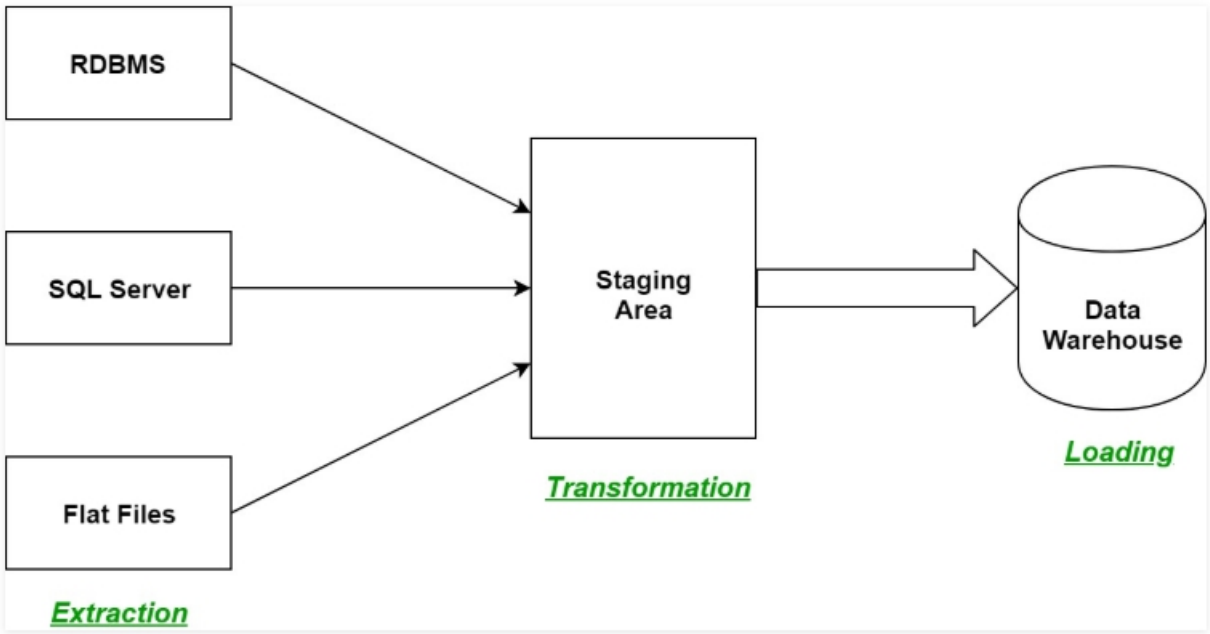
BI - UNIT II

1. Explain ETL process.



1. **Extraction:**

The first step of the ETL process is extraction. In this step, data from various source systems is extracted which can be in various formats like relational databases, No SQL, XML and flat files into the staging area. It is important to extract the data from various source systems and store it into the staging area first and not directly into the data warehouse because the extracted data is in various formats and can be corrupted also. Hence loading it directly into the data warehouse may damage it and rollback will be much more difficult. Therefore, this is one of the most important steps of ETL process.

2. **Transformation:**

The second step of the ETL process is transformation. In this step, a set of rules or functions are applied on the extracted data to convert it into a single standard format. It may involve following processes/tasks:

- Filtering – loading only certain attributes into the data warehouse.
- Cleaning – filling up the NULL values with some default values, mapping U.S.A, United States and America into USA, etc.

- Joining – joining multiple attributes into one.
- Splitting – splitting a single attribute into multiple attributes.
- Sorting – sorting tuples on the basis of some attribute (generally key-attribute).

