

Q.1. What is BI?

→ Business intelligence is a technology-driven process for analyzing data and delivering actionable information that helps executive, managers and workers make informed business decisions.

The ultimate goal of BI initiative is to drive better business decisions that enable organizations to increase revenue, improve operational efficiency and gain competitive advantages over business.

Q.2. Leveraging data and knowledge for BI.

→ Leveraging data and knowledge for Business intelligence is crucial for organizations looking to make informed decisions, gain a competitive edge, and improve overall performance.

Leveraging data gain insights that help you understand customer sentiment.

- Key steps and strategies :

- i) Data Collection : Identify data sources.
- ii) Data integration : combining data
- iii) Real-time data ;
- iv) Data cleaning and preparation ;
- v) Data storage : choose appropriate data storage sol.
- vi) Data Analysis : Business Intelligence strategy
- Vii) Continuous Improvement.

Q.3. BI Components :

→ BI involves various components working together to help organizations make informed decisions and gain insights from their data. Here are key components...

- i) Data source : origins of data
- ii) Data Integration : The process of collecting, cleaning and transforming data. This step ensures data quality & consistency.
- iii) Data Warehouse : A central platform (repository) where the collected data is stored.
- iv) ETL (Extract, Transform, Load) : ETL process involve extracting data from Source System & transform into desired format and loading into data warehouse.
- v) Data Modeling : Designing structure of data within Data warehouse to enable efficient querying and reporting.
- vi) Data Analysis Tools : These tools allow users to analyse the data.

Q.4. Business Intelligence and Business Analytics

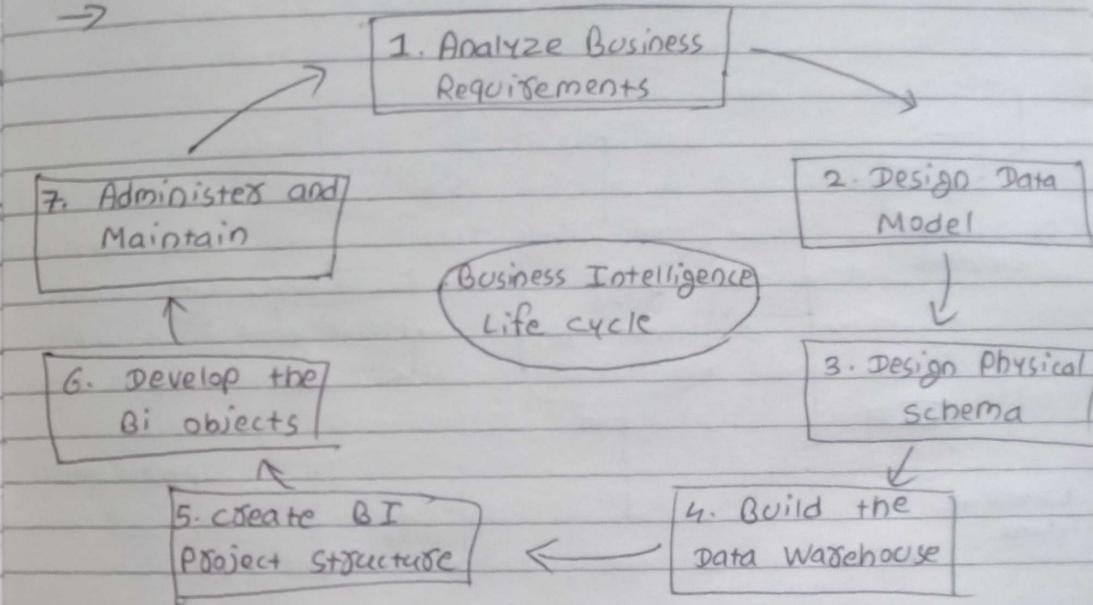
→ Business intelligence

- i) Examines past and display to drive current business needs.
 - ii) To run current trade operations.
 - iii) For current commerce operations.
 - iv) Tools are SAP Trade obj, QlikSense, TIBCO, PowerBI
 - v) Apply to all large-scale companies to run current commerce operations.
 - vi) Comes beneath Business Analytics.
 - vii) Key skills for business intelligence are Data Collection and Management, Data Stacking Concepts, Understanding of diverse data sources and exchange applications, Domain and business information.

