meaning beyond the data. For example, you may be able to read a person's driver's licence number and recognise it as such, but you have no further information about them.

Communication Networking

Hardware, software, and data have long been considered the foundation of information systems technology. However, some argue that networking communication is a separate category from the rest of an IS. It is possible to have an information system without the ability to communicate. For example, the original personal computers were standalone units with no Internet connection. Information systems, on the other hand, have evolved since their inception. We used to have simply desktop operating system software or hardware, for example. However, in today's world, operating system software now encompasses mobile operating systems, and hardware now includes devices other than desktop computers. A computer device that is not connected to another device or a network is extremely rare.

People

People created computers to be used by others. This means that the development and management of information systems to help firms create value and enhance productivity fall under a variety of categories, such as:

Users: These are the people who utilise an IS to carry out a specific job function or task. A student might use a spreadsheet or a word processing tool as an example.

Technical Developers: These are the individuals that design the technologies that are used to construct an information system. A computer chip engineer, a software programmer, and an application programmer are some examples.

Business Professionals: These are CEOs, owners, managers, entrepreneurs, and employees who utilise information technology to start or expand their businesses and execute job functions including accounting, marketing, sales, and human resources.

Process

Process is the final component of information systems. A business process is a set of actions that must be followed in order to reach a specific result or goal. Businesses must constantly innovate in order to either generate more money through new products and services that meet client wants, or to find cost-cutting opportunities in how they manage their businesses. It is insufficient to just automate activities with technology. Information systems are becoming increasingly integrated with organisational processes in order to provide value in revenue-generating and cost-cutting activities that might provide businesses a competitive advantage over their competitors. "Business process reengineering," "business process management," "enterprise resource planning," and "customer relationship management" are all specialised standards or methods that deal with the continuous improvement of certain business procedures.

 How is the TCP/IP protocol related to information transfer on the Internet?

Step 1: TCP/IP

TCP/IP defines how data is exchanged over the internet by defining end-to-end communications that define how packets should be broken down, addressed, transported, routed, and received at their destination. This IP address is checked by each gateway computer on the network to determine where the message should be forwarded.

Step 2: TCP/IP protocol related to information transfer on the Internet

TCP/IP is often referred to as "the Internet's language." TCP/IP is the official language of many smaller networks, in addition to being the official language of the Internet.

TCP/IP is a data communication protocol that allows computers and other devices to send and receive data over the internet. Transmission Control Protocol/Internet Protocol (TCP/IP) is a protocol that allows devices connected to the internet to communicate with one another across networks.

TCP/IP stands for Transmission Control Protocol/Internet Protocol. It is a datalink protocol that is used on the internet. It has four unique layers in its model. They can also be referred to as a protocol suite when used together.

TCP/IP (Transmission Control Protocol/Internet Protocol), often known as the Internet Protocol Suite, is the primary communication technology of the World Wide Web, allowing every Internet-connected device to communicate with every other Internet-connected device at the same time.

TCP/IP defines how data is exchanged over the internet by defining end-to-end communications that define how packets should be broken down, addressed, transported, routed, and received at their destination.

The network layer is in charge of sending and receiving data packets across the network. The Internet's network layer is the Internet Protocol, or IP. Each node on the network has a unique address, known as an IP address. IP packets are used to send data.

 What technological innovation made client/server computing possible?

Step 1: Answer

Client server computing

Step 2: Explanation

In client-server computing, a client requests a resource, which the server fulfils. While a client is only in contact with one server, a server can serve several clients at the same time. Both the client and the server normally communicate across a computer network, although they can also share a single machine.

Step 3: Characteristics of Client-Server Computing

* A request and response system is used in client-server computing. The client makes a request to the server, which the server fulfils by providing the requested information.
* The client and server should use the same communication protocol to make it easier for them to communicate with one another. At the application layer, all communication protocols are available.
* A server can only handle a certain amount of client requests at any given moment. As a result, it responds to requests using a priority-based method.
* By flooding a server with fake requests, denial of service attacks make it difficult for it to respond to legitimate client requests.
* A web server is an example of a client-server computing system. It sends the requested web pages back to the clients.

What is cloud computing, and how has it impacted the Internet?

Step 1: cloud computing

Cloud computing is the supply of various services, such as data storage, servers, databases, networking, and software, over the Internet. Cloud storage allows you to save files to a remote database and retrieve them whenever you need them.

Google Cloud, for example, is a set of public cloud services provided by Google. Google hardware is used for every application development.

Data backup, disaster recovery, email, virtual desktops, software development and testing, big data analytics, and customer-facing web apps are just a few of the use cases that organisations of all types, sizes, and industries are embracing the cloud for.

Step 2: Impact in the Internet

* There is no requirement for you to have your own hardware or software.

Although you might think of clouds as virtual, they nonetheless require hardware as part of their architecture.

Switches, routers, firewalls, and load balancers are examples of networking equipment, as are storage arrays, backup devices, and servers.

The delivery of various services over the Internet is known as cloud computing. These resources include data storage, servers, databases, networking, and software, among other tools and applications. As long as an electronic device has internet access, it has access to the data as well as the software programmes needed to run it.

* Decreases IT staff costs; available for a fraction of the price online

Infrastructure is being reduced or eliminated. Allowing for collaboration and a remote workforce. Specialization and retraining are becoming more important in IT. Increasing the reliability of the system and removing redundancies.

Employees can be more flexible in their work practises because to cloud computing. For example, you can access data when at home, on vacation, or on your way to and from work (providing you have an internet connection).

* Cloud computing is the supply of various services

Cloud computing is the supply of various services, such as data storage, servers, databases, networking, and software, over the Internet. Cloud storage allows you to save files to a remote database and retrieve them whenever you need them.

6) Traditional SQL queries are appropriate to deal with big data. True False

Step 1: Answer

False

Step 2: Explanation for the answer

SQL lacks performance, scalability, and cost. A particular SQL product has a performance level and may or may not be capable of handling big data sets. Some SQL products, such as SQLite, have a relatively small footprint, making them suited for use on small devices.

SQL databases are vertically scalable, which means that they can only be scaled by increasing the processing capacity of the implementation hardware, which makes processing big batches of data a pricey proposition. In exchange for speed and horizontal scalability, NoSQL databases give up some of the features of traditional databases.

Hence Traditional SQL queries are not appropriate to deal with big data.

7)Relational database is appropriate to deal with big data. True False

Step 1: Answer

False

Step 2: Explanation for the answer

Relational databases, the most used technology for storing and managing data, aren't built to manage large amounts of data.

Relational databases are not designed for change. Rows and columns are used to organise data in relational databases, with each row representing a distinct entry and each column describing distinct features.

Data modelling must be done ahead of time and, depending on the system, can take months or even years. After-the-fact changes require a lot of time and resources, and database-modeling efforts can take years and cost millions of dollars.

Because big data is continuously changing, a database infrastructure that is both adaptable and forgiving is required.

Relational database is not appropriate to deal with big data

8) Hadoop is a well-known solution to deal with big data. True False

Step 1: Answer

True

Step 2: Explanation for the answer

Hadoop is a Java-based open-source programming platform that allows massive data sets to be processed in a distributed computing environment. It's based on GFS, or Google File System.

Hadoop enables users to take advantage of the opportunities presented by Big Data while also overcoming the challenges they face.

Hadoop can help with big data.