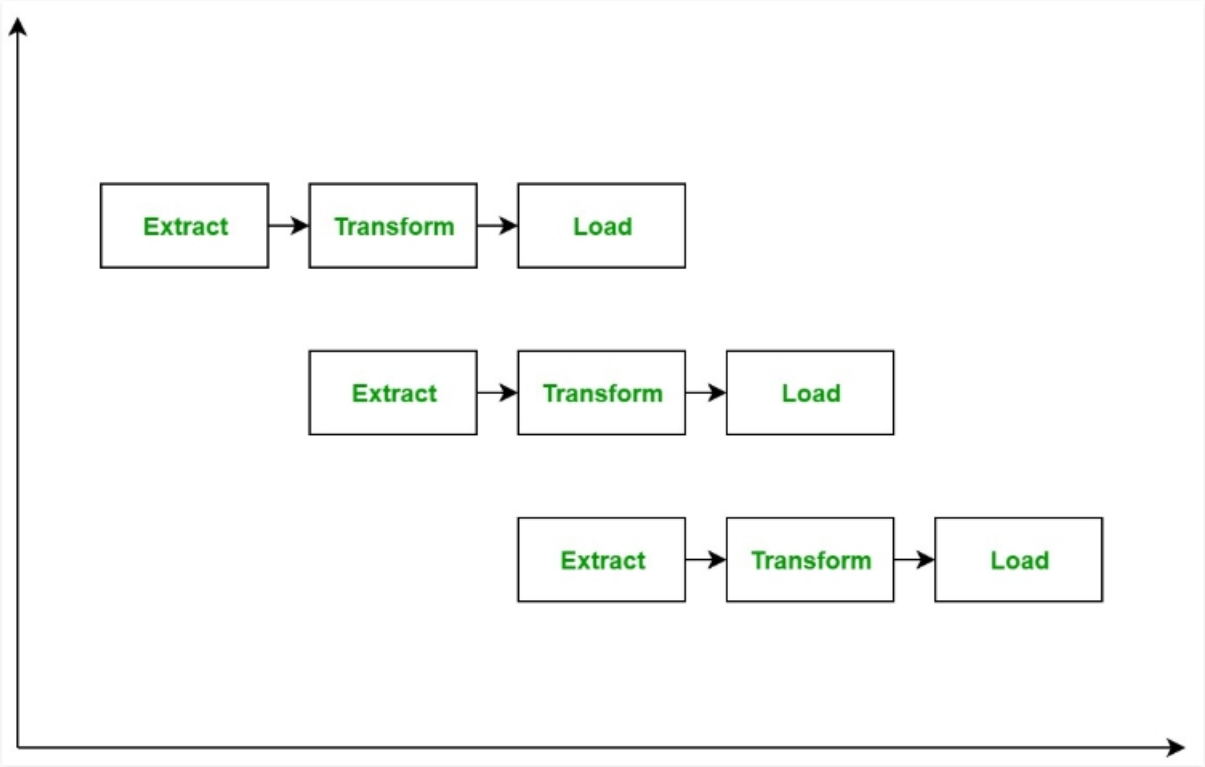
3. **Loading:**

The third and final step of the ETL process is loading. In this step, the transformed data is finally loaded into the data warehouse. Sometimes the data is updated by loading into the data warehouse very frequently and sometimes it is done after longer but regular intervals. The rate and period of loading solely depends on the requirements and varies from system to system.

ETL process can also use the pipelining concept i.e. as soon as some data is extracted, it can transformed and during that period some new data can be extracted. And while the transformed data is being loaded into the data warehouse, the already extracted data can be transformed.

ETL Tools: Most commonly used ETL tools are Sybase, Oracle Warehouse builder, CloverETL and MarkLogic.

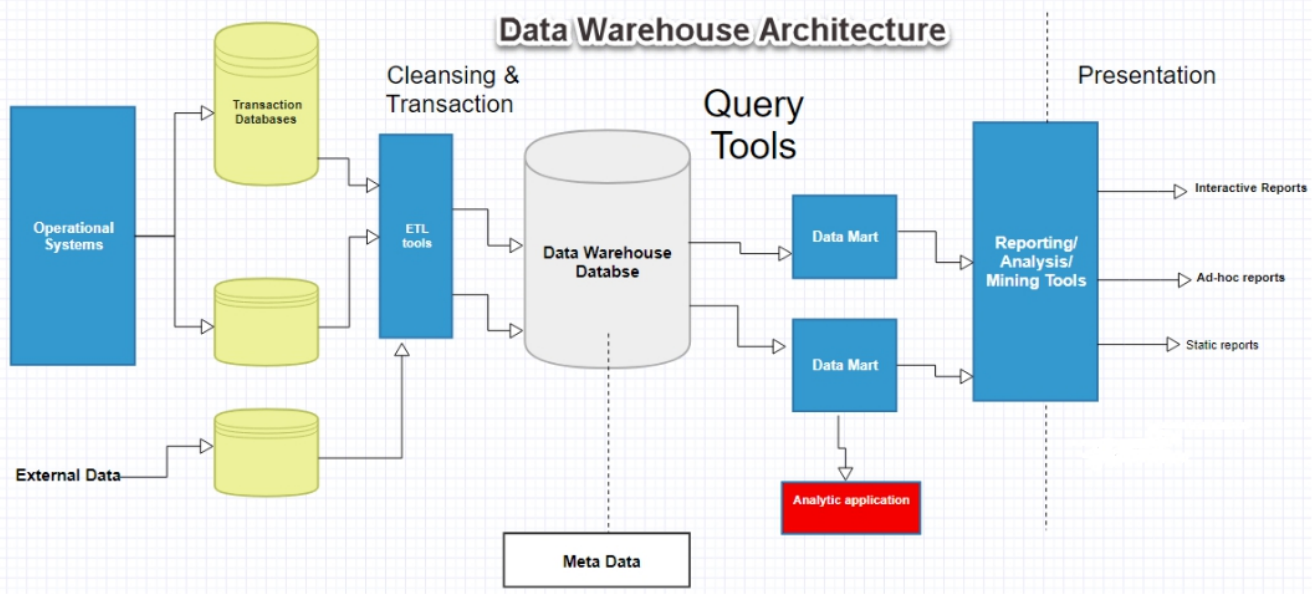
The block diagram of the pipe-lining of ETL process is shown below:



2. Explain the logical architecture of DWH.

Data warehouse is an information system that contains historical and commutative data from single or multiple sources. It simplifies reporting and analysis process of the organization.

