

3. BUSINESS INFORMATION SYSTEM

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3. BUSINESS INFORMATION SYSTEM

classmate

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Q1: Information system:

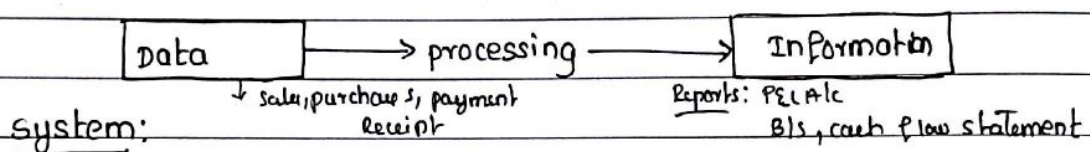
information:

information is generated from working data of organization i.e., data is processed (or) arranged to provide the desired information.

" Processing of data is known as information

Data is nothing but representation of facts pertaining to certain things and events

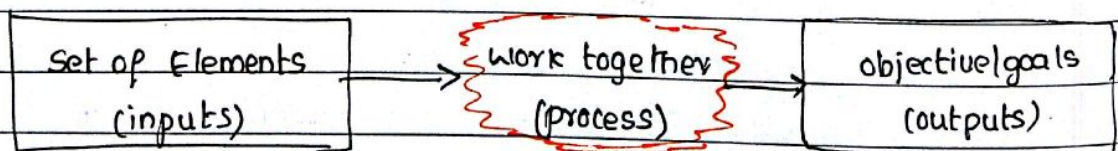
Eg., Name of students of a particular class
quantity of any item



system:

* A system is a mutually related, coordinated elements (or) components that operate together to accomplish objectives by taking inputs and producing outputs in an organized manner.

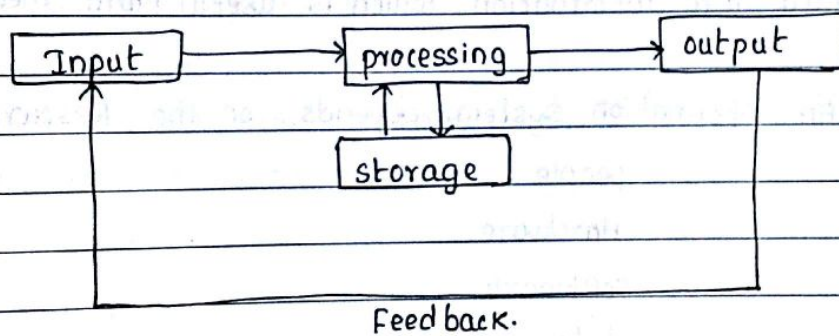
* A system contains several subsystems with sub goals, all contributing to meet the overall system goals.



information system:

information system is a combination of people, hardware, software, communication device, network and data resources that process data and produce information for specific purpose.

"The information system needs input from users (through keyboard, scanning etc) which are then processed (using operations like calculations and sorting etc..) using technology device such as CPU, memory and software and finally it produces outputs (or) results".

components of generic system:

Input: input is the data flow into the system.

(key in instruction, commands & typing etc..)

processing: processing is the action of manipulating the input into more useful form (calculating, reporting)

output: output is the information flowing out of a system (printing report, displaying result etc..)

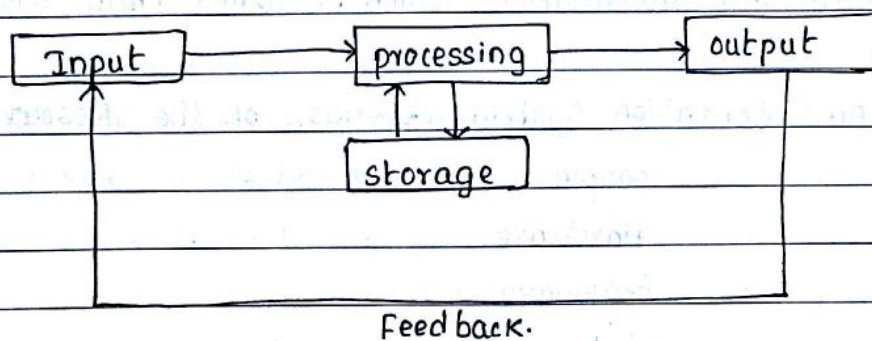
storage: storage is the means of information for later usage.

Feedback: feedback is the method that controls the operation.

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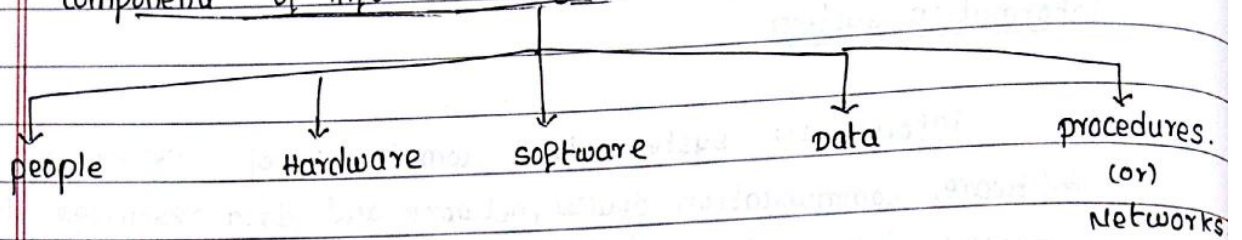
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Q2: components of information system:



peop

☺ information system is a set of interrelated components working together to collect
retrieve
process
store and
disseminate (distribute)
information for the purpose of achieving objectives.

☺ The main purpose of information system is to convert the data into information which is useful and meaningful.

☺ An information system depends on the Resource of
people
Hardware
software
data
and Networks.

To perform input, processing, output, storage, and control activities that transform data resource into information products.

☺ All components of information systems are mutually connected and cannot exist individually.

Q5:

BIS: Business information system:

Business information system can be defined as

"A system which integrates

information technology

people and

Business.

3 BIS bring Business functions and information modules together for establishing effective communication channel.

3 These are useful for making timely and accurate decisions and which helps to increase competitiveness of organization which in turn helps to achieve growth in revenue and profit for organization.

3 BIS is used to manage and control the informational Resource in better manner.

Q4: Information system and Their Role in Business:

In general,

information system refers to a system of computers, data and software etc., which is used to process data and provide required info

☞ organizations use information system to

☺ Reduce costs

☺ control wastes and

☺ increase Revenue.

☞ information systems always results in
"Better management of Business process"

☞ In The present Business Environment,

The computer Based information systems have far reaching effects for organizations and helping them for not only achieving a smooth and efficient operation but also helping to achieve

↳ strategic advantages &

↳ better corporate governance

☞☞☞ some of the important Role of information system-

→ Helps managers in effective decision making

→ Helps to take right decision at The Right time.

→ Helps organization to gain edge in The competitive Environment.

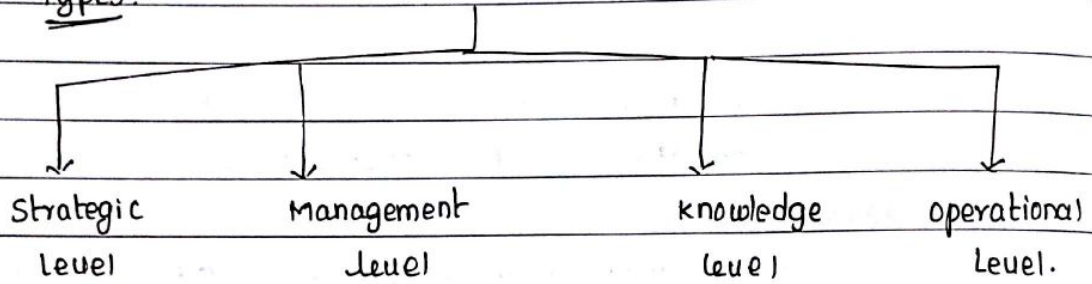
- Helps to execute innovative ideas efficiently.
- Helps in solution of complex and critical problems.
i.e., Helps to resolve complex & critical problems.
- Helps to utilize knowledge,
gathered through information system in day to day
Business operations.