Hadoop is an open-source software framework for storing and processing data on commodity hardware clusters. It has a lot of storage for any kind of data, a lot of processing power, and it can handle almost unlimited concurrent processes or jobs.

Hence Hadoop is a well-known solution to deal with big data.

9) Hadoop is an open-source distributed data processing system. True False

Step 1: Answer

True

Step 2: Explanation for the answer

Apache Hadoop is an open source software platform for distributed storage and processing of very large data sets on commodity hardware computer clusters.

Hadoop is an open source distributed processing system for big data applications that organises data processing and storage in scalable clusters of computer servers.

Hadoop is an open source distributed processing system for big data applications that organises data processing and storage in scalable clusters of computer servers.

It's at the heart of a big data ecosystem that's largely used to support advanced analytics projects like predictive analytics, data mining, and machine learning.

Hadoop systems can handle both structured and unstructured data, allowing users more flexibility than relational databases and data warehouses in terms of data collection, processing, analysis, and management.

Hence, Hadoop is an open-source distributed data processing system

10) NoSQL is another name for Hadoop. True False

Step 1: Answer

False

Step 2: Explanation for the answer

NoSQL databases and Hadoop look to be similar, if not competitors, at first glance. Both manage enormous and fast rising data volumes, can handle a range of data formats, and can use commodity technology in a cluster setting.

Hadoop is a file system that allows for massively parallel computation, whereas NoSQL is a distributed database infrastructure that can handle the severe demands of large data.

Hadoop uses MapReduce to distribute a dataset over numerous servers and perform operations on it.

The MapReduce outputs are then recombined and saved in Hadoop's own distributed filesystem HDFS, which makes data available to other Hadoop computing nodes.

Hence, NoSQL is another name for Hadoop

Which access method uses a “listen before sending” strategy?

Step 1: Explanation for option

Token passing is a channel access mechanism on a local area network in which a packet called a token is transmitted between nodes to authorise that node to interact. There is no pre-defined "master" node, unlike polling access methods.

Carrier Sense Multiple Access with Collision Detection (CSMA/CD) is a network protocol that operates at the Medium Access Control (MAC) layer for carrier transmission. When a collision is detected, the station pauses broadcasting, transmits a jam signal, and then waits a random amount of time before retransmitting.

the CSMA/CD procedure

Listen before sending

Detecting a collition

Jam signal and random back off

For token passing LANs, the Token Bus (IEEE 802.4) is a popular standard. The physical medium in a token bus LAN is a bus or a tree, and a logical ring is constructed using coaxial cable. The token is sequentially passed from one user to the next (clockwise or anticlockwise). According to the logical ring's sequence, each station knows the address of the station to its "left" and "right."

You can poll the network to get information from network devices that you can use to track their activities. In regards to polling the network. Network Manager polls the network by sending inquiries to the devices on the network on a regular basis.

Step 2: Answer:

Option B CSMA/CA

Step 3: Explanation for the answer

A device with a frame to send must listen before transmitting the frame using the CSMA/CD access technique. If a device detects a signal from another device, it will wait a specified amount of time before transmitting.

Which of the following is true about full-duplex Ethernet?

Step 1: Full duplex Ethernet

Full-duplex Ethernet allows stations to send and receive data on the network at the same time, avoiding network collisions. This is performed by employing a full-duplex LAN switch. Ethernet switching is the process of dividing a big Ethernet network into smaller portions.

Step 2: Explanation of options

a)To offer independent transmit and receive data routes, the link between the stations must use a point-to-point media segment, such as twisted-pair or fibre optic media. When full-duplex mode is activated, both stations can broadcast and receive data at the same time, doubling the link's overall capacity.

Half duplex can transmit data in two directions, but not at the same direction

b)The Rx and Tx lines are totally independent in full-duplex mode, no collisions occur.

There would be no collision because the Tx and Rx mediums are different copper wires on the same cable. A PC connected to a Switch Port is an example. Each Switch-port is a separate Collision Domain

c)Simultaneous transmission is the default in full-duplex Ethernet, but only between the Ethernet switch and each node. The following are the primary distinctions between full-duplex and half-duplex: Bidirectional transmissions are supported via full-duplex links, but half-duplex lines can only handle one direction at a time.

d)Full-duplex Ethernet allows stations to send and receive data on the network at the same time, avoiding network collisions. This is performed by employing a full-duplex LAN switch. Ethernet switching is the process of dividing a large Ethernet network into smaller portions.

Step 3: Answer with explanation

Answers are

b. Collision detection is turned off.

The Rx and Tx lines are totally independent in full-duplex mode, no collisions occur.

There would be no collision because the Tx and Rx mediums are different copper wires on the same cable. A PC connected to a Switch Port is an example. Each Switch-port is a separate Collision Domain

c. It’s possible only with switches

Simultaneous transmission is the default in full-duplex Ethernet, but only between the Ethernet switch and each node. The following are the primary distinctions between full-duplex and half-duplex: Bidirectional transmissions are supported via full-duplex links, but half-duplex lines can only handle one direction at a time.

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Define each of the following term

Determinant:

Step 1: Introduction

The concept of keys and indexes in the database is most closely related to determinants. In determinants, there is no hierarchy, but the order in which they are specified determines the order in which they are evaluated.

Step 2: Explanation

A determinant can provide a set of database columns (query items) that uniquely identify a set of data or a set of columns that uniquely identify a non-unique set of data.

Step 3: Example

Consider the attributes employee id, first name, last name, and date of birth in a table. The remaining three fields are determined by the field employee id in this case. Because the firm may have several employees with the same first and/or last name, the name fields do not identify the employee id. Similarly, because multiple employees may have the same birthday, the DOB data has no bearing on the employee id or name fields.

Functional dependency

Step 1: Explanation

A functional dependency is a constraint between two sets of attributes in a database relation in relational database theory. A functional dependency, in other terms, is a constraint between two qualities in a relation.

A functional dependency is a constraint that describes the relationship between two sets of attributes in which one set of attributes may properly predict the value of the other sets.

The Determinant property is put on the left side of the arrow, whereas the Dependent attribute is set on the right side.

Step 2: properties

A functional dependency exists when two qualities have a relationship. Within a table, it usually exists between the primary key and the non-key attribute. The left side of FD is referred to as a determinant, whereas the right side is referred to as a dependent.

Step 3: Example

For example, if we know the value of a student's roll number, we may find out the student's address, grades, and other information. This means that a student's address and grades are functionally depended to their roll number.

Transitive dependency

Step 1:

If two functional dependencies are generated indirectly, the functional dependency is said to be transitive. For example, if the following three functional dependencies are true, X -> Z is a transitive dependency: X->Y. Y does not equal X.

Transitive Dependency occurs when an indirect interaction results in functional dependency. P-> R is a transitive dependency if P -> Q and Q -> R are true. Eliminate the Transitive Dependency in order to attain 3NF.

Step 2: Example

The distributor, for example, is a determinant but not a candidate key for the items table we've been using as an example.

Recursive foreign key

Step 1: Explanation

The main key of one table that is also the primary key of another table.

The recursive foreign key is a key that refers to the same table as the primary key, i.e. the foreign key is in the same table as the primary key. As a result, the parent and child tables are identical.

Step 2: Example

Consider the following scenario:

Let's get a table together. Employees have two fields: empID and managedbyempID, which both hold the same table's employee ids (both are employees). One will serve as a primary key, while the other will serve as a recursive foreign key.