Business Analytics

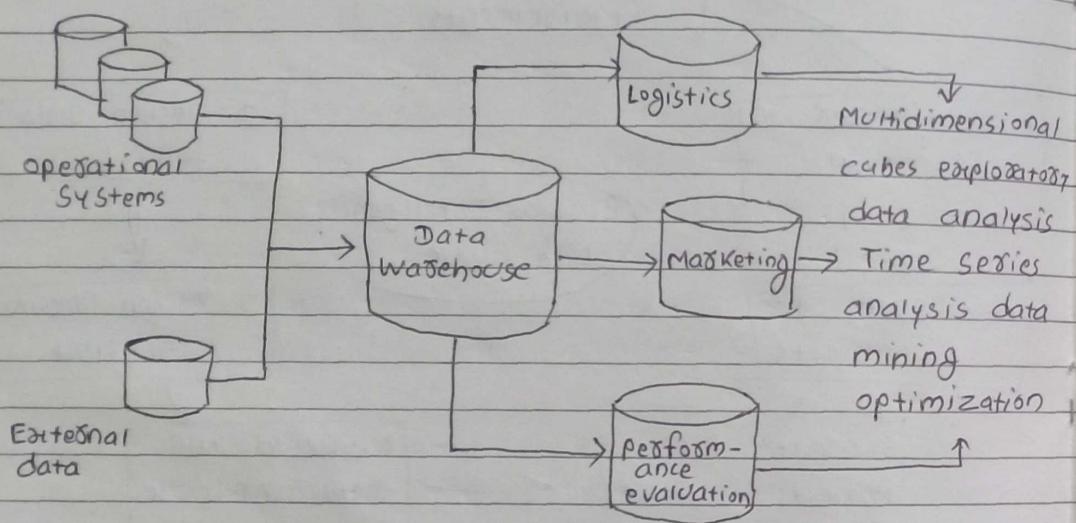
- i) Analyses past information to drive current business.
 - ii) To alter trade operation and move forward efficiency
 - iii) For future commerce operations.
 - iv) Tools are word handling, Google docs, MS Vision, MS office
 - v) Applies to companies where future development and efficiency as its objective
 - vi) Contains Data warehouse, data administration etc.
 - vii) Key skills for business Analytics, Get it your objectives, Good Verbal communication skills, The capacity to run partner meetings, Be a great listener, ~~Hone~~ Hone your introduction aptitudes.

Q.S. BI Life Cycle



Note: Read the above steps from Greeks for Geeks

Q.6. BI Architectures.



Effective decision:

a choice made based on accurate, comprehensive, and timely insights derived from data analysis, leading to positive outcomes for the organization.

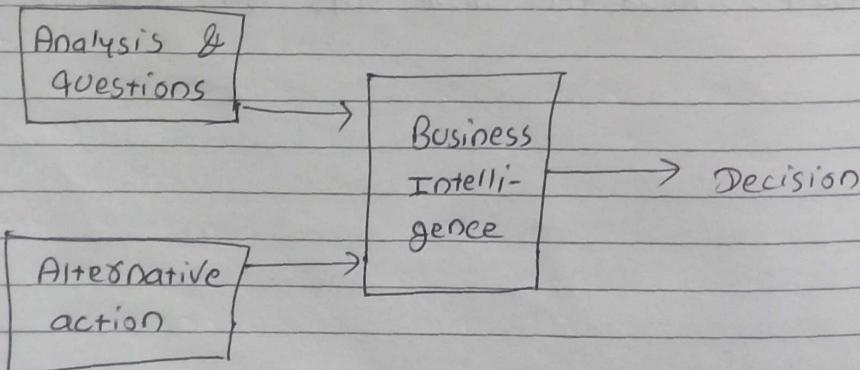
This goes beyond simply picking the option with the highest profit and lowest risk.

Timely decision:

a choice made at the optimal moment when it can produce the greatest impact or avoid potentially consequences.

It's not just about speed, but also about understanding the right timing to act.

Q.7. Effective and Timely decision:



Q.1. The role of mathematical models.

- Mathematical models play a significant role in transforming raw data into actionable knowledge.
- First, the objectives of the analysis are identified and the performance indicators that will be used to evaluate alternative options are defined.
- Mathematical models are then developed by exploiting the relationships among system control variable, parameters and evaluation metrics.
- Finally, what-if analyse are carried out to evaluate the effects on the performance determined by variations in the control variables and changes in the parameters.

Q.2. Enabling factors in BI projects.

- Some factors are more critical than others to the success of a business intelligence project: technologies, analytics and human resources.

i) Technologies : Hardware and software advancements have fueled the rise of BI:

Fast CPU's, Massive storage, Fancy visuals, Flexible tech.

ii) Analytics : Advanced analytics are the real brains behind BI. They predict trends, suggest actions, and optimize operations, taking you beyond just pretty picture to data-driven decisions that win.

iii) Human Resources : Sharp minds using data are more valuable than fancy tools. Invest in human skills like analysis, creativity, and adaption to unlock true data-driven advantage.