Q5: Types (or) level of information systems:

There are different types of information system and these are used for

- Supporting knowledge
- strategy
- management and
- operation aspects of organization.

Types:



Strategic level systems:

➤ Strategic level systems are used by top level management for tracking and dealing with strategic issues.

➤ Top managers set goals for the organization and direct the company to achieve them.

➤ These systems primarily include information from external environment matching with the internal environment and

then help to capture the opportunities and deal with threats

Eg: ESS

management level system:

These systems are primarily used by middle management for monitoring, controlling, decision-making and administrative activities.

Middle level managers are responsible for carrying out the goals setup by Top level Management.

knowledge operational level - Systems:

These systems support knowledge building and knowledge management activities in the organizations.

ie.,

These systems support discovery, processing and storage of knowledge.

operational level systems:

Support operational managers for tracking day-to-day activities and also includes tracking customer orders, invoice tracking etc.,

Q6: Types of information systems depending upon usage:

Depending upon The usage at different levels, information systems can be classified into The following categories:

- 3 TPS : Transaction processing systems
- 3 MIS : Management information systems
- 3 DSS : Decision support systems.
- 3 EIS : Executive information systems
- 3 OAS/OIS : office automation system (or)
office information system.
- 3 KWS : knowledge work systems.

Q6(i) TPS : Transaction processing system:

TPS is used to process transactions and provide routine and regular reports

TPS is a type of information system that

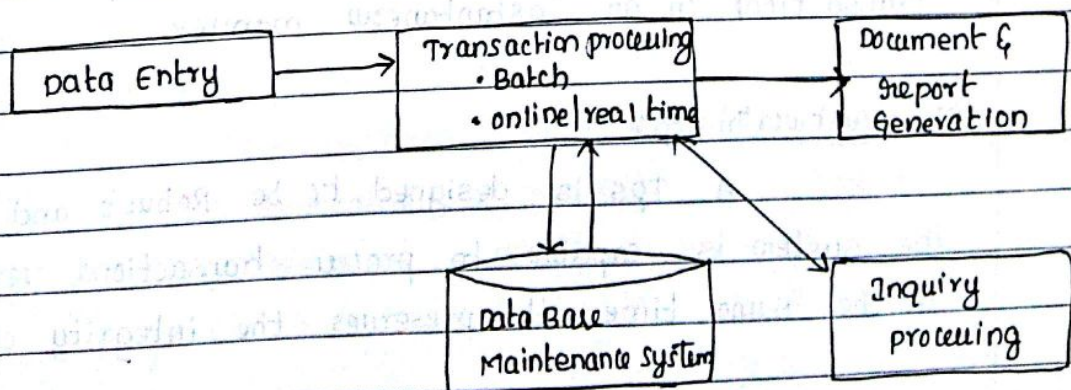
- collects
- stores
- modifies and
- retrieves the day-to-day transactions of an

enterprise.

Examples of TPS system:

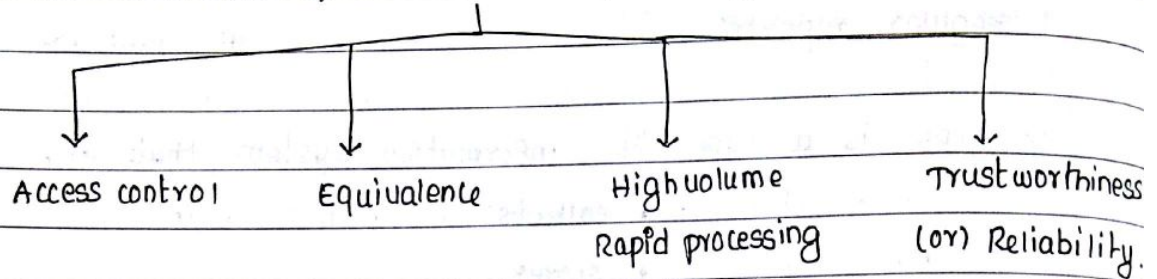
- * Airline Reservation system
- * Railway Reservation by IRCTC
- * Banking system and
- * Accounting system of an organization etc...

TPS system are designed to process transactions instantaneously to ensure that customer data is available to the processes, that require it.



*. Attribute of TPS:

The Attributes of transaction processing system are



(i) Access control:

Most TPS provide access control features such as "They allow access to only those users who are authorized to use the systems"

(ii) Equivalence:

TPS provides similar format (or) interface for data entry to maximize the efficiency and effectiveness of its users.

The similar interface to every one and for each transaction processing helps to increase effectiveness of TPS.

(iii) High volume rapid processing:

TPS is designed to process large volume of transactions in an instantaneous manner.

(iv) Trustworthiness:

A TPS is designed to be robust and trustworthy. The system is capable to process transactions very rapidly at the same time it preserves the integrity of data.

*. Transaction processing Qualifiers:

→ In order to qualify as a TPS, transactions made by the system must pass ACID Test.



Tps should pass the ACID (Atomicity, consistency, Isolation and Durability) test in order to be considered as secured, efficient, reliable and error free system.

ACID Test refers to the following four prerequisites.

A ⇒ Atomicity:

Meaning: Transaction needs to be completed in entirety not in parts.

Explanation:

This means that the transaction is completed in full (or) not at all.

Tps system ensure that transactions take place in entirety

C ⇒ consistency:

Meaning: Tps needs to maintain data consistency (or) integrity.

Explanation:

Tps system exists with in a set of operating rules. if an integrity constraint states that all transactions in a database must have a positive value, then any transaction with a negative value would be rejected.

I → Isolation:

Meaning:

Transaction should be executed in isolation, but simultaneously.

Example:

if a fund is transferred b/w two accounts ie., debit to one account and credit to another Account, then these must take place simultaneously.

However,

accounts isolation (or) individual privacy should be maintained.

D → Durability:

Meaning:

Transaction done should not be undone and transaction failed during processing should not be recorded as done.

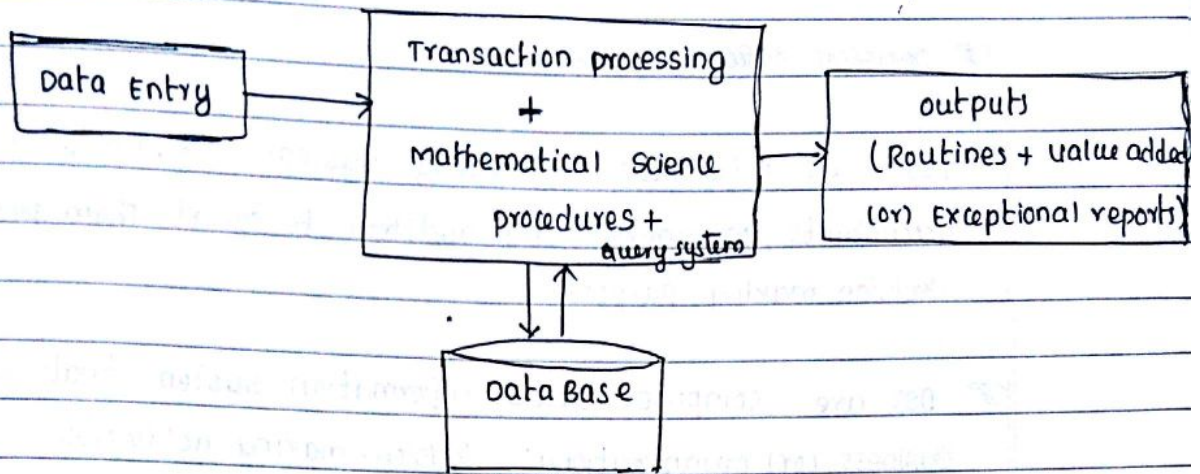
Explanation:

if Tps suffer a failure during processing data then a log should be maintained,

To document

↓ ↓
completed & uncompleted transaction.