Normalization

Step 1: Explanation

The process of restructuring data in a database so that it meets two basic standards is known as normalisation. There is no data redundancy; all data is stored in a single location. All linked data items are stored together, and data dependencies are logical.

Step 2: purpose of Normalization

Normalization is the process of organising data in a database efficiently. The normalisation process has two basic goals: to minimise redundant data (data that is stored in several tables) and to guarantee that data relationships make sense (only storing related data in a table).

Step 3: Types of Normalization

The process of database normalisation is further divided into the following types:

First Normal Form (1 NF)

Second Normal Form (2 NF)

Third Normal Form (3 NF)

Boyce Codd Normal Form or Fourth Normal Form ( BCNF or 4 NF)

Composite key

Step 1: Explanation

In SQL, a composite key is a collection of columns that are used to uniquely identify all of the rows included. Despite the fact that a single column cannot uniquely identify any row, a combination of more than one column can uniquely identify any record.

A composite key is a primary key with two or more characteristics. It's the result of combining two or more columns.

Step 2: Example

Creating table with a composite key:

CREATE TABLE student

(rollNumber INT,

name VARCHAR(30),

class VARCHAR(30),

section VARCHAR(1),

mobile VARCHAR(10),

PRIMARY KEY (rollNumber, mobile));

In this example, we have made the composite key as the combination of two columns i.e. rollNumber and mobile because all the rows of the table student can be uniquely identified by this composite key.

 Relation

Step 1: Explanation

The way two or more data sets are linked is referred to as a relationship. This is especially true when it comes to Relational Database Management Systems (RDBMS). The Foreign Key is a dataset that is linked to another dataset, and the Primary Key is the dataset that is linked to it. Multiple Foreign and Primary keys may be linked to one another.

Step 2: Example

A typical business order entry database, for example, would have a table that defines a customer, including columns for name, address, phone number, and other information.

Normal form

Step 1: Explanation

The normal form of a table is the state in which it is organised (or a stage of normalization). The first normal form (or 1NF), second normal form (or 2NF), and third normal form (or 3NF) are the three stages of normal forms (or 3NF).

The process of normalisation involves removing duplication from a relation or group of relations. Anomalies in insertion, deletion, and update can be caused by relation redundancy. As a result, it aids in reducing relational redundancy. Normal forms are used in database tables to eliminate or decrease redundancy.

Partial functional dependency

Step 1: Explanation

A functional reliance If Y is functionally dependent on X and Y may be determined by any suitable subset of X, then X->Y is a partial dependency.

When a non-prime property is functionally dependent on a portion of a candidate key, this is known as partial dependency. The Partial Dependency is eliminated in the 2nd Normal Form (2NF). i.e. no non-prime attribute (attributes that aren't part of any candidate key) is reliant on any appropriate subset of any table's candidate key.

Enterprise key

Step 1: Explanation

Professional key management systems that supply encryption keys across a number of operating systems and databases are referred to as enterprise key management.

An enterprise key management system (KMS) improves an organization's security posture by reducing key loss, compromise, and misuse: Ensures that cryptographically strong keys are used. It protects your keys from being stolen. Logic access constraints are enforced.

Surrogate primary key

Step 1: Explanation

A Surrogate Key is a one-of-a-kind identifier for each row that can also be used as a Primary Key. A surrogate Primary Key has only one requirement: each row must have a distinct value for that column. An artificial key or identity key is another name for a surrogate key. It's suitable for data warehouses.

The surrogate key in a modern database could be the primary key, which is generated by the database management system and not derived from any application data in the database. The surrogate key's sole purpose is to serve as the primary key.

Step 2: Example

Some examples of Surrogate keys are :

System date & time stamp. Random alphanumeric string.

 Which of the following connectors is not associated with fiber-optic cabling?

Step 1: fibre optic cable

A fiber-optic cable, also known as an optical-fiber cable, is a structure that looks like an electrical cable but contains one or more optical fibres for light transmission. The optical fibre elements are usually separately coated with plastic layers and housed in a protective tube that is appropriate for the cable's use environment.

Step 2: Explanation of option

The F connector (also known as the F-type connector) is a coaxial RF connector that is typically used with RG-6/U or RG-59/U cable for "over the air" terrestrial television, cable television, and worldwide for satellite television and cable modems.

Subscriber Connector (abbreviated SC) is also known as Square Connector or Standard Connector. It's a popular fiber-optic connector for point-to-point and passive optical networking because of its low cost, durability, and ease of installation.

A fiber-optic cable connector with a bayonet plug and socket is known as a straight tip connector. Fiber-optic connections and FOCIS are two terms that come to mind. ST Connector is a type of connector. To keep the connection secure, the ST features a half-twist bayonet lock.

Lucent Connector was created by Lucent Technologies in the 1990s . The LC connector is a compact form-factor fibre optic connector that was created to replace the SC connector because of its smaller size. (The LC connector has half the footprint of the SC connector.)

Step 3: Answer

Option A

F type connecters are used with coaxial cabling. They are not used with fiber optic cable. All the other connector type are used with fiber optic cabling

1. What is a programming language

Step 1: Introduction to programing language

A programming language is a set of rules for converting texts, or graphical programme elements in the case of visual programming languages, into machine code. Programming languages are a type of computer language that is used to implement algorithms in computer programming.

A programming language is a form of written language used to instruct machines.

Step 2: Example of programing language:

Python, Ruby, Java, JavaScript, C, C++, and C# are some examples. All computer programmes and software are written using programming languages.

Step 3: explanation for programing language

A programming language is a set of instructions for the computer to follow in order to do a task.

To create programmes, a programmer writes text in the source code of a programming language. The programming language usually utilises real words for some commands (e.g. "if... then... else...", "and," "or") to make the language easier to understand for humans. Many programming languages, like any other language, use punctuation. Many programmes are then compiled, which means that the computer converts the source code into a different language (such as assembly language or machine language) that a computer can understand but is considerably more difficult for a human to comprehend.

Computer programmes must be meticulously written. If a programmer makes a mistake or a programme tries to do something the programmer did not intend for it to accomplish, the programme may "crash" and stop working. A "bug" occurs when a programme encounters a difficulty as a result of the way the code was written. A minor blunder can quickly escalate into a major issue.

There are over 300 programming languages, but you don't need to know them all, and each one serves a distinct purpose (or several). Most are rather simple to learn when compared to spoken languages. Many of the most popular programming languages are listed below.

Step 4: Type of programing language

The following are the two main categories of computer programming languages:

1. Low-level lingo

2. High-level lingo

Languages at a Basic Level

Low-level programming languages are programming languages that are very near to machine code (0s and 1s).

These languages use binary code to write their programme instructions.

Languages of a High Level

High-level languages are programming languages that are similar to human languages (for example, English languages).

The following are some examples of high-level languages:

Fortran

COBOL

Basic

Pascal

C

Fortran

Java

The high-level languages are comparable to English. Print, input, and other English terminology are used in the computer instructions. However, for writing programme instructions, each high-level language has its own set of rules and grammar. These rules are called syntax of the language.

2. Distinguish between syntax and semantics.

Step 1: Syntax

The syntax of a computer language is the set of rules that determine the combinations of symbols that are regarded correctly formed statements or expressions in that language, according to computer science. This is true for both programming languages and markup languages, where the document represents source code and data, respectively.

In other terms, it refers to the use of computer-readable character structures. When a user tries to run a command without using proper syntax, it creates a syntax error, which usually results in the application failing.