Q.3. What is business Ethics ?

→ - Business ethics in BI involves applying ethical principles to the collection, analysis and use of data within an organization. It's about using data responsibly, with consideration for both individual privacy and potential impact on society as a whole.

- The law usually sets the tone for business ethics, providing a basic guideline that businesses can choose to follow to gain public approval.

Q. 4 Development of a business intelligence System.

→

1st Phase Analysis

Identification of business needs

Design

Infrastructure recognition

2nd Phase

Project macro planning

Planning

Detailed project requirements

3rd Phase

Definition of the mathematical models needed

Identification of the data defn of data warehouses and data marts

Development of a prototype

Implementation and Control

Development of data warehouse and data marts

Last Phase

Development of ETL tools

Development of applications

Development of metadata

Release and testing

Q. 5 planning for Success Initiating a Program.

→ BI needs clear business goals, hard metrics, and top-down supports to avoid the graveyard of failed projects.

i) Senior-level sponsorship :

ii) High-level goals and expectations :

iii) Success metrics

iv) Creating a Partnership success stake

v) The Value Vision .

Q. 6 Business / Information Technology partnership :

→ In the world of BI it's not a solo show. The real magic happens when business and IT partners up to unleash the power of data.

i) Dichotomy :

a division or contrast between two things that are or represented as being opposed or entirely different.

ii) Partnering :

Partnering refers to the strong, collaborative relationship between business users and IT department working together to unlock the power of data and achieve shared goals.

Q.7. BI success factors.

- i) strong dedicated management
- ii) setting appropriate expectations.
- iii) Establishing metrics for success.
- iv) Building a strong team.
- v) Understanding the technology
- vi) proper data architecture
- vii) using quality information
- viii) Enterprise Integration.
- ix) Exploring Reuse.
- x) Managing Scope.

Q.9 Strategic versus Tactical planning.

→

- | Strategic | Tactical |
|---------------------|--------------------|
| - planning | - Doing |
| - Large scale | - Smaller scale |
| - Why | - How |
| - Difficult to copy | - easy to copy |
| - Long time frame. | - Short time frame |

Q.8 Team Building.

- i) Insist on Business Participation.
- ii) clarify Responsibilities.
- iii) Create Leadership Possibilities
- iv) Create an Ego-free culture.
- v) Cultivate Believability.
- vi) Maintain Diversity of opinion
- vii) Look for diversity of Technical skill
- viii) Keep Your Eyes on the prize

① definition of system :-

The term system is often used in everyday language for

a system refers to a comprehensive set of tools, technologies and processes used to gather, store, analyze and present data for informed decision-making

It enables organization to

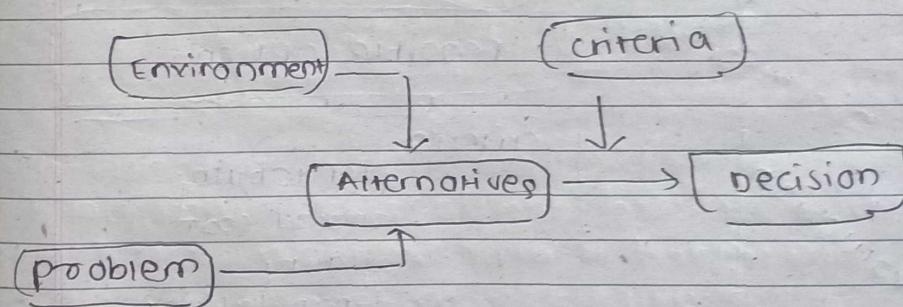
- Extract data
- transform data
- Analyze data
- present data

(Rationality of problem solving)