Q6(ii)

MIS: Management information system:

3 MIS refers to the data, equipment and computer programs that are used to develop information, for managerial use.

3 MIS is considered as an extension of TPS because MIS can provide certain value added reports in addition to routine & regular reports provided by TPS.

MIS provides value added reports by incorporating mathematical science tools and query system on database provided by TPS.

3 It provides accurate, timely and meaningful data for management planning, analysis and control.

3 MIS is the management of information systems.

Example:

😊 Airline reservations:

Seat booking, payment, schedule, Boarding list, Special needs etc.

😊 Bank operations:

deposits, transfer, withdrawal etc.,
electronically with a distinguish payment gateway.

😊 Train Reservation with the help of IRCTC.

Q 6(iii) DSS: decision support system:

☞ Decision info

☞ DSS are information processing systems frequently used by accountants, managers and auditors to assist them for decision making purposes.

☞ DSS are computer-based information system that supports Business (or) organizational decision-making activities.

☞ DSS can be extremely Beneficial to any organization's overall performance.

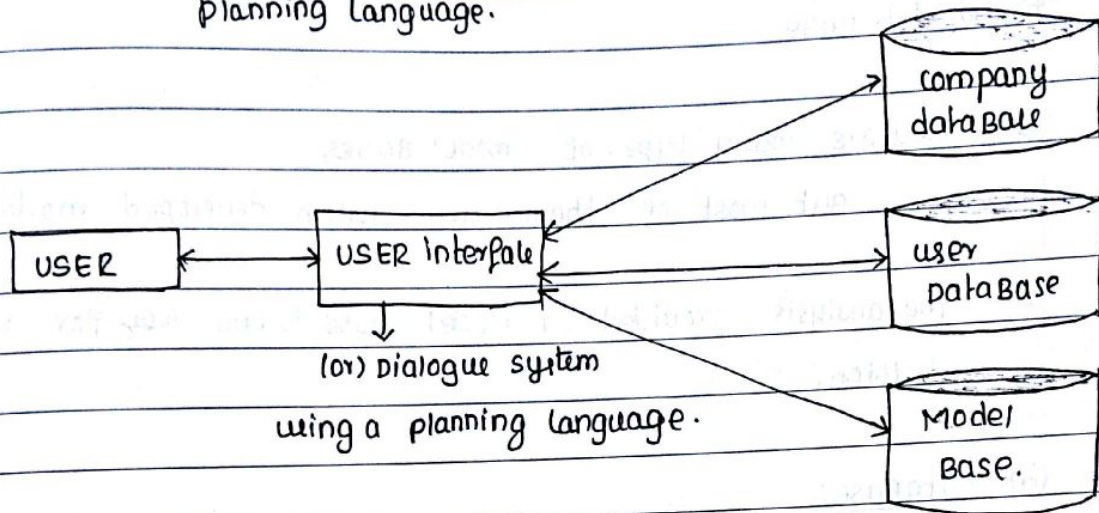
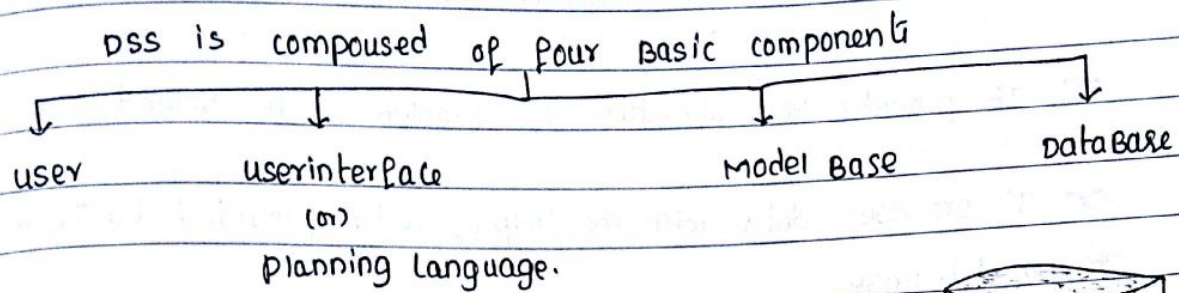
* characteristic features:

😊 DSS support management decision making

😊 DSS helps to solve semi-structured and unstructured problems by bringing together human judgement & computerized information.

😊 friendly computer interface.

* components of decision support system (DSS)

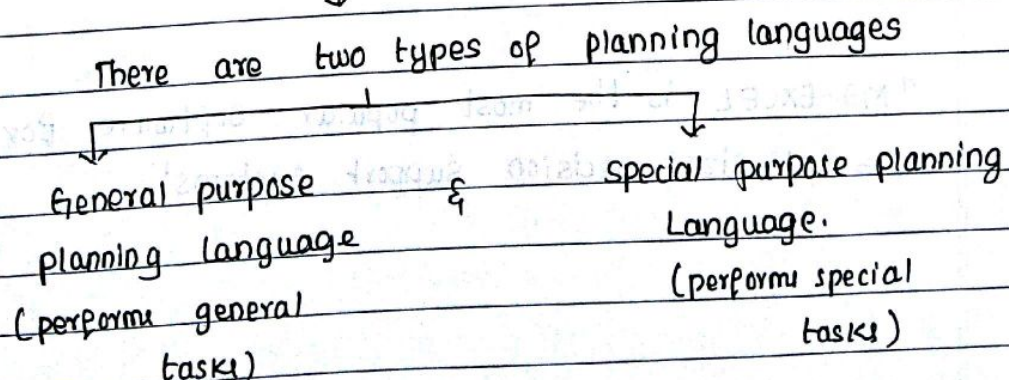


a) USERS:

usually, the user of DSS is manager with some semi-structured (or) un-structured problem.

b) user interface; (or) planning language:

A user communicates with DSS and commands the DSS through user interface (or) planning language.



© Model Base:

Model Base is known as Brain of DSS.

↓

- It provides the structure of problem to be solved.
- It processes data with the help of data provided by the user and the database.

They are many types of model bases, but most of them are custom developed models.

- The analysis provided by model base is the key for user's decision.

(d) Database:

DSS includes one (or) more databases.

These databases contain both internal & external data.

Internal data comes from within the organization's TPS and external data may include, industry data, marketing research data etc...

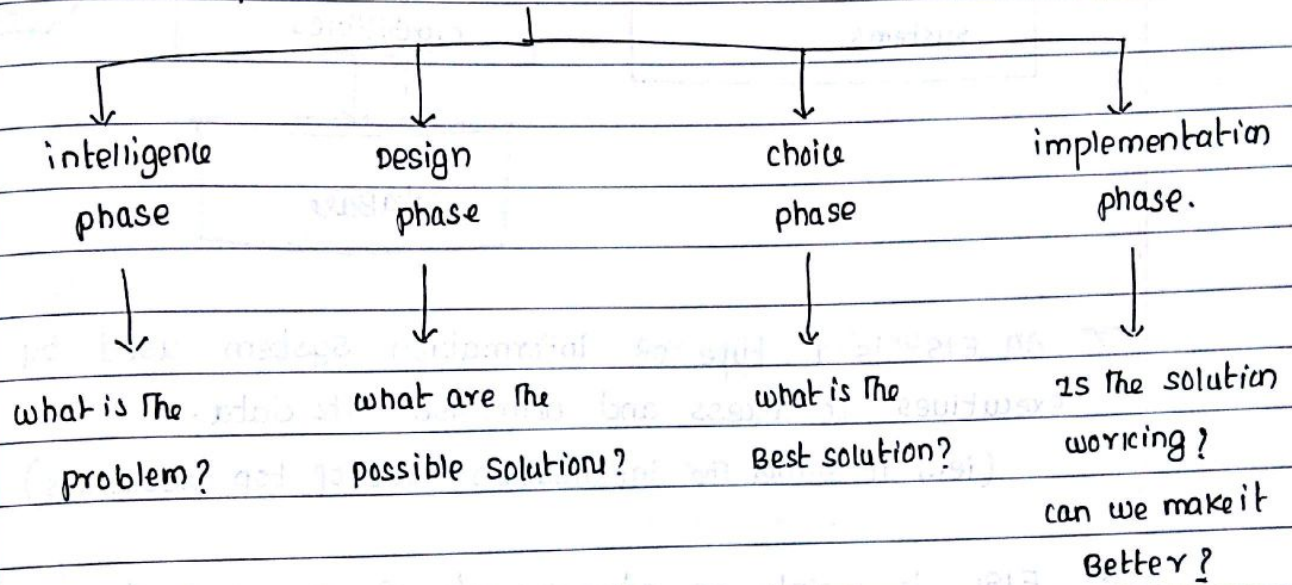
"MS-EXCEL is the most popular software for creating small size decision support systems"