Step 2: Semantics

Semantics describes the steps a computer takes when running a programme written in that language. This can be demonstrated by describing the relationship between a program's input and output, or by explaining how the programme will be performed on a certain platform, resulting in the creation of a computational model.

The study of meaning in language is known as semantics. It can be used on full texts or just a few words. "Destination" and "final stop," for example, have the same technical meaning, but semanticists examine their subtle shades of meaning.

Step 3: Distinguish between syntax and semantics

Syntax is the study of grammar, whereas semantics is the study of meaning. Semantics is the way one's lexicon, grammatical structure, tone, and other parts of a sentence coalesce to communicate a sentence's meaning.

The terms "syntax" and "semantic" mistakes are not interchangeable. A syntax error is an inaccurate source code construction, but a semantic error is faulty logic that creates the incorrect result when performed.

The structure or grammar of a language is referred to as syntax. The meaning of a statement is what semantics is all about.

A programming language's syntax specifies which strings of characters make up a legitimate programme. A computer language's semantics specifies what syntactically correct programmes signify and what they perform. Syntax is concerned with the structure of language, while semantics is concerned with its content.

3. Distinguish between a program that the CPU can execute directly and a program that must be translated.

Step 1: Program that the CPU can execute directly

When the CPU runs a programme, it is saved in the main memory of the computer (also called the RAM or random access memory). Memory can store data that is needed or processed by the programme in addition to the programme itself. A succession of locations makes up main memory. These sites are numbered, and a location's address is its sequence number. An address is a technique of locating a specific piece of data among the millions in memory. When the CPU needs to access a programme instruction or data in a certain position, it sends a signal to the memory with the address of that information; the memory replies by sending back the value stored in the specified location.

Step 2: Program that must be translated.

Machine code (binary) is the only programming language that computers comprehend; this is a problem because programmers prefer to utilise a range of high and low-level programming languages instead. The high-level and low-level computer code (source code) must both pass through a translator to get around the problem.

Step 3: Difference between them

In CPU execution the CPU follows a "fetch-execute" cycle, in which it fetches the first instruction in the sequence, executes it (adding two integers or whatever), then fetches and executes the next instruction, and so on. Some of the instructions have an impact on the order in which the CPU executes the instructions.

But in programing, A compiler takes the entire source code and converts it to object code in one step. The object code can be run without assistance at any moment after it has been transformed. Compilation is the term for this procedure.

The CPU's job is to execute programmes. Each type of computer has its own machine language, and only programmes written in that language may be executed directly by the computer. (If programmes written in other languages are first translated into machine language, it can run them.)

Machine code (binary) is the only programming language that computers comprehend; this is a problem because programmers prefer to utilise a range of high and low-level programming languages instead. The high-level and low-level computer code (source code) must both pass through a translator to get around the problem.

Step 1: Central Processing Unit (CPU)

The central processor unit (CPU) is the most important part of a computer system because it contains the technology that allows the computer to comprehend and execute program instructions. Microprocessors are sometimes known as central processors.

The central processing unit (CPU) is the computer's brain. The CPU, like the human brain, is in charge of coordinating the timing of each action and executing the instructions or directions from an application or operating system.

The CPU is always following computer program instructions that tell it which data to process and how to process it.

Step 2: Basic element in a CPU

The central processing unit (CPU) consists of six main components:

control unit (CU)

arithmetic logic unit (ALU)

registers.

cache.

buses.

Clock.

Step 3: Explanation of basic component

1.control unit:

The control unit (CU) is a component of the central processing unit (CPU) of a computer that directs the processor's operation.

The CU control most of the computer resources. It controls the data flow between the CPU and the rest of the system.

The central processing unit's control unit regulates and integrates the computer's activities.

It chooses and retrieves instructions from the main memory in the correct order, then interprets them to activate the system's other functional elements at the proper moment.

2 ALU

Arithmetic logic unit (ALU) is a type of digital combinational circuit that performs arithmetic and bitwise operations on integer binary integers. A floating-point unit (FPU), on the other hand, works with floating-point numbers.

The ALU is separated into two units in some processors: an arithmetic unit (AU) and a logic unit (LU) (LU).

3 CPU

Within the CPU, registers are small pieces of high-speed memory.

The processor uses them to store little quantities of data needed during processing, such as the address of the next instruction to be performed. the currently decoded instruction

An instruction, a storage address, or any data can be stored in a processor register (such as bit sequence or individual characters).

After the current instruction is completed, the address of the next instruction is calculated in the register holding the memory location.

4 cashe

A CPU cache is a hardware cache utilised by a computer's central processing unit (CPU) to lower the average cost (in terms of time or energy) of accessing data from main memory. A cache is a smaller, quicker memory that stores copies of data from frequently utilised main memory locations and is situated closer to the CPU core.

Cache memory is crucial because it enhances data retrieval performance. It saves program instructions and data that are utilized repeatedly throughout program execution, as well as information that the CPU is expected to want next.

5 Bus

A bus is an internal high-speed link. Control signals and data are sent between the CPU and other components via buses. There are three different types of buses that are used. Memory addresses are passed from the processor to other components such as primary storage and input/output devices through the address bus.

The CPU is attached to the motherboard (also called the logic board). Buses are motherboard circuits that connect the CPU to other components. On the motherboard, there are many buses. A bus delivers data and instructions throughout the system.

6 Clock

Every second, your CPU processes a large number of instructions (low-level calculations like arithmetic) from various program. The clock speed of your CPU is measured in GHz and represents the number of cycles it performs per second (gigahertz).

A system clock—a tiny quartz crystal situated on the motherboard—is used to synchronize all of a computer's functions.

A clock is housed in the CPU and is used to coordinate all of the computer's components. The clock emits a regular electrical pulse that synchronizes (keeps) all of the components in sync. The clock speed refers to the frequency of the pulses. The frequency of a clock is measured in hertz.

Step1:

An administrator account is a database account that has been enabled to conduct administration activities in Enterprise Manager. By default, database and standard Enterprise Manager accounts are not administrators.

Step 2

Administrator account has the following characteristics

Not visible on the sign in screen

It has a blank password by default

It cannot be deleted

It cannot be locked out due to in correct sign in attempts

It cannot remove from the local administrator group

It can be renamed

It can be disabled

**Step3:**

**a. It has a blank password by default.**

**b. It cannot be deleted are correct answer**

**Hence option a,b are correct answer**

**b,c are incorrect answer**

Which of the following are not true about differences between network attached storage (NAS) devices and storage area network (SAN) devices?

A NAS system is a network-connected storage device that allows authorised network users and heterogeneous clients to store and retrieve data from a centralised place. NAS systems are adaptable and scale-out, which means you may expand your storage capacity as needed.

A SAN (storage area network) is a collection of storage devices that can be accessed by numerous servers or computers to create a shared storage pool. Each computer on the network can access storage on the SAN as if it were local discs attached to the computer directly.

A file-level (as opposed to block-level) computer data storage server connected to a computer network that provides data access to a diverse collection of clients is known as network-attached storage (NAS). It's frequently made as a computer appliance, or a custom-built specialised computer.

Data is transported, stored, and accessed at the block level in a SAN. As a result, a SAN only provides block-level storage and operations, not data file abstraction. As if they were local to themselves, server operating systems keep their own file systems on their own dedicated, non-shared LUNs on the SAN.