② Representation of decision making process

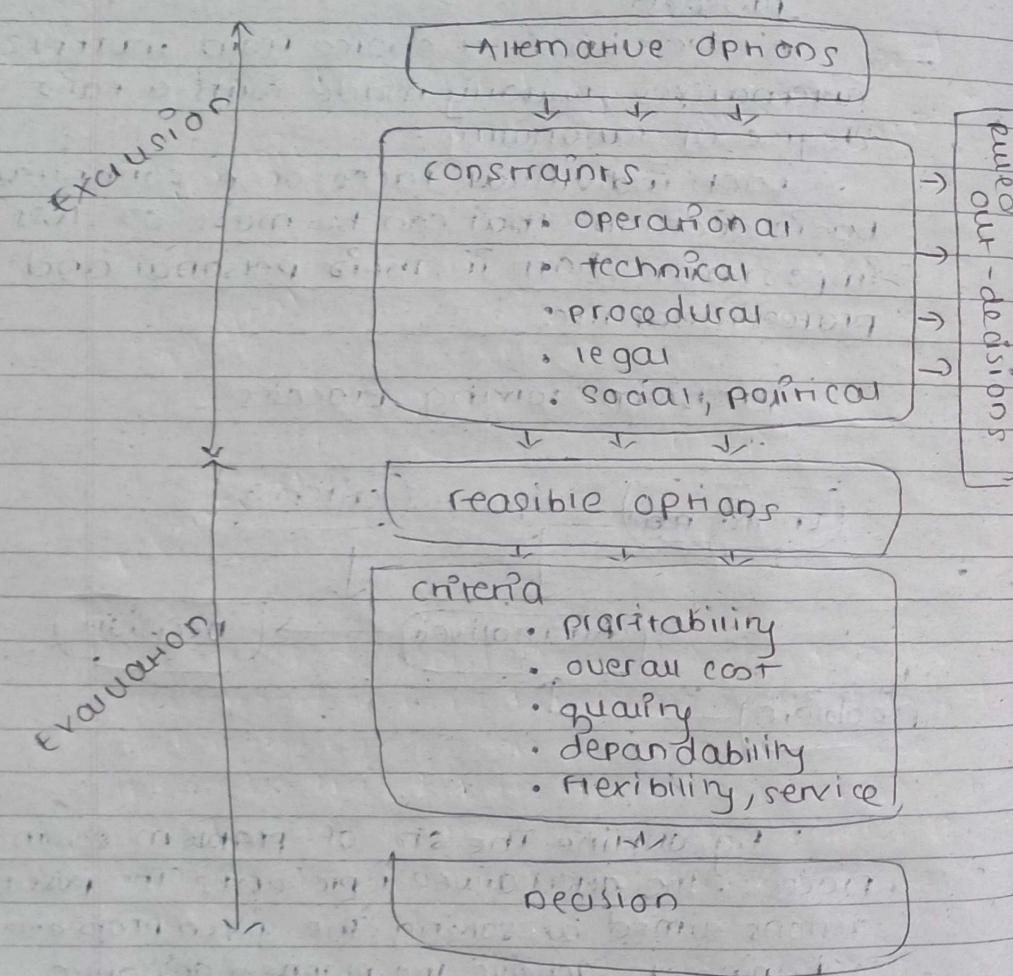
- • A decision is a choice from multiple alternatives, usually made with a fair degree of rationality.
- Each individual faces on a continual basis decisions that can be more or less important, both in their personal and professional life.

problem solving process

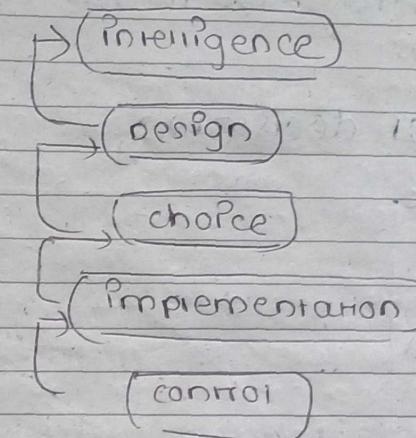


- fig outline the st of problem solving process. The alternatives represents The possible actions aimed at solving The given problem & helping to achieve the planned objective.

③ decision making process



→ Phases of decision making



① **Intelligence** - In this phase, the task of decision maker is to identify, circumscribe and explicitly define the problem that emerges in system under study.