* phases of decision making:

DSS helps to arrive at a decision for complex problems.



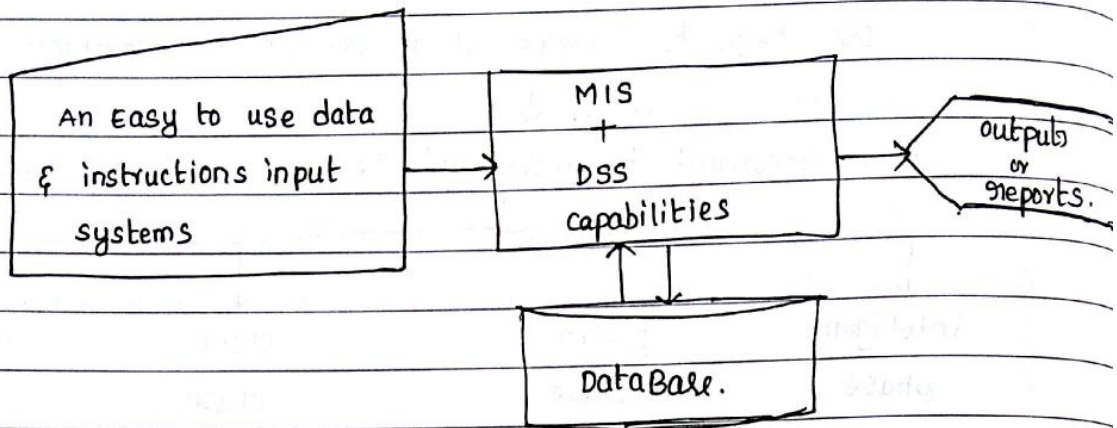
It is important to understand The four phases of DSS.



* Benefits of DSS:

- 😊 improved decision quality
- 😊 improved communication
- 😊 improved customer satisfaction
- 😊 Time saving
- 😊 cost reduction
- 😊 increased productivity.

Q6(10)

EIS: Executive information systems:

✓ An EIS is a type of information system used by executives to access and administer the data.
(i.e., it serves the information need of top executives)

✓ EIS is mainly an advancement of MIS but it can include the DSS capabilities to solve complex problems.

✓ It is a tool that provides direct on-line access to relevant information in a useful and navigable format.

✓ EIS is also known as EES: Executive support systems.

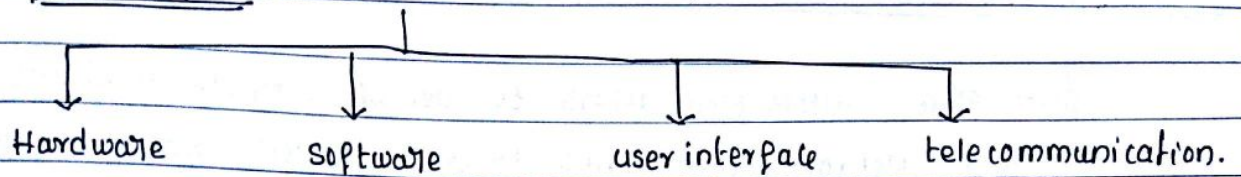
characteristics of EIS:

☺ EIS is capable of accessing both internal & external data.

☺ EIS is easily connected to internet (with online information services and email)

☺ EIS is very user friendly with GUI.

☺ EIS can easily be given a DSS support for decision making.

* components of EIS:Hardware:

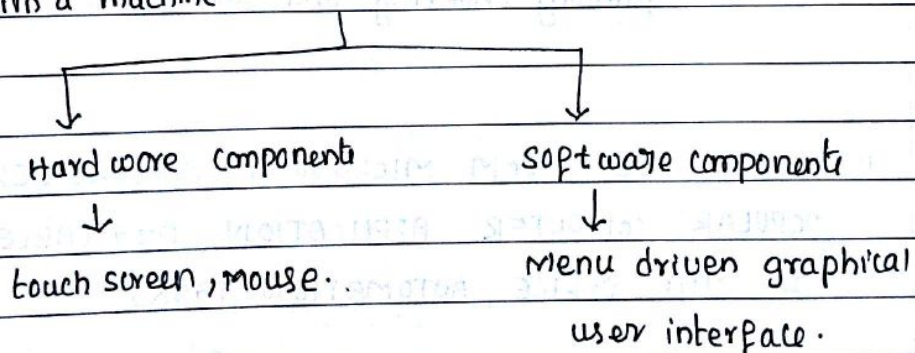
it includes data Entry devices, CPU, data storage and output devices.

Software:

it includes text based software, database & Graphic types such as maps
motion graphics
sequence charts &
Bar charts.

user interface:

it includes hardware and software components by which users interact with a machine

Telecommunication:

involves transmitting data from one place to another immediately and in an error free manner.

Q6(V)OAS: Office Automation System:

Office automation refers to use of computer Hardware, software and Network technologies to create, collect, store, manipulate, and transmit office information digitally.

This information is needed for performing basic tasks for organization.

Office automation helps in optimizing (or) automating existing office procedures.

* It primarily comprises the following activities:

- Exchange of information.
- Management of business tasks.
- Handling of quantitative/numerical data
- planning, meeting and management of work schedule etc.

"MS-OFFICE FROM MICROSOFT IS CONSIDERED AS MOST POPULAR COMPUTER APPLICATION AVAILABLE WHICH HELPS IN THE OFFICE AUTOMATION TASKS"

* BENEFITS:

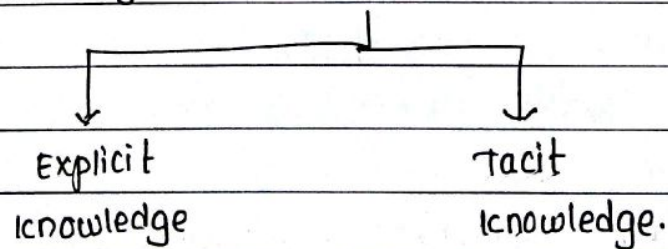
- 😊 Improves communication within and between organizations.
- 😊 Accuracy of communication.
- 😊 Reduces the cost of communication.
- 😊 Reduces time.

Q6(vi)

KMS: knowledge management system:

- 3 KMS refers to an IT system which can store and retrieve knowledge.
- 3 It improves collaboration and locates knowledge sources.
- 3 It mines repositories of data for hidden knowledge and captures and uses that knowledge.
- 3 KMS treats the knowledge component a precious resource & treat's it as part of organization's explicit function just like finance and HR components
- 3 KMS provides an importance to knowledge component in organization such that it is
reflected in strategy,
policies and
practices of the organization.

•x• knowledge can be divided into two categories



* Explicit knowledge:

It is knowledge available, in the documents and database of organization.