Hence option A is correct

A network-attached storage (NAS) device is a data storage device that connects to and is accessed over a network rather than being directly connected to a computer. NAS systems have a processor and an operating system, which allows them to run applications and provide the intelligence required for files to be shared effortlessly by authorised users.

These components are not required by SAN devices. The storage devices in a SAN are not owned and managed by a server because it does not employ direct connected storage (DAS). A SAN enables a server to access a significant amount of data storage capacity, which may also be accessed by other servers.

Hence option B is correct

NAS is a network device that stores and shares files without the need for a full operating system. Typically, the seller preinstalls a stripped-down operating system, which is usually based on Linux or BSD.

SANs are typically used to connect servers to data storage devices such as disc arrays and tape libraries, allowing the operating system to see the devices as direct-attached storage.

Hence option C is incorrect

NFS (common on UNIX systems), SMB (Server Message Block) (used with Microsoft Windows systems), AFP (used with Apple Macintosh computers), and NCP (used with Apple Macintosh computers) are all file-based protocols utilised by NAS (used with OES and Novell NetWare).

SCSI protocol and either iSCSI or fibre channel interface are used by SAN to deliver high throughput.

Hence option D is incorrect

LBAC (lattice-based access control) is a complicated access control model that relies on the interaction of any number of objects (such as resources, computers, and applications) with people (such as individuals, groups or organizations).

A lattice is used to specify the levels of security that an object and a subject can have in this type of label-based obligatory access control paradigm.

Mandatory access control is a method of restricting access to resources based on the sensitivity of the information contained in the resource and the user's authority to access information of that sensitivity level. A security label is used to specify the resource's sensitivity.

Password protection entails assigning a password to your data set in order to protect it. Without knowing the password, another user cannot view, edit, or delete your data collection.

File sharing is the act of making files available for others to obtain. It might be something as simple as viewing business files from your personal computer or sharing documents published on your website. Peer-to-peer (P2P) software, such as Morpheus or kazaa, is one of the most contentious parts of file sharing.

AppArmor is the default security system in Ubuntu. AppArmor (Application Armor) was created as a replacement for SELinux (securityenhanced linux). It's a lot less complicated, but it uses the same kernel support as SElinux. AppArmor is a straightforward mechanism for enforcing media access control (MAC) for a specific Linux application.

Hence option B. Mandatory access controls is the answer

 A is a device used to prevent unauthorized individuals from seeing a computer monitor.

Answer: **option D Time lockout program**

Explanation for the correct answer;

Time Lock is a simple software that protects your computer against unauthorised use. Nobody can view documents on your computer, launch programmes, or browse the internet when the Time Lock software is activated. The programme allows you to lock the computer in such a way that it can't be used.

Explanation for incorrect answer:

Blinder is the most straightforward way to engage anyone in a conversation while still capturing HD digital material. And, because no special software is required, anyone may conduct a Blinder interview right now. Register for a free account.

A screensaver is a computer application that is activated after a period of inactivity by the user (when you leave your computer). It was originally designed to protect older monitors from harm

A computer privacy screen, also known as a privacy filter, is a thin sheet of plastic that is placed over your monitor or display panel to keep prying eyes from absorbing sensitive data.

Answer: token ring

Explanation for the correct answer

On token-passing networks, beaconing is a technique for monitoring the state of the token-passing process.

To ensure that token passing is working effectively, beaconing is utilised in token ring and Fiber Distributed Data Interface (FDDI) networks.

Every station on a token-passing network like FDDI is responsible for monitoring the token-passing process's status.

When a station identifies a defect, it begins putting beacons on the ring. When a beacon is detected by the next station on the ring, it begins planting beacons on the ring, and the first station stops sending them.

Explanation for the wrong answer

The wireless technology that connects computers, tablets, cellphones, and other devices to the internet is known as Wi-Fi. The gadget sends a radio signal back to the router, which uses wire or cable to connect to the internet.

Ethernet cables are used to connect devices to a local network and give internet access. They connect to Ethernet ports on a number of different devices. An Ethernet cable is most commonly used to connect a WiFi router or modem to the internet entry port or telephone line

(Generation 1) A 1G represents the initial generation of something, such as 1G cellular, which was the first cellular phone system installation.

2. You are working on an older network that still uses FDDI on the backbone to connect servers and network devices. What type of cable do you expect to see on the FDDI backbone?

 Answer: fiber-optic

Explanation for the correct answer

Within a plastic casing, a fiber-optic cable includes ranging from a few to hundreds of optical fibres. They are also known as optic cables or optical fibre cables because they transmit data in the form of light and can travel hundreds of kilometres quicker than standard electrical connections.

FDDI's physical medium is optical fibre. It works in the Open Systems Interconnection (OSI) network model's physical and media access control (MAC) layers. It has a 100 Mbps data throughput and can support thousands of users.

Hence fiber optic is the answer

Explanation for incorrect answer

Most modern Ethernet networks, among other things, use twisted pair cabling. A twisted pair of wires makes a circuit that conveys data. As we all know, bandwidth is a critical aspect in data communications.

Copper tubing is commonly used in heating systems and in HVAC systems as a refrigerant line. In hot and cold water applications, copper tubing is gradually being replaced with PEX tubing.

HDMI cables are the most common type of HDTV cable. They transmit video signals that are at least 1080p or higher. Each end of an HDMI cable has a 19-pin connection.

Answer:

Option A ICMP

Explanation for correct answer:

Control messages are sent to network devices and hosts using the Internet Control Message Protocol (ICMP). Routers and other network devices keep an eye on the network's performance. When a mistake occurs, these devices can use ICMP to transmit a message.

Explanation for in correct answer:

DNS servers convert requests for names into IP addresses, allowing users to choose which server they want to visit when they type a domain name into their web browser. Queries are the term for these requests.

The Simple Mail Transfer Protocol (SMTP) is a programme that allows senders and receivers to send, receive, and relay emails. When an email is sent, it is sent over the internet using SMTP from one server to another. Simply put, an SMTP email is one that is sent over the SMTP server.

Sun Microsystems created the Network File System (NFS) in 1984 as an Internet Standard client/server protocol to provide shared, stateless (file) data access to LAN-attached network storage. As a result, NFS allows a client to access, store, and update files on a remote computer as if they were on the client's own computer.

Which of the following is a disadvantage of workgroup computing?

 </o:p>

a. requires one or more expensive servers b. supports an unlimited number of workstations c. no centralized security management d. simple to set up initially

A workgroup is a group of people who collaborate on a project. When everyone in a workgroup has a computer connected to a network, they can send e-mail, share data files, and organise meetings. Users can build workflows in sophisticated workgroup systems so that data is automatically transmitted to the right persons at each stage of the process.

Workgroup disadvantages include:

A workgroup's security measures aren't as robust as those found in a domain.

For sensitive data, transmission networks, or corporate networks, workgroups are not recommended.

Unlike the domain network, there is no centralised resource management.

**1. Which of the following is not true regarding Transmission Control Protocol/Internet Protocol (TCP/IP)?**

 Answer: **option d The two major protocols are RDP and XLORV.**

**Explanation:**

Transmission Control Protocol (TCP) is a connection-oriented communications protocol that allows computers in a network to send and receive messages.**It is the most widely used protocol in networks that use the Internet Protocol (IP); it is sometimes referred to as TCP/IP when used together**.