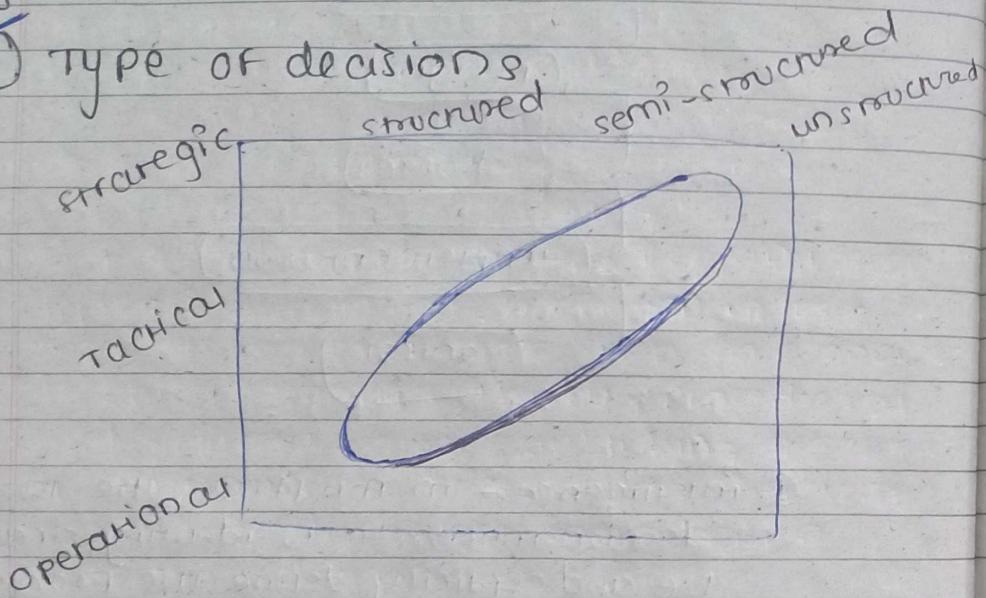
② **Design** - actions aimed at solving the identified problem should be developed & planned.

③ **Choice** - once the alternative actions have been identified, it is necessary to evaluate them on basis of performance criteria deemed significant.

④ **Implementation** - when the best alternative has been selected by the decision maker, it is transformed into actions by means of an implementation plan.

⑤ control - it checks if the satisfaction and effect of the action match the original intentions.

④ Type of decisions



a) structured decisions → A decision is structured if it is based on well-defined and recurring decision-making procedure. It can be traced back to an algorithm, which may be more or less explicit for decision making, & therefore better suited for automation.

b) semi-structured decisions → A decision is semi-structured when some phases are structured and others are not.

c) unstructured decisions → A decision is said to be unstr. if three phases of intelligence, design and choice are also unstructured.

d) strategic decisions → Decisions are strategic when they affect the entire organization or at least a substantial part of it for a long period of time.

e) tactical decisions → Tactical decisions affect only parts of an enterprise and are usually restricted to a single department.

f) operational decisions → affect only parts of an enterprise refer to specific activities carried out within an organization & have a modest impact on the future.

Question

(5) Approaches To decision-making process

-
- Rational approach
 - political-organizational approach
 - Absolute rationality
 - Bounded rationality
- a) Rational approach → when an rational approach is followed, a decision maker considers major factors such as economic, technical, legal, ethical, procedural and political, and establishing the criteria of evaluation so as to asses different options & then select best decision.
- b) political-organizational approach → when it is pursued, a decision maker proceeds in a more instinctual and less systematic way.
- c) Absolute rationality → This term refers to decision making process for which multiple performances indicators can be reduced to a single criterion, which therefore naturally lends itself to an optimization model.
- d) Bounded Rationality → it occurs when it is not possible to meaningfully reduce multiple criteria into a single objective.

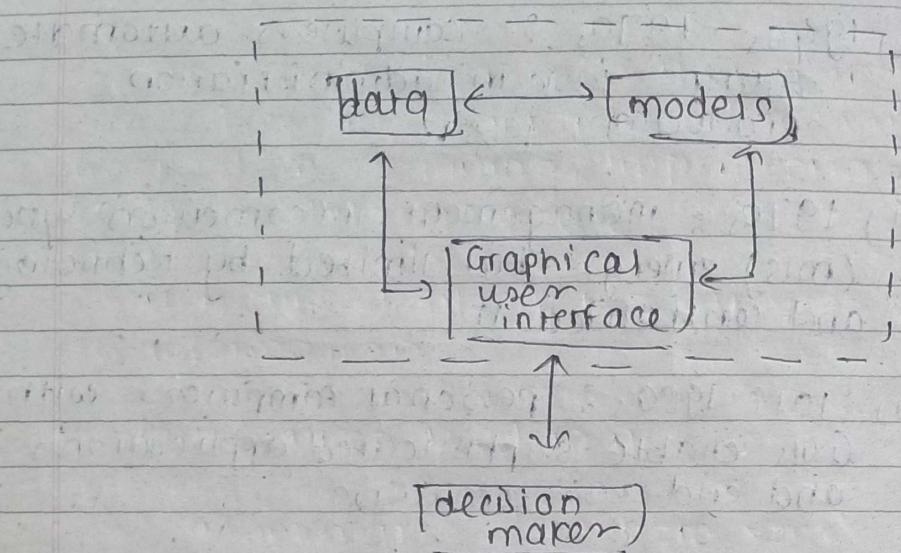
Question

(6) Evaluation of information systems

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- 1940s - 1970s : computers automate routine task in administration, production, R&D
 - 1970s : management information system (mis) emerge, but limited by technology and centralized IT
 - late 1980s : personal computers with GUIs enable sophisticated applications and end-user computing
 - 1980s - 1990s : decision support system, executive information system, strategic information system introduced
 - early 1990s - networked client-server architecture, data warehouse, and data marts emerge
 - late 1990s - "Business intelligence" term encompasses architecture, methodologies and models for data-driven decision making.