It is also a single version of truth for any company for decision making and forecasting.



There are 5 main components :

1. Data Warehouse Database

The central database is the foundation of the data warehousing environment. This database is implemented on the RDBMS technology.

2. Sourcing, Acquisition, Clean-up and Transformation Tools (ETL)

The data sourcing, transformation, and migration tools are used for performing all the conversions, summarizations, and all the changes needed to transform data into a unified format in the data warehouse. They are also called Extract, Transform and Load (ETL) Tools.

3. Metadata

The name Meta Data suggests some high-level technological Data Warehousing Concepts. However, it is quite simple. Metadata is data about data which defines the data warehouse. It is used for building, maintaining and managing the data warehouse.

4. Query Tools

One of the primary objects of data warehousing is to provide information to businesses to make strategic decisions. Query tools allow users to interact with the data warehouse system.

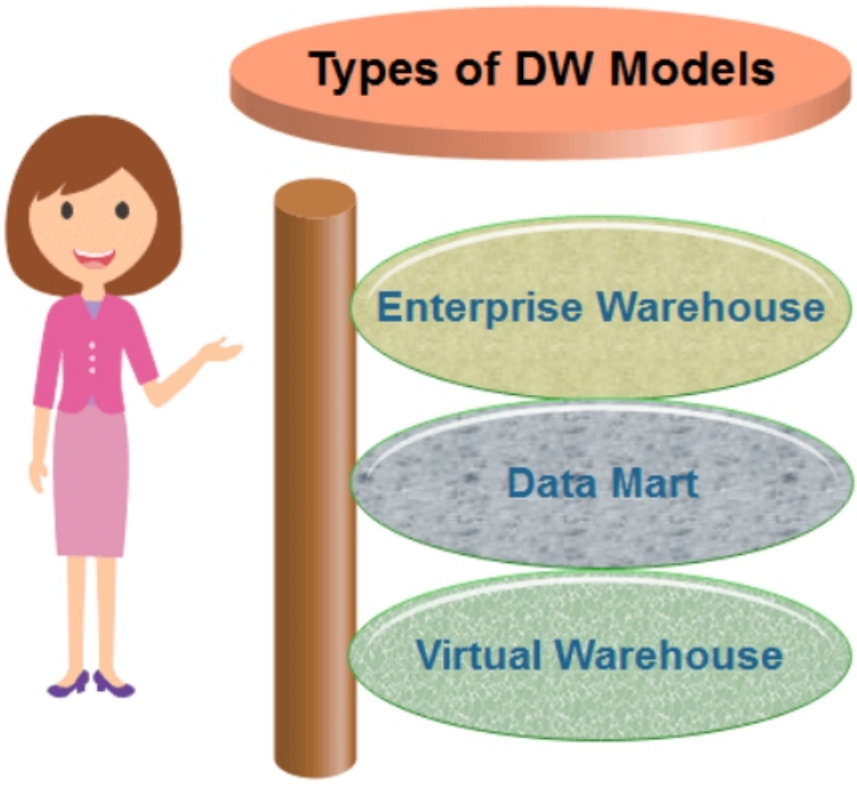
These tools fall into four different categories:

- Query and reporting tools
- Application Development tools
- Data mining tools
- OLAP tools

5. Data warehouse Bus Architecture

Data warehouse Bus determines the flow of data in your warehouse. The data flow in a data warehouse can be categorized as Inflow, Upflow, Downflow, Outflow and Meta flow.

3. DW models.



1. Enterprise Warehouse

An Enterprise warehouse collects all of the records about subjects spanning the entire organization. It supports corporate-wide data integration, usually from one or more operational systems or external data providers, and it's cross-functional in scope. It generally contains detailed information as well as summarized information and can range in estimate from a few gigabyte to hundreds of gigabytes, terabytes, or beyond.

An enterprise data warehouse may be accomplished on traditional mainframes, UNIX super servers, or parallel architecture platforms. It required extensive business modeling and may take years to develop and build.

2. Data Mart

A data mart includes a subset of corporate-wide data that is of value to a specific collection of users. The scope is confined to particular selected subjects. For example, a marketing data mart may restrict its subjects to the customer, items, and sales. The data contained in the data marts tend to be summarized.

Data Marts is divided into two parts:

Independent Data Mart: Independent data mart is sourced from data captured from one or more operational systems or external data providers, or data generally locally within a different department or geographic area.

Dependent Data Mart: Dependent data marts are sourced exactly from enterprise data-warehouses.

3. Virtual Warehouses

Virtual Data Warehouses is a set of perception over the operational database. For effective query processing, only some of the possible summary vision may be materialized. A virtual warehouse is simple to build but required excess capacity on operational database servers.