**TCP and IP are two different protocols that work together** to ensure that data reaches its intended destination within a network. IP collects and defines the address of the application or device to which data must be transmitted (the IP address). TCP is then in charge of carrying and routing data through the network architecture, ensuring that it reaches the IP-defined destination application or device.

 In other terms, an IP address is similar to a smartphone's phone number. TCP is the computer networking version of the technology that makes a smartphone ring and allows the user to speak with the person who has called them.

Because the two protocols are widely used together and rely on one another for data to have a destination and arrive safely, the process is commonly referred to as TCP/IP.

 TCP/IP (Transmission Control Protocol/Internet Protocol) is a communications protocol that is used to connect computers and communicate over the Internet. **On a single Local Area Network, several computers in a small department could use TCP/IP as well as other protocols (LAN).**

**Transmission Control Protocol/Internet Protocol (TCP/IP) is a suites of communication protocols that are used to connect network devices on the internet.** In a private computer network, TCP/IP is also used as a communications protocol (an intranet or extranet).

**The test that validates a program by ensuring that all of its statements have been executed-that is, by knowing exactly how the program is written-is**

**Answer: Option  e. White box testing**

**Explanation for the correct answer:**

White box testing is a method of inspecting and verifying the inner workings of a software system, including its code, infrastructure, and connections with other systems.

White Box Testing is a sort of testing that focuses on the structure of a programme and generates test data based on programme logic or code. Clear box testing, open box testing, logic-driven testing, path-driven testing, and structural testing were all terms used to describe this type of testing.

**Explanation for the wrong answer:**

Testing a system with no prior knowledge of its internal workings is known as **black box testing**. A tester gives the system under test an input and watches the output it produces. Because it exercises a system from beginning to end, black box testing is a powerful testing technique.

**Destructive testing**is a type of testing that determines when a component, asset, or material fails. Toughness, hardness, flexibility, and strength are all physical attributes that can be determined using destructive testing procedures.

**Non-Destructive Testing (NDT)** is an acronym for non-destructive testing. It refers to a set of inspection techniques that allow inspectors to assess and collect data about a material, system, or component without causing irreversible damage to it. NDT is also known as NDE (non-destructive examination or evaluation)

**System testing**is a type of software testing that is carried out on an entire integrated system in order to assess the system's compliance with the appropriate requirements. Integration testing passed components are used as input in system testing.

Answer: Data Link (Layer 2)

The Data Link layer ensures that data is transported reliably via a physical network link. Physical addressing, network topology, error warning, frame sequencing, and flow control are among the network and protocol characteristics defined by distinct Data Link layer specifications. The Data Link layer converts network messages into bits for transmission through the physical layer. It converts messages into data frames and includes a custom header with the source and destination hardware addresses. Each device on a local network must be uniquely identified by the Data Link layer.

At the data link layer, physical addressing (as opposed to network addressing) determines how devices are addressed.

The data connection layer specifications that often dictate how devices are to be physically connected, such as in a bus or ring topology, make up network topology.

Error warning informs upper-layer protocols when a transmission error occurs, and data frame sequencing reorders frames that are sent out of order.

Flow control regulates data transfer so that the receiving device isn't overburdened with more data than it can process at any given time.

At the Data Link layer, a packet is framed with control information before being delivered across routers. At the destination router, the information is deleted, leaving only the original packet.

The framing step is continued until the packet reaches the receiving host if it is going to another router. The packet is never changed; it is only enclosed with control information that will be sent on to the various media types.

Which layer is responsible for keeping the data from different applications separate on the network?

Session layer

Communication sessions between presentation layer entities are established, managed, and terminated by the session layer.

Service requests and replies are exchanged between apps on separate network devices during communication sessions.

Protocols deployed at the session layer coordinate these requests and responses. Zone Information Protocol (ZIP), an AppleTalk protocol that coordinates the name binding process, and Session Control Protocol (SCP), a DECnet Phase IV session-layer protocol, are two examples of session-layer implementations.

Also allows for device or node-to-device or node-to-device or node-to-dev Offering three separate modes: simplex, half-duplex, and full-duplex, it coordinates and organises communications across systems. The layer essentially keeps data from distinct applications separate from data from other applications.

Define and contrast the following terms: *subnet*, *prefix*, and *BGP route*.

A subnet, also referred to as a subnetwork, is a network within a network. Subnets improve the efficiency of networks.

Subnetting allows network data to travel a shorter distance to its destination without passing through unnecessary routers.

By creating subnets without a new network number, an organisation can hide network complexity and reduce network traffic.

Prefix is a metric for determining the size of a group of people.

Prefixes are used in networking to quantify a large number of hosts/networks; for example, 10.0.0.0/8 and 10.0.0.0/24 are prefixes.

A large number of networks learned via the BGP Routing Protocol is defined as a BGP Prefix.

BGP (Border Gateway Protocol) is the protocol that underlies the internet's global routing system. It coordinates the routing of packets from one network to the next by exchanging routing and reachability information among edge routers.

Border Gateway Protocol (BGP) is a protocol that is used to exchange internet routing information between ISPs with different ASes. The protocol can link any autonomous system's internetwork together utilising any topology.

How does BGP use the NEXT-HOP attribute? How does it use the AS-PATH attribute?

The AS-PATH characteristic is used by routers to identify and avoid looping advertising, as well as to choose amongst various pathways to the same prefix.

The nexthop attribute in BGP specifies the IP address that will be utilised to reach a specific destination. The IP address of the neighbour supplied in the neighbour command is always the next hop for EBGP.

The IP address of the first router along an advertised path (outside of the AS receiving the advertisement) to a particular prefix is indicated by the NEXT- HOP property. A router utilises the NEXT-HOP characteristic to configure its forwarding table.

Answer: c. CTRL+SPACEBAR

Explanation:

 Ctrl + 0 changes the zoom level back to its default setting.

 Ctrl+I italicize and unitalicize text.

Ctrl + spacebar.To remove character formatting from the selected text, press

 Ctrl+U is a shortcut key most often used to underline text.

The \_\_\_\_ shortcut keys underline words, and not spaces

Answer:

CTRL+SHIFT+W

Explanation

CTRL+SHIFT+W Underline words but not spaces

Ctrl+U  Underlines the selected text

Ctrl+W close a program, window, tab, or document

Ctrl + Shift plus resizes all the columns in the grid to their "automatic" size

12. The shortcut keys for the \_\_\_\_\_ character formatting are CTRL+SHIFT+PLUS SIGN.

Answer: option c. superscript

Explanation:

Choose the character you'd like to format. Press Ctrl, Shift, and the Plus sign (+) at the same time for superscript.

To change between lowercase, UPPERCASE, and Capitalize Each Word using a keyboard shortcut, select the text and press SHIFT + F3 until the case you want is applied.

A quick cut for underlining words but not spaces is CTRL+SHIFT+W, and a shortcut for capitalising all letters is SHIFT + F3.

13. The shortcut keys used to left-align a paragraph are \_\_\_\_.

Answer: c. CTRL+L

Explanation:

 Ctrl+J aligns the selected text or line to justify the screen.

CTRL+L Align the text to the left

ALT+J Adjust the justification of text in a file

Alt+L open the Developer tab in the Ribbon.

14. The shortcut keys used to center a paragraph are \_\_\_\_.

Answer: d. CTRL+E

Explanation:

Ctrl+T open a new tab in a browser.

Closing a browser tab that you intended to remain open by accident. Your tab will return if you press Ctrl-Shift-T.