question

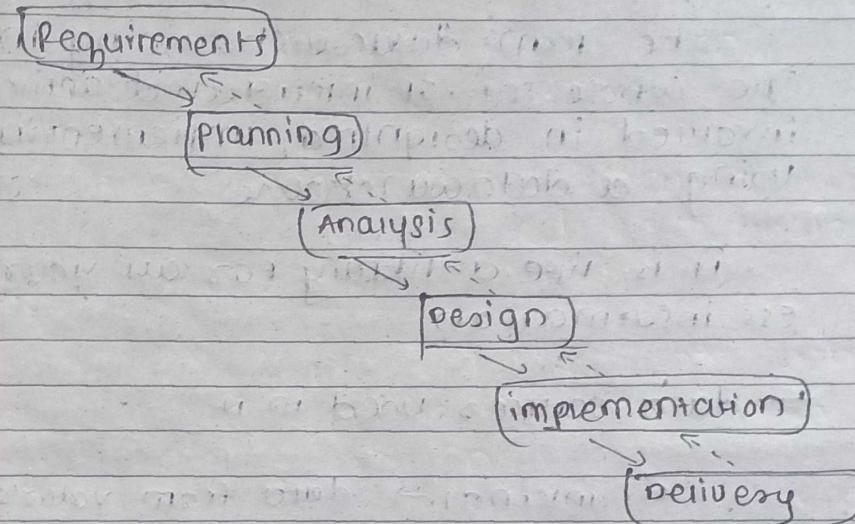
① definition of decision support system



defined as interactive computer system helping decision makers to combine data and models to solve semi structured and unstructured problems

question

⑧ Development of decision support system



① data warehouse

→ The term data warehousing indicates the whole set of interrelated activities involved in designing, implementing & using a data warehouse.

- It is like a library for all your business information.

❖ data sources used in it

(i) Internal → data from your company's operational system (ERP, accounting, sales, etc)

(ii) External → market research, industry trends, financial indicators, geographic data (GIS)

(iii) Personal → information and assessments stored by individual decision-makers in spreadsheets or local database

❖ Benefits

- a) better business insights
- b) informed decision making
- c) improved efficiency.

② datamarts → datamarts are like specialized mini-libraries within a larger data warehouse. They focus on providing specific departments or functions with the data they need most for their decision making.

❖ Benefits

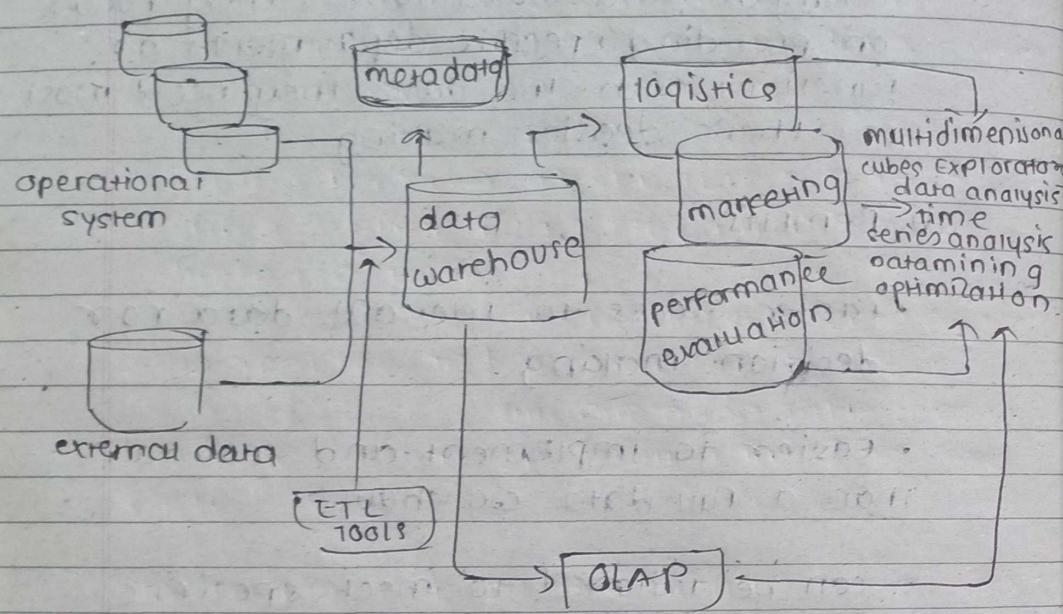
- Faster access to relevant data for decision making
- Easier to implement and maintain than a full data warehouse.
- can be tailored to meet specific departmental needs.