It is collected through historical activities, operation and experience of organization.

It is known as recorded knowledge.

It is represented in written material, compiled data and Recorded audio and video

Eg: online tutorials, policies and procedure manuals etc.,

* Tacit knowledge:

Tacit knowledge is unarticulated and Represented as intuition
perspective
beliefs and
values that individual form Based on
Their experience

This knowledge primarily resides in the mind of organization's Employees.

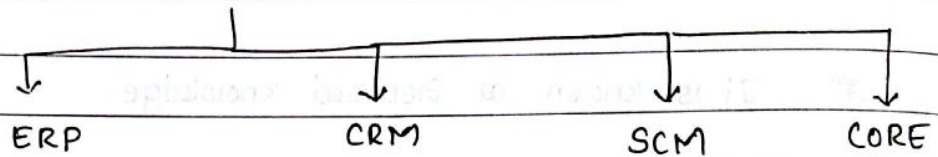
The tacit knowledge differentiates organization & provides strategic edge.

Ex: Microsoft & Micromax and Apple Both manufacture The mobile phone devices But tacit knowledge of professionals in these two organizations differentiate these organizations.

Q7: specialised systems:

specialised systems provide comprehensive and END-TO-END IT solutions and services to various organizations.

* There are various specialized systems, some of them are



(*)
↓
See pg: 107

Q7(i) ERP: Enterprise Resource planning:

ERP provides solution to overall business problems.

ERP helps to integrate five major resources of an organization namely:

Man
Material
Money
Machine &
Market.

ERP involves managing a large volume of data, large no. of users and multiple system components distributed anywhere in the world.

Definition of ERP

"Software solution that addresses the enterprise needs by tightly integrating all functions of an enterprise".

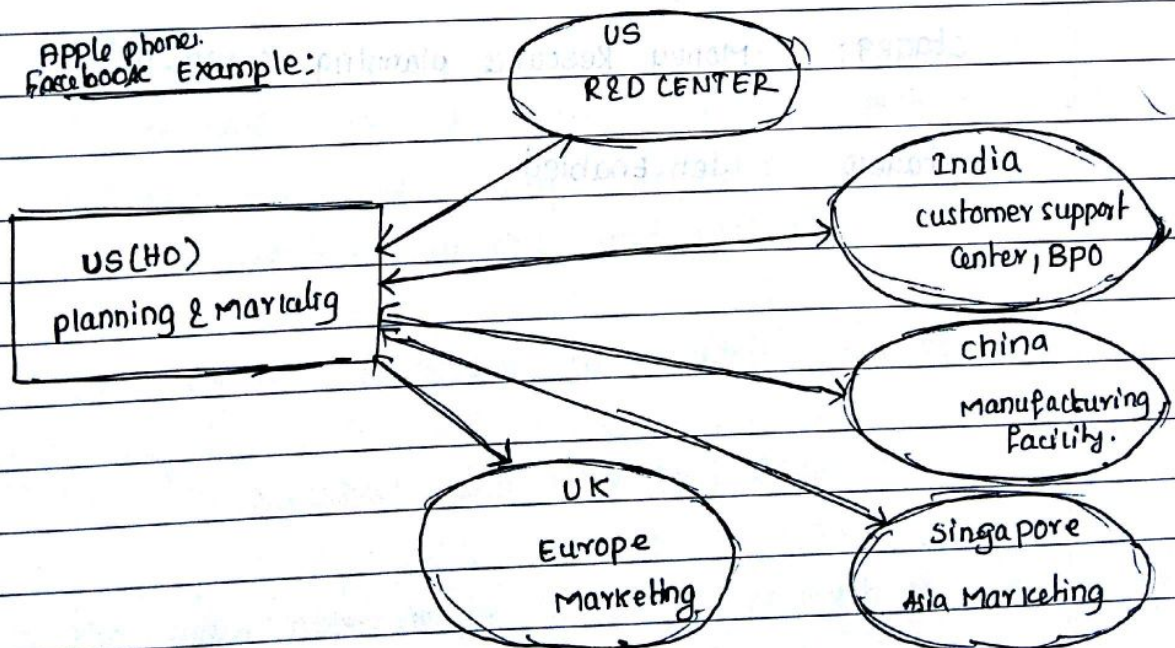
- In simple words:

ERP promises one database, one application and one user interface for entire enterprise, where previously separate systems ruled the manufacturing, personnel, finance and sales.

ERP software provides competent and efficient administration, and mechanized business activities.

It is a complete software solution package for enhancing the performance in large organizations and meeting their requirements with ease & efficiency.

Apple phone.
Facebook Example:



A view of global business which can be managed using ERP

Q7(i) b

Different stages of ERP:

stage 1: inventory controls

stage 2: ABC analysis

stage 3: Economic order quantity (EOQ)

stage 4: Just in time (JIT)

stage 5: Material Requirement planning (MRP-I)

stage 6: Manufacturing Resource planning (MRP-II)

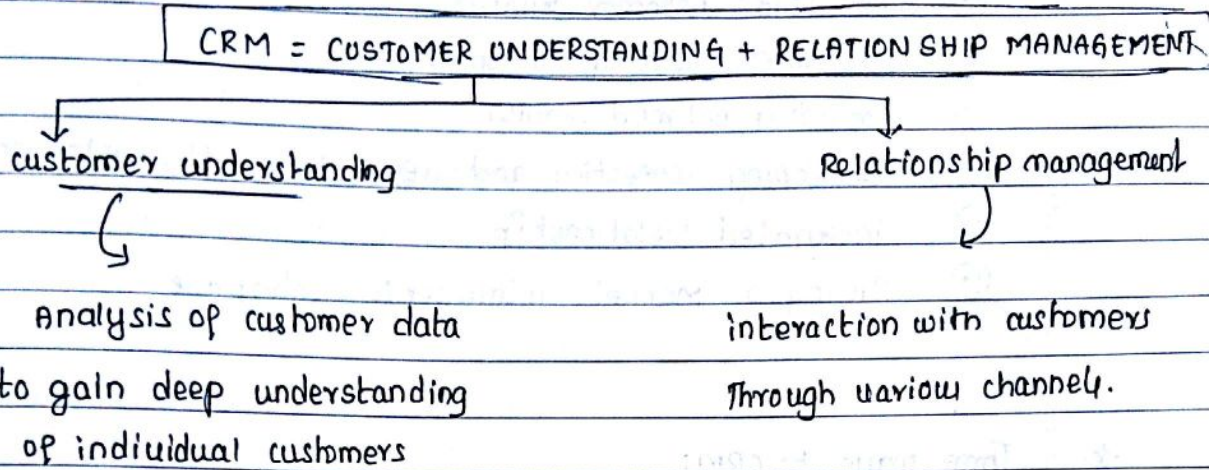
stage 7: Distribution Resource planning (DRP)

stage 8: Enterprise Resource planning

stage 9: Money Resource planning (MRP-III)

stage 10: Web Enabled

Q7(ii)

CRM: customer relationship management:

CRM may be defined as a business process in which client relationships; customer loyalty and brand value are built through marketing strategies & activities.

CRM purpose is to help organizations in managing their customers in a better way through the introduction of reliable systems, processes and procedures.

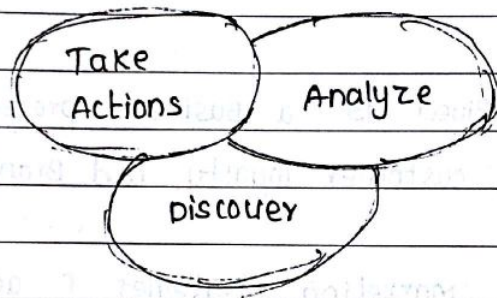
CRM allows businesses to develop long-term relationships with established and new customers.

The main objective is to retain as much as loyal customers.