Ctrl + M indents the paragraph

Ctrl + E the address bar, search bar, or omnibox.

15. To decrease a font size, use the \_\_\_\_ shortcut keys.

Answer: b. CTRL+SHIFT+<

Explanation:

CTRL+SHIFT+< To decrease a font size

16. To right-align a paragraph, use the \_\_\_\_ shortcut keys.

Answer: c. CTRL+R

Explanation:

Ctrl+T open a new tab in a browser.

Ctrl+R refresh the page in a browser.

Ctrl + M indents the paragraph.

Ctrl+ K is often used to add, edit, or modify a hyperlink to a Web page.

17. To increase a paragraph indent, use the \_\_\_\_\_ shortcut keys.

Answer: d. CTRL+M

Explanation:

CTRL+L Align the text to the left.

Ctrl+1  switch to the first tab in an Internet browser or other programs with tab support.

Ctrl + E focus on the address bar, search bar, or omnibox.

 Ctrl + M indents the paragraph.

18. Although you can use a dialog box to indent paragraphs, Word provides a quicker way through the \_\_\_\_.

Answer: d. horizontal ruler

Explanation:

The Quick Access Toolbar is a resizable toolbar that contains a collection of instructions that are independent of the presently selected ribbon tab.

The vertical ruler can be used to modify the top and bottom page margins, as well as the row height in tables.

The OFFICE BUTTON lets you open, save, and print documents, as well as do other document-related tasks (e.g., fax and email). By clicking the new Choices button on the OFFICE BUTTON, you can adjust Word's options and preferences (e.g., Word Options, Excel Options, PowerPoint Options).

The horizontal ruler will display at the top of your document, followed by the vertical ruler on the left side. The ruler tool can then be used to format your work

19. The \_\_\_\_\_ feature automatically corrects typing, spelling, capitalization, or grammar errors as you type them.

Answer: b. AutoCorrect

Explanation:

By default, AutoCorrect is set to correct common spelling and punctuation errors. You'll notice that it corrects itself to the correct spelling of attain.

20. If you want to remove the AutoCorrect Options button from the screen, you can press the \_\_\_\_ key.

Answer: a. ESC

Explanation:

to stop, pause, or abort a running process or application, or to close a pop-up window Also known as the Esc key or the Escape key.

allowing secondary functions to be performed by other keys on the keyboard Ctrl is the most common designation.

The document window or page will reload or refresh if you press F5. Ctrl+F5 triggers a complete web page refresh.

Shift is a modifier key on a keyboard that allows you to enter capital letters and other "upper" characters.

The \_\_\_\_ shortcut keys remove character formatting.

Answer: c. CTRL+SPACEBAR

Explanation:

 Ctrl + 0 changes the zoom level back to its default setting.

 Ctrl+I italicize and unitalicize text.

Ctrl + spacebar.To remove character formatting from the selected text, press

 Ctrl+U is a shortcut key most often used to underline text.

**What kind of access method is CSMA/CD?**

Answer: **option a contention**

**Explanation for correct answer:**

Contention-based media access refers to a method of transferring data over a network in which computers "contend for" or share media. When more than one system discovers a free network and tries to communicate, a data collision occurs, and the systems must retransmit. Because computers compete for the right to transmit data into the network media, CSMA/CD is known as a contention mechanism. For Ethernet networks, CSMA/CD is the standard access mechanism.

**Explanation for incorrect answer**

The administrator can assign a priority to requests for media access using **demand priority.** When there is a tie for media access, the highest-priority connection wins, making the demand priority approach ideal for time-sensitive applications. Demand priority networks necessitate the employment of a specialised network device to govern access. As a result, demand priority installation is more costly than alternatives like CSMA/CD.

In computer networking, carrier-sense multiple access with **collision avoidance** (CSMA/CA) is a network multiple access approach in which nodes use carrier sensing but only begin transmission after the channel is sensed to be "idle."

Collisions are possible in both CSMA/CD and CSMA/CA. As the number of hosts in the network grows, the likelihood of collisions grows as well. When using**token passing**, a host must hold the token, which is an empty packet, while transmitting data. The token is cycling  the network at high speed.

The second most prevalent media access technique is tocken ring, which is specified in IEEE 802.5. However, due to Ethernet networking's dominance, tocken ring is a distant second.

Which of the following replaces the Cyclic Redundancy Check (CRC) function in WEP in WPA?

Answer: option a The Message Integrity Check (MIC)

Explanation

A cyclic redundancy check (CRC) is an error-detection code that is extensively used in digital networks and storage devices to detect unintentional data changes. A short check value is applied to blocks of data entering these systems, based on the remainder of a polynomial division of their contents.

The initial attempt at wireless security was called Wired Equivalent Privacy (WEP). The goal was to encrypt data and give security to wireless networks.

WPA (Wi-Fi Protected Access) is a security standard for computing devices that connect to the internet over a wireless connection. The Wi-Fi Alliance created WPA to provide more advanced data encryption and user authentication than the original Wi-Fi security standard, Wired Equivalent Privacy (WEP).

The Message Integrity Check (MIC) in WPA replaces the ayclic redundancy check (CRC) function in WEP, which is designed to prevent an attacker from capturing, modifying, and resending data packets. The CRC is used to identify any packet alterations, whether they are unintentional or purposeful.

Another name for the robust security network (RSN) is

Answer option :  a. IEEE 802.11i

Explanation:

The Robust Security Network Element (RSNE) is an 802.11 Beacon frame info element that indicates a security network that only supports the construction of robust security network associations (RSNAs) and that the group cypher suite chosen is not wired comparable privacy (WEP).

RSN (Robust Secure Network) is a wireless communication protocol that allows for secure communication over an 802.11 network.

WPA2, commonly known as RSN, is the Wi-Fi Alliance's authorised, interoperable implementation of the complete 802.11i standard (Robust Security).

Cloud computing is a broad word that refers to any method of delivering hosted services over the internet. Utility computing or on-demand computing are other terms for cloud computing.

Businesses can ensure reliable disaster recovery and backup solutions without the effort of putting them up on a physical device by investing in cloud computing. The cloud is built in such a way that data saved on it is replicated across servers, ensuring that it is promptly backed up if one fails.

Cloud computing allows you to focus on what you do best—running your business—by storing servers off-site and entrusting their operation to an expert provider. The time it takes to get started with these services falls from days to minutes since resources in the Cloud may be used as needed.

There are numerous benefits to using cloud computing, one of which is the flexibility it provides. Cloud computing allows employees to access files and data even when they are working remotely or outside of normal business hours. Staff can access information from home, on the road, at clients' offices, or even on a smartphone as long as they have access to the Internet. Even if they are not physically there, employees can collaborate on files and documents. Documents can be viewed and modified simultaneously from many places.

In comparison to server and hard drive constraints, cloud solutions provide almost infinite storage space. Server improvements and equipment are unaffected by the need for greater storage capacity. To get more data storage, you usually just need to increase your monthly fee significantly. Instead of purchasing software altogether, cloud computing allows you to subscribe to it. This means you only pay for it when you need it, and it also gives you flexibility: it can be scaled up and down quickly and easily to meet demand. Furthermore, because their data is stored and backed up online, it cannot be lost or erased.

List some of the challenges in cloud computing

1. Data Privacy and Security

When it comes to cloud computing, data security is a key problem. Data saved in the cloud by users or organisations is vital and confidential. Even if the cloud service provider guarantees data integrity, user authentication and authorization, identity management, data encryption, and access control are all your responsibility. Identity theft, data breaches, malware infections, and other security issues in the cloud can all lead to a loss of trust among your application's users.