③ Data quality → Data quality is crucial for making accurate decisions based on insight from a datawarehouse.

• major factors affecting data quality.

- i) Accuracy - data must be correct
- ii) completeness - should have minimal missing values
- iii) consistency - should be consistent across sources
- iv) timeliness - should be updated regularly
- v) non-redundancy - avoid repetition
- vi) relevance - must be relevant
- vii) interpretability - clear & well documented
- viii) accessibility - easily accessible

④ Datawarehouse Architecture



⑤ ETL Tools → are librarians of the 'datawarehouse' world. They gather, organize, and shelve data so it's ready for analysis.

functions:

- ① Extract → gather data from various sources (internal database, external sources etc)
- initial extraction, keep warehouse empty
- incremental keep warehouse updated

② Transform - clean & prepare data for analysis

- correct inconsistencies and errors
- handle missing values
- remove duplicates

③ Load - place the transformed data into the datawarehouse for access & analysis.

⑥ metadata → metadata is like a library catalog for a datawarehouse. It provides essential information about the data, making it easier to understand, use & manage.

functions:

- Documentation → Describes the warehouse structure, dimensions, derived data & data marts
- Data genealogy → Track datasources & transformations applied
- Usage statistics → Record how often different fields & viewed are accessed
- General meaning → provides definition, data properties, ownership & loading policies

⑦ schemas used in datawarehouse

In datawarehouse schemas are blueprints for organizing and structuring data within a datawarehouse.

a) star schema → (i) structure: star-shaped with a central fact table surrounded by dimension tables.

(ii) Fact tables contains the core metrics and measure of business.

(iii) Dimension Table: describe attribute & levels of detail related to the fact table.

b) snowflake schema → similar to a star schema, but dimension tables are further normalized into sub-dimension tables.

c) fact constellation → most complex (galaxy schema)

structure with multiple fact tables and dimensions tables linked together in a web-like fashion.

⑧ cubes & multidimensional analysis

⑨ hierarchies of concept & OLAP operations

⑩ OLAP vs OLTP

Q.1. Data mining.

→ Data mining in BI also known as knowledge discovery in database is a powerful technique used to extract hidden patterns, trends, and relationships from large datasets.

Q.2. Models and Methods for data mining.

Q.3. Data mining, Classical Statistics and OLAP

→ i) Data mining :

- what it does : uncovers hidden patterns, trends, and relationships within large datasets, often using algorithms like regression, classification and clustering.
- Think of it as : A deep-sea exploration, diving into the depths of data to discover hidden treasure.
- Strengths : Powerful for predictive modeling, identifying anomalies, and finding previously unknown connections.
- Weaknesses : Requires more technical expertise, can be complex to interpret, can't find always patterns.

ii) OLAP : (Online Analytical Processing)

- what it does : Allows interactive exploration of multi-dimensional data from different perspectives, like product, region and time period.
- Think of it as : A helicopter tour, giving you a birds-eye view of your data landscape with the ability to zoom in specific areas.
- Strength : easy to use, helps to understand data relationships quickly.
- Weaknesses : Limited to analysing pre-defined dimensions, not ideal for uncovering completely new patterns.

iii) Classical statistics:

- what it does: uses established statistical methods like hypothesis testing, regression analysis, and ANOVA to measure relationships between variables and draw conclusions about population data.
- Think of it as: A scientific experiment, testing specific hypotheses using rigorous methods and providing well-defined statistical significance.
- Strength: provides reliable and interpretable results, adheres to statistical principles, and works well with smaller datasets.
- Weaknesses: can be time consuming, may not reveal unexpected patterns.