* Benefits of CRM:

- 😊 Generating customer loyalty
- 😊 preserving existing customers
- 😊 providing enhanced service
- 😊 developing connection and affiliation with customers
- 😊 integrated relationship
- 😊 Raising a Market Intelligence Enterprise.

* Three ways to CRM:



Take action:

Talks about policies & procedures, marketing policies, support procedures.

Analyze:

Talks about customer Base profitability, Buying pattern, support pattern, productivity.

Discover:

Talks about The trends in market selling opportunities for expansion.

Q7(iii)

Supply chain management:

Supply chain management is the process of planning
implementing &
controlling

The operations of supply chain, with the purpose to satisfy
customer requirements in an effective ^{efficient} way.

Supply chain management covers all movements & storage of
Raw materials, w.i.p, & finished goods from
point of origin to
point of consumption.

Supply chain management integrates supply and demand
management, within and across companies.

SCM is a chain that starts with customers and
ends with customers.

Supply chain management is based on two central ideas.

(1) Firstly,

Every product that reaches to an end user
represents the cumulative effort of multiple organizations.

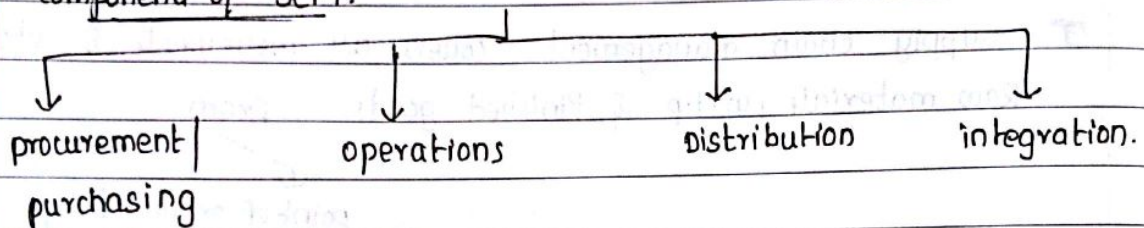
These organizations collectively referred to as
Supply chain.

Secondly,

Earlier organizations paid attention to supply chain existed within the factory premises,

But now with the use of IT they have started managing the entire chain of activities, from source to destination.

* components of SCM:



😊 procurement:

This primarily includes procurement of Raw material at optimum/minimal cost

This also includes supplier selection for reliable supply of Raw materials at lower costs.

😊 operations:

This includes maintaining optimum (or) minimum inventory of raw material and finished goods such that organizations are able to achieve the maximum profit without losing production (or) customers.

It also includes checking quality of material being sourced

③ distribution:

Distribution involves several activities - Transportation (logistics), warehousing, and CRM

☺ Integration:

This includes coordination with different elements of supply chain.

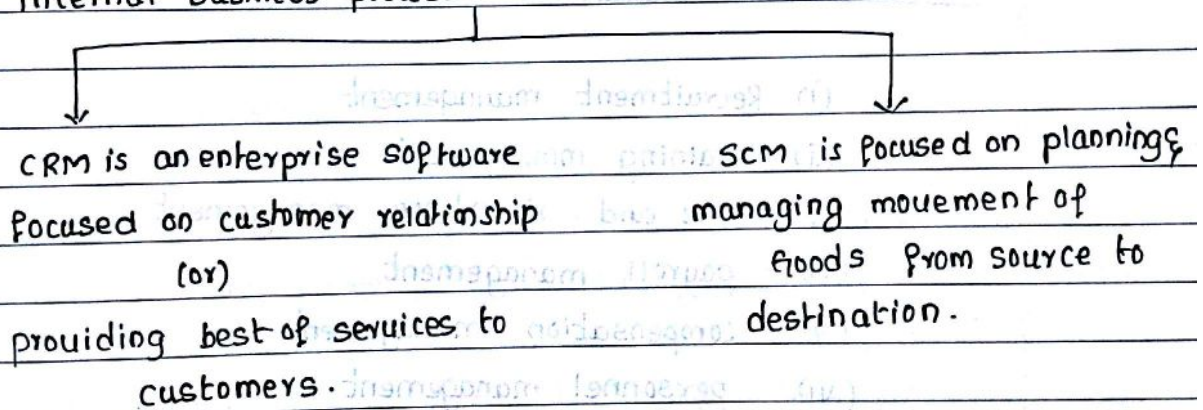


This helps to integrate all the components of supply chain.

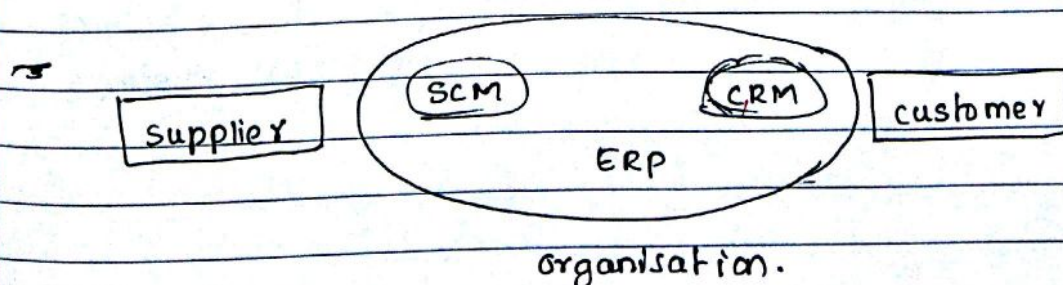
Q7(14) Relationship between ERP, CRM and SCM:

☞ CRM and SCM are two categories of enterprise software that are widely implemented in corporations & Non-profit organisations.

☞ The primary goal of ERP is to improve and streamline internal Business process



☞ SCM Software ensuring that materials and information flow through the supply chain with the highest possible efficiency and the lowest possible cost.



Q8: OR HUMAN RESOURCES Management system [HRMS]

(i) people are the most valuable asset of an enterprise and substantial time and endeavor has to be spent in managing the human resources.

(ii) HRM's is a software application that coalasce many human resources functions, together with benefits of adminishtratio payroll, recruiting and training and performance analysis and assessment into one parcel.

In other words,

HRMS (or) HRIS [Human resources information system] refers to the systems and processes at the intersection b/w Human Resource management (HRM) and information technology.

KEY MODULES OF HRMS:

- (i) Recruitment management
- (ii) Training management
- (iii) Time and attendance management
- (iv) payroll management
- (v) compensation management
- (vi) personnel management
- (vii) organizational management
- (viii) workforce management
- (ix) Employee self service (ESS)
- (x) Analytics.

(i) Recruitment management:

This module compiles the skills requirements and then hiring right people with right target skills.

(ii) Training management:

This module manages the skills profile of Employees & it provides information about training programs for employees to enhance the skills.

This module tracks the trainer (or) training organization; costs associated with training schedule, tracks training locations & monitor the progress of Employees and usefulness of training.

(iii) Time and attendance management:

It helps to gather data related to attendance (time in and time out) which helps to prepare payroll and also helps in analyzing the data related to work efforts to control costs.

(iv) payroll management:

This module primarily automates the payroll functions and facilitate salary, deduction and incentive calculations.

This module links the payroll with the other financial modes.

(v) compensation management:

compensation management is to attract and retain talented employees.

This integrates the Employee's performance and processes with organizational processes and strategies to create a competitive workforce.

(vi) personnel management:

This module maintains the master data of employees related to salary, recruitment and compensation.

(vii) organizational management:

This includes organizational structure information, staffing and job description and this helps in hiring and promoting employees within the adopted organization structure.

(viii) workforce management:

It helps to manage effectively the workforce in terms of compliance to labour laws and control labour cost & expenses and

provide required labour for organizational functions.

(ix) Employee self service:

This module provides access of HR system to employees for any query related to time and attendance, salary, benefit and training etc.,

(x) Analytics:

This module helps to use data for business intelligence

(BI) i.e. This analysis helps in taking right decisions for HR planning.

Q9.