2. Management of Costs

Despite the fact that almost all cloud service providers operate a "Pay As You Go" model, which lowers the overall cost of the resources consumed, there are times when the company incurs significant costs as a result of cloud computing. When resources aren't being used to their full potential, such as when servers aren't being used to their full potential, the hidden costs add up.

3. Multi-Cloud Environments

Because of the increased number of options available to businesses, they now rely on multiple cloud service providers rather than just one. The majority of these businesses employ hybrid cloud strategies, with over 84 percent relying on several clouds.

4. Performance Challenges

When it comes to cloud-based solutions, performance is critical. If the cloud's performance isn't up to par, users will leave and profits will suffer. Even a small amount of latency when loading an app or a web page might cause a significant decline in the number of users.

5. Flexibility and interoperability

When a company employs a specific cloud service provider and wishes to transfer to a different cloud-based solution, it can be a time-consuming process because apps created for one cloud using the application stack must be rewritten for the other cloud. Due to the complexities involved in switching from one cloud to another, there is a lack of flexibility.

6. Network reliance is high

Because cloud computing involves real-time resource provisioning, it involves massive quantities of data transit to and from servers. This is only possible because of the high-speed network's availability. Despite the fact that these data and resources are shared across the network, they might be extremely vulnerable in the event of low bandwidth or a sudden interruption. Even though businesses can save money on hardware, they must ensure that internet bandwidth is adequate and that there are no network failures, or else they risk losing revenue. As a result, maintaining network bandwidth that comes with a high cost, It is difficult for smaller business

7. A lack of expertise and knowledge

Working with the cloud can be a time-consuming process due to its complexity and high demand for research. It necessitates a great deal of knowledge and experience in the field. Despite the fact that there are many specialists in the industry, they must keep up to date. Because of the large disparity between demand and supply, cloud computing is a well-paid employment. There are many job openings, but there are a limited number of qualified cloud engineers, developers, and specialists. As a result, upskilling is required so that these experts can actively comprehend, operate, and develop cloud-based applications with the fewest problems and highest reliability.

Aneka is a pure Platform as a Service model implementation. Aneka's primary value is a service-oriented runtime environment that can be deployed on both physical and virtual infrastructures and can run applications created using various application models.

Aneka's capability for providing resources on several public Cloud providers, such as Amazon EC2, Windows Azure, and GoGrid, is one of its important advantages. In this chapter, we'll look at the Aneka platform and its interface with one of the public Cloud infrastructures, Windows Azure, which allows you to use Windows Azure Compute Service as an Aneka PaaS resource provider.

Aneka PaaS has the ability to provision resources on public Clouds such as Windows Azure, Amazon EC2, and GoGrid, as well as private Cloud resources such as desktops and clusters, as well as virtual datacenters, when needed to improve application performance.

Option B  Aluminum Bronze is the answer:

Explanation

Materials in Autodesk products are realistic representations of real-world materials including concrete, wood, and glass.

These materials can be used to give things in a design a realistic appearance and behaviour. The appearance of an object is crucial in some design contexts, thus materials have particular appearance attributes like reflectivity and surface roughness. Physical qualities of a material, such as yield strength and thermal conductivity, are more relevant in other circumstances, because the materials must support engineering analysis.

**Metal, glass, and ceramic materials are separated into categories.**

Types are separated into categories. **The Metal category contains types: Aluminum, Steel**, and so on.

Each variety has distinct physical characteristics that set it apart from the others. The different grades are found within the material types. Steel types can include grades like 4130 Chromoly and 403 Stainless Steel, for example.

Hence option A, C are incorrect

Sketched shapes can be projected between work planes using which tool?

Answer: d. Project Geometry

Model edges, vertices, work features, points, or curves from a visible drawing are projected as reference geometry onto the active sketch plane.

When dealing with a top-down assembly design, projecting is beneficial since it eliminates the need to manually update and position repetitive parts.

Projected geometry can also be used to:

To use in a profile or path, draw a silhouette on the sketch plane.

Project a sketch from a feature onto the sketch plane to use in the profile or path of a new feature.In a drawing, define the break-out view's boundaries.

In a 3D drawing, copy the model edges and 2D sketch geometry.

Constrict or dimension sketch curves or points, for example, by projecting the default centre point onto the sketch plane to limit the sketch to the coordinate system's origin.

Hence option A,B,C are incorrect answer

strong entity types;

A powerful entity is one whose existence is not contingent on the existence of other entities. A major feature of strong entity types is that they have a key attribute. The key property aids in the unique identification of each entity. A room, for example, may only exist within a structure. A tyre, on the other hand, may be thought of as a powerful entity because it can exist without being tied to a vehicle.

weak entity types

A weak entity in a relational database is one that cannot be uniquely identified by its attributes alone, necessitating the use of a foreign key in conjunction with its attributes to create a primary key.

A room, for example, may only exist within a building. A tyre, on the other hand, may be called a strong entity because it can exist without being attached to a car

one-to-many (1:\*) binary relationship types

A one-to-many relationship is a sort of cardinality in systems analysis that describes the relationship between two entities (see also entity–relationship model) A and B in which an element of A can be linked to many elements of B but a member of B can only be linked to one element of A.

One-to-many relationships can be seen in the following examples: Addresses of Individuals (Each person can live at one address, but each address can house one or more people.) Pets-Owners (Each pet has one owner, but each owner can have one or more pets.)

one-to-one (1:1) binary relationship types

When zero or one instance of entity A can be associated with zero or one instance of entity B, and zero or one instance of entity B can be associated with zero or one instance of entity A, a one-to-one (1:1) relationship exists in relational database design. (It's abbreviated as 1:1).

One family lives in one house, and one family lives in the house.

A passport belongs to one individual and can only be used by that person.

one-to-one (1:1) recursive relationship types;

A recursive relationship is defined as a relationship between two things of the same type. This indicates that the connection is between instances of the same entity type. Because one person can be the parent of multiple people, this is a 1 to many recursive relationship.

superclass/subclass relationship types;

Super-class/subclass or class/subclass connection refers to the relationship between a superclass and a subclass. A subclass represents the'same real-world entity' as a superclass member.

Inheritance refers to the relationship between subclasses and superclasses. A subclass inherits all of its superclass's attributes.

Car, Truck, and Motorcycle, for example, are all subclasses of the superclass Vehicle. They all inherit common vehicle characteristics such as speed, colour, and so on, but they also have distinct characteristics, such as the number of wheels in a car versus the number of wheels in a motorcycle.

complex relationship types;

Many records in one table can link to many records in another table in this complex relationship. For example, our company will almost certainly require tables for Customers and Orders, as well as a Products table. At the very least, three tables are required for this type of interaction.

multi-valued attributes.

An entity's multivalued attribute is one that can have more than one value associated with the entity's key. A large corporation, for example, may have numerous divisions, some of which may be located in separate cities.

many-to-many (\*:\*) binary relationship types;

When numerous records in one table are linked to several records in another table, this is known as a many-to-many relationship. Customers and products, for example, have a many-to-many relationship: customers can buy a variety of things, and products can be bought by a large number of customers.

Consider the two entities Student and Books, for example. A Book can be owned by many students, and multiple Books can be distributed to a single student, resulting in a many-to-many connection.