Q.4. Application of data mining

- i) Relational marketing.
- ii) Fraud detection
- iii) Risk evaluation
- iv) Text mining
- v) Image recognition
- vi) Web mining.
- vii) Medical diagnosis

Q.5. Data mining process:

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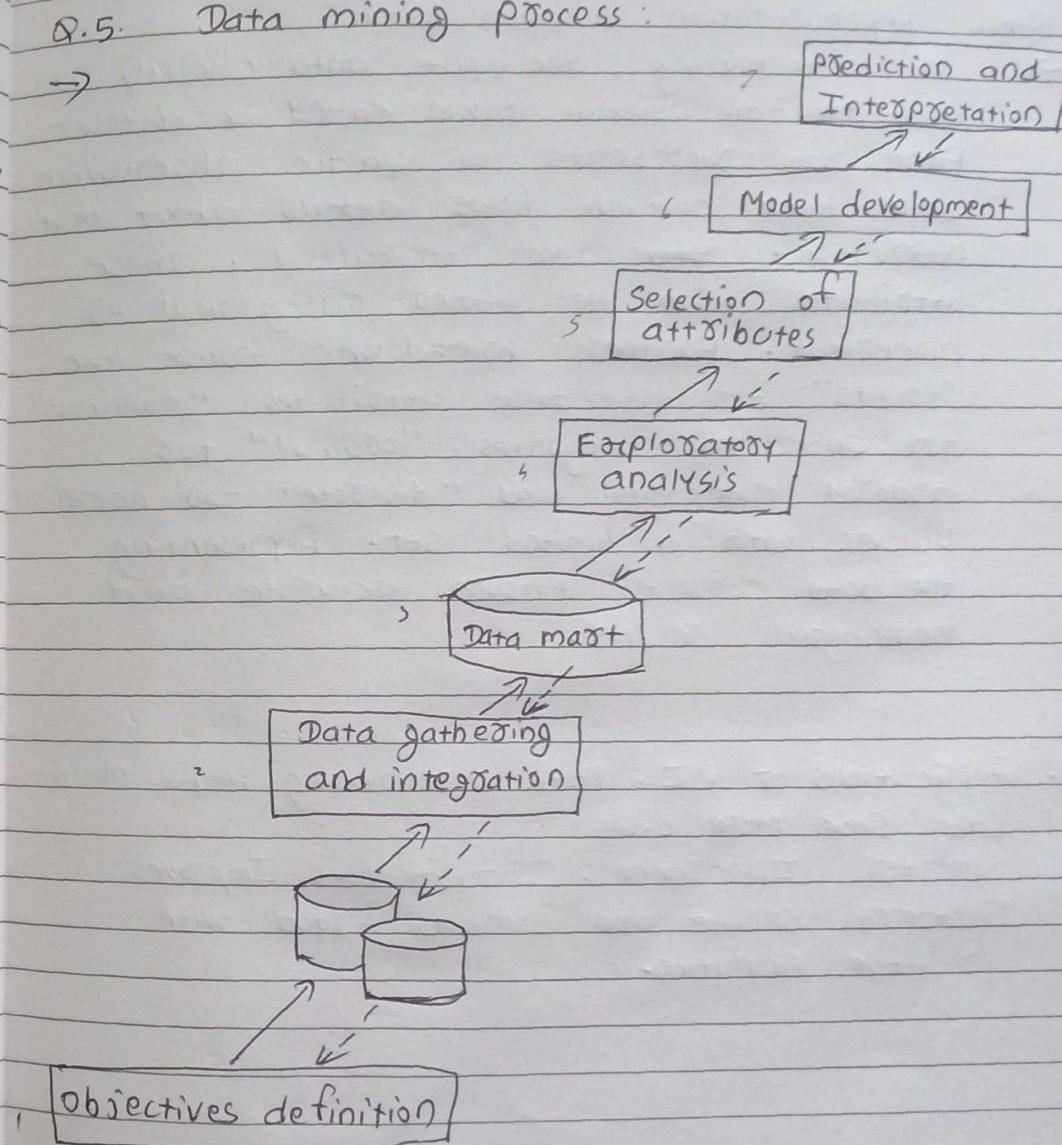


Fig. data mining process.

Q.6. Representation of input data.

→ In data mining, the input data usually sits in a two-dimensional table called a dataset. Each row represents a specific observation, while each column holds details about that observation (~~is~~ called attributes). These attributes can be either categorical or numerical. Further breakdowns exist, like "counts" for true/false attributes, "nominal" for unordered categories, "ordinal" for ordered categories, and "discrete" for numerical values with a limited set. Representing the data correctly ensures accurate and meaningful results.

Q. Applications of BI: Data Warehousing Helps Multi-Care Save More Lives.

Q. Smarter Insurance: Infinity P&C Improves Customer Service and Combats Fraud with Predictive Analytics.