CORE BANKING SYSTEM:

- (i) Banks can no longer continue to use legacy applications.
- (ii) Nowadays, most banks use core banking applications to sustain their operations where CORE stands for "CENTRALIZED ONLINE REAL-TIME ENVIRONMENT".
- (iii) core banking system may be defined as the set of basic software components that manage the services provided by a bank to its customers through its branches (branch network).
- (iv) The absolute bank's branches access applications from centralized data centers.
- (v) Normal core banking functions will include deposit accounts, loans, mortgages and payments.
Banks make these services available across multiple channels like ATMs, internet banking, and branches.
- (vi) The various elements of core banking include:
 - a) Making and servicing loans
 - b) opening new accounts
 - c) processing cash deposits and withdrawals.
 - d) processing payments and cheques.
 - e) calculating interest
 - f) customer relationship management (CRM) activities.
 - g) Managing customer accounts
 - h) Establishing criteria for minimum balances, interest rates, no. of withdrawals allowed etc.,
- (vii) Example of major core banking products includes:
 - (i) infosys finacle, nucleus finnone and oracle's flex cube application.

Q10: Accounting information system (AIS):

Accounting information system is defined as a system of collection, storage and processing of financial and accounting data that is used by decision makers.

AIS is generally a computer based method for tracking accounting activity in conjunction with information technology resources.

The resultant statistical report can be used

internally by

↓
Management

externally by

↓
other interested parties

like investors, creditors etc..

It helps an organization in achieving its goal.

key components / Elements of AIS:

(i) people

(ii) procedure and instructions

(iii) data

(iv) software

(v) information technology infrastructure

(vi) internal controls.

Q11: Artificial intelligence:

Artificial intelligence (AI) is the distinct area of computer science focusing on creating machines that tries to imitate aspects of human behaviour like human thinking, communication and recognition characteristics etc.,

The decisive object of AI is to make a computer that can discover, sketch, and crack problems in parallel.

Artificial intelligence is manmade and its level of activity depends on the programming capability.

It is a mechanism that is not subject to human feelings like fatigue, worry etc.,

The subject of artificial intelligence spans a wide horizon dealing with various kinds of knowledge representation schemes, different techniques of intelligent search, various methods for resolving uncertainty of data and knowledge, different schemes for automated machine learning and many others.

some of the various purposes on which AI may be applied are:

- (i) Expert systems
- (ii) pattern recognition
- (iii) Natural language processing
- (iv) voice recognition systems
- (v) voice synthesizers. etc.,

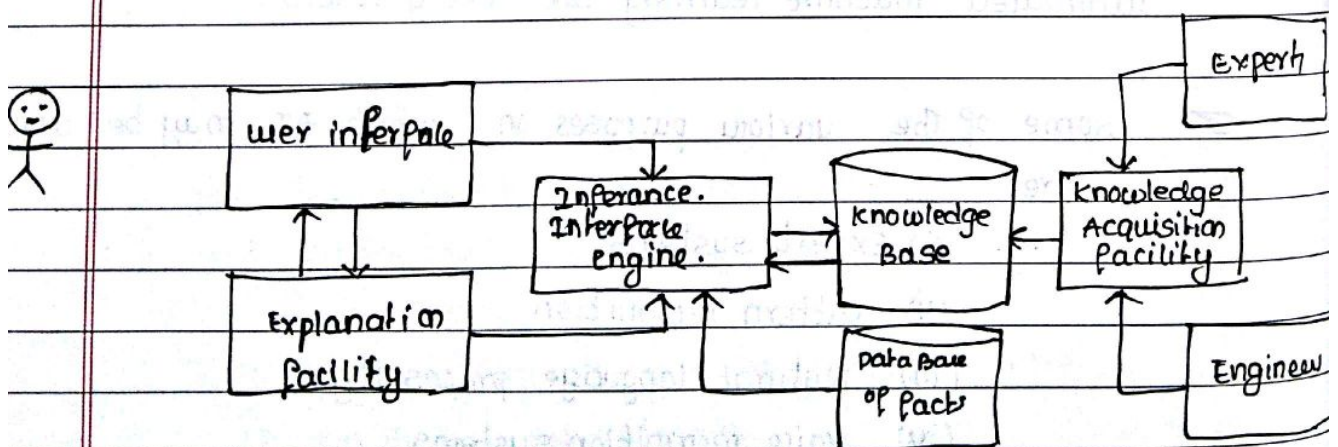
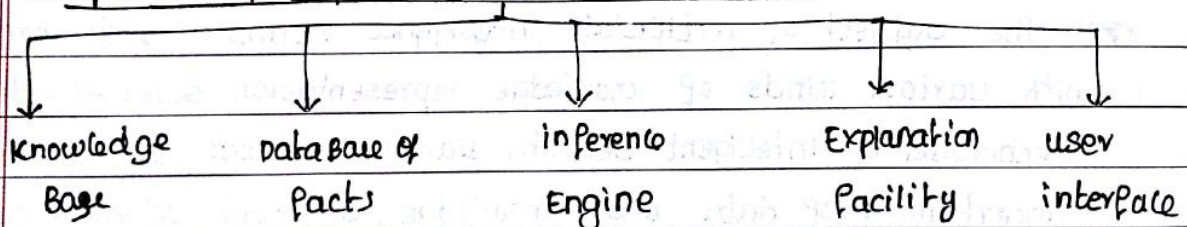
Q12: Expert system: [ES]

An expert system (ES) is a computerized information system that allows non-experts to make decisions,
 ↳ comparable to those of an expert.

→ The aim of The expert system is to have a team of seasoned specialists holding industry wide experience, who further spread across implementations like in -

- * defence
- * Government
- * Finance
- * Telecom and
- * Engineering sectors

components of expert system are as follows:



(i) Knowledge Base:

→ Knowledge Base contains the past knowledge of experts for problem solutions in an organized manner.

→ A Knowledge Base in a computer is equal to the knowledge of an expert (or) group of experts developed through years of experience in their field.

→ The knowledge base of expert system encloses both realistic and heuristic knowledge.

(ii) data base of facts:

This holds the user's input about the current problem.

(iii) Inference Engine:

It contains various rules and logics to arrive at solution for the problem provided by the users by matching the pre-existed problem solution from knowledge base.

(iv) → Inference Engine is the most important component of expert system;

it is like a search engine.

(iv) Explanation Facility:

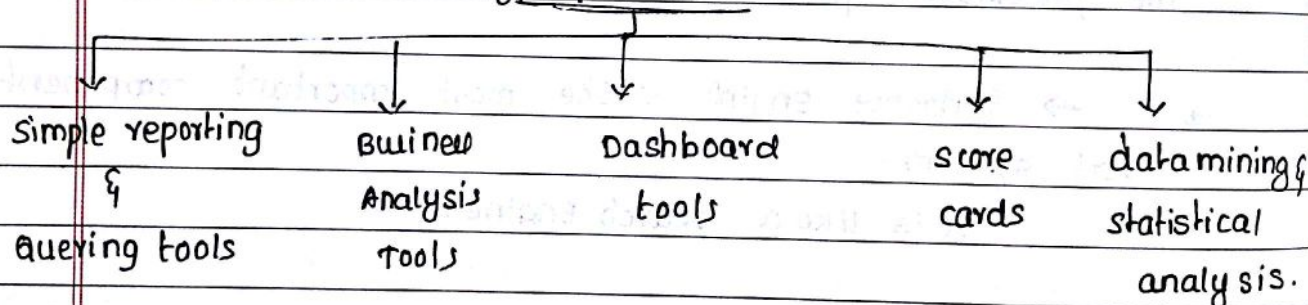
It is like a reporting system, it provides explanation of logics to users for solution given by expert system.

(v) user interface:

It is used to communicate with the expert system.

Q13: Business intelligence & BI tools:

- Business intelligence is an emerging concept in the today's complex Business environment.
- BI can primarily be described as a technique which provides useful information to decision makers automatically by scanning internal and external database of organizations.
- we can say BI is closely linked with datamining technique.
- BI software provide knowledge (or) useful information in real time to reduce the cost of managing Business and Business processes.

Type of BI Tools

(i) simple Reporting and querying tools:

→ These tools are primarily related to simple search of required information and

Reporting of that information in useful form.

→ Such tools use data warehousing which provides appropriate responses to given data query.

→ Data warehousing technique helps to collect and store data from different sources in an organized form.

↳ This involves using the datawarehouse to get response to the query:

" Tell me what happened "

(ii) Business Analysis:

↳ This involves using the data to get response to the query

" TELL ME WHAT HAPPENED AND WHY "

→ This category of tools is an advanced form of Reporting and querying tools.

→ Reporting and querying tools present information in rows & column But These tools provide information in a multidimensional manner

(iii) dash boards:

→ This involves using the information gathered from the data warehouse and making it available to users as Snapshot of many different things.

→ dashboard is a flexible tool and it can be configured as per users requirements.

→ dashboard is like mobile phone screen having different icons at one place.

(iv) Score cards:

→ score card's represents "organization's key matrix and graphics for organizations performance indicators".

→ In addition,

"it provides mapping of these indicators with organization's strategic goals and objectives".

→ This helps to know how an individual, Business unit (or) organization as a whole is performing.

(v) Data mining (or) statistical data analysis:

→ This technique automatically provides useful information which can be helpful to management for decision making

→ Data mining and statistical analysis tool converts a raw data into knowledge, not just in simple information.

→ This involves using statistical, artificial intelligence, and related techniques,

To mine through large volume of data and providing knowledge without asking questions to users.

Eg: finding information about a customer, who has interest in particular category of goods by looking at the purchasing pattern over the years.

Q:14Business reporting through MIS and IT:

Q15.

Access controls:

information system and its resources can have two types of Access:

Logical
Access



it is access of resource
Through programs (or)
applications.

physical
Access.



it is access of Resource through
access of harddisk, tape &
other disk devices etc.,

→ The information system and its resources should be made available to only authorized users.

Therefore,

it is very important that the information system & its resource should be protected from unauthorized users. / unauthorized access.

→ For the above purpose, there are two types of access controls.

Logical access
controls

Ex: password

physical access controls

Ex: Lockers.

⇒ importance of Access and privilege controls:

☞ Helps to provide access of software and system resources to authorized users.

☞ Helps to avoid unauthorised modifications and theft of information resources.

☞ Helps to provide information when required to authorized users.

☞ Helps to implement principle of "Least privilege" i.e., access of information as per user's rights.

⇒ Access controls help us to restrict "WHOM AND WHAT ACCESS" for information resources:

There are 4 key functions which help to enforce access to authorized users only.

(i) identity management

(ii) Authentication

(iii) Authorization

(iv) Accountability.

(i) identity management:

identity management consists of one (or) more processes to verify the identity of a subject, attempting to access an object.

→ This is providing an unique id (or) identity to user's for access of resources.

→ An identity is normally a combination of id and password for access of information system & resources.

(ii) Authentication:

Authentication is the process of "verifying a subject's identity at the point of object access"

in other words:

Authentication is the process of verifying user's identity when user wants to access information system

(iii) Authorization:

→ once an information system resource (or) network verifies a user's identity,

↳ The process of determining what resources that the user can access.

→ Authorization identifies what systems and network resources a user (object) can access.

(iv) Accountability:

Each step from providing identity through authentication & authorization is logged (or) recorded into the system.

They provide insight into how well the access control process is working.

Q16: Approaches to access control:

There are two major approaches to access controls:

Role-Based Access
control (RBAC)

Rules Based Access
control (RAC)

* RBAC:

In this access for resources is assigned to the role rather than an individual.

For Example,

A manager is given access for his role and when that manager leaves then access rights are deleted and similar rights are assigned to new manager who joins.

* RAC:

RAC uses specific rules that indicate what can and cannot happen between a subject and an object.

For example

A manager can approve hours worked for juniors assigned to him but he cannot approve his timesheet/hour for juniors who are not assigned to him.

Q17: principle of least privilege:

→ The principle of least privilege is the fundamental principle of information security.

→ This describes that only those privileges (or) access rights should be granted to user's which are essential to user's work i.e., whereas possible user should be given the least privileges.

For Example:

A backup user does not need to install a software; Hence the backup user has right only to run backup and backup related applications, Any other privileges, such as installing new software, should be blocked.

Q18: various payment mechanisms:

major types of electronic payments are

- (i) credit card
- (ii) Electronic cheque
- (iii) smart cards
- (iv) Electronic purse.

(i) credit cards

→ In a credit card transaction, The consumer presents preliminary proof of his ability to pay, by presenting his credit card to the Merchant.

→ The merchant can verify this with the Bank and create a purchase slip for the customer to endorse.

→ The merchant then uses this purchase slip to collect funds from the Bank and

→ Then the customer receives a statement from the Bank with a record of the transaction, on the next billing cycle.

→ In a credit card transaction, the steps involved are

- (i) Authorisation
- (ii) batching
- (iii) clearing and
- (iv) funding.

(i) Authorisation:

This is the first step in processing a credit card. After a merchant swipes the card, the data is submitted to the merchant's Bank, called an "ACQUIRER", to request authorization for the sale.

The acquirer ^{then} routes the request to the card issuing Bank, where it is authorized, then the merchant is allowed to process the sale.

(ii) Batching:

→ This is the second step in processing a credit card.

At the end of the day, the merchant reviews all the day's sales to ensure that all of them were authorized and signed by the cardholder.

→ It then transmits all the sales at once, called a batch, to the acquirer to receive the payment.

(iii) clearing:

After the acquirer receives the batch, it sends it through the card network, where each sale is routed to the appropriate card issuing Bank.

The issuing Bank then subtracts its interchange fees, which are shared with the card network and transfers the remaining amount to the acquirer.

(iv) Funding:

After receiving the payment from the issuer, the acquirer subtracts its fee and sends the remaining to the merchant.

(ii) Electronic cheques:

- ✓ An electronic cheque has all the features as a paper cheque.
- ✓ It acts as a message to the sender's bank to transfer funds.
- ✓ Like a paper cheque, the message is first given to the receiver, who in turn endorses the cheque and presents it to the bank to obtain funds.
- ✓ They provide for electronic method of presenting, endorsing and delivery of cheques with adequate security.
- ✓ Electronic cheques are also known as e-cheques.
- ✓ This means that instead of paper cheque the customer fills out their information (Acc-No, card No, cur etc) online.
- ✓ In a more simple language an e-cheque is an electronic version of a paper cheque.
- ✓ It can be used in any transactions where paper cheques are used - But provide processing with speed.

(iii) smart cards:

→ smart card contains an embedded microchip instead of a magnetic strip used in credit/debit cards.

→ The chip contains all the information as magnetic strip contains but offers the possibility of manipulating the data & executing applications on the card.

→ smart cards may also be used as electronic wallets.

Types of smart cards:

3 types

↓
contact cards

↓
contactless cards

↓
combi/hybrid cards

(i) contact cards:

This type of cards need to be inserted into the reader machine for payment.

(ii) contactless cards:

This type of cards does not need to be inserted into the reader, these just need to be waved in front of reader.

(iii) combi cards:

It is a combination of contact & contactless card technology.

Ex:

(iv) Electronic purses:

- Electronic purse is yet another way to make payments over the internet.
- It is very similar to pre paid card.
- while making purchases, customer pass their cards through a vendor's point of sale terminal.
- No credit cheque (or) signature is needed.
- validation is done through a personal identification Number [PIN]
- once the transaction is complete, funds are deducted directly from the card and transferred to vendor's terminal.
- customer can load additional funds to their card through appropriate channels.