Big Data Assignment

1.Difference between map-reduce and Spark?

Map-Reduce and Spark are both distributed computing systems used for processing large amounts of data in parallel across a cluster of computers, but there are several differences between them. Here are a few key differences:

1. Processing Model: Map-Reduce uses a batch processing model where the data is processed in batches, whereas Spark supports both batch and streaming processing. This means that Spark can process data in real-time as it arrives, whereas Map-Reduce cannot.
2. Data Processing Speed: Spark is generally faster than Map-Reduce due to its ability to cache data in memory and process it in-memory rather than reading from and writing to disk. Spark also uses a DAG (Directed Acyclic Graph) execution engine, which optimizes the processing of data across a cluster of computers.
3. API: Spark provides a richer set of APIs and libraries for data processing and analysis than Map-Reduce, including support for SQL, machine learning, and graph processing. This makes it easier to use Spark for a wide range of use cases.
4. Memory Management: Spark has a more efficient memory management system than Map-Reduce, which allows it to cache data in memory and reuse it across multiple tasks. This makes Spark more efficient in handling iterative algorithms that require multiple passes over the data.
5. Fault Tolerance: Both Map-Reduce and Spark are fault-tolerant, but Spark has a more efficient fault-tolerance mechanism, which allows it to recover from node failures more quickly and efficiently than Map-Reduce. This is because Spark stores the lineage information of RDDs (Resilient Distributed Datasets), which helps in reconstructing the lost data in case of a node failure.

In summary, while both Map-Reduce and Spark are used for distributed data processing, Spark offers faster processing, a richer set of APIs, better memory management, and more efficient fault-tolerance mechanisms.

2.Difference between Flume and Scoop?

Flume and Sqoop are both tools used for data ingestion in Hadoop, but they differ in their approach to data ingestion and the types of data sources they support. Here are some key differences between Flume and Sqoop:

1. Data Sources: Flume is designed primarily for streaming data ingestion from sources such as log files, social media feeds, and machine-generated data, whereas Sqoop is designed for bulk data ingestion from structured data sources such as relational databases.
2. Approach to Data Ingestion: Flume uses a push-based approach to data ingestion, where the data source pushes data to the destination (Hadoop cluster). Sqoop, on the other hand, uses a pull-based approach where data is pulled from the source (relational database) and then loaded into Hadoop.
3. Parallelism: Flume is designed to ingest data in parallel across multiple agents and channels, which allows for efficient data ingestion from high-volume data sources. Sqoop, on the other hand, is designed for bulk data transfer in parallel, but the parallelism is limited by the number of mappers configured for a Sqoop job.
4. Data Transformation: Flume allows for data transformation and enrichment in-flight through the use of interceptors, which can modify or add metadata to the data. Sqoop, on the other hand, does not provide built-in support for data transformation, although transformation can be performed using external tools or scripts.

5. Integration with Hadoop Ecosystem: Flume integrates well with other components in the Hadoop ecosystem, such as HDFS, HBase, and Spark Streaming, making it easier to use Flume in various use cases. Sqoop, on the other hand, is primarily designed to work with Hadoop's HDFS and MapReduce components.

In summary, while Flume and Sqoop are both used for data ingestion in Hadoop, they differ in their approach to data ingestion, types of data sources supported, parallelism, data transformation, and integration with other components in the Hadoop ecosystem.

3.For below use case

- **You have database of 3 employment website. All resumes are in same template.**
- **Your task is to make 3 sheet. First one to extract the important data, second one is what transformation you perform, last one Entity relationship model.**

Source | Full Name | Address | Phone Number | Email Id | Skills | Experience | Projects Worked

Assessment – Every Sheet will have 10 points.

What technologies you would use to process them.

Collecting the data from different sources like LinkedIn, Naukri and Monster

Source	Full Name	Address	Phone Number	Email Id	Skills	Experience	Project Worked
LinkedIn	Teja Krishna	Kadapa	99XXXXX	teja@gmail.com	Python, SQL	0	None
Naukri	Prashant	Rajamundry	9XXXX	pra@gmail.com	SQL, python	5	Fake Account Detention
Monster	Jyosthna	Puttaparti	99XXX	joo@gmail.com	MI, AI, Deep learning	3	Model Building
LinkedIn	Tameem	Amalapuram	99XXXX	tams@gmail.com	SQL	0	None
LinkedIn	Mahendra	Hyderabad	80XXX	mahi@gmail.com	DS, AI	1	ML models
LinkedIn	Satyam	Patna	678XX	sat@gmail.com	SQL, PowerBi	2	Finance Dashboard
Monster	Manoj	Bangalore	567XXX	m@gmail.com	Python, SQL	0	None
LinkedIn	Rahul	Delhi	999XX	R@gmail.com	Tableau ,looker	1	HealthCare
Naukri	Lokesh	KGF	888XXX	LCU@gmail.com	Looker, Tableau	2	Finance Dashboards

Extracting the important data from the above raw data,

As the Source and Address columns are not important for the selection criteria we can filter that.

Important Data

Full Name	Phone Number	Email Id	Skills	Experience	Project Worked
Teja Krishna	99XXXXX	teja@gmail.com	Python, SQL	0	None
Prashant	9XXXX	pra@gmail.com	SQL, python	5	Fake Account Detention
Jyosthna	99XXX	joo@gmail.com	MI, AI, Deep learning	3	Model Building
Tameem	99XXXX	tams@gmail.com	SQL	0	None
Mahendra	80XXX	mahi@gmail.com	DS, AI	1	ML models
Satyam	678XX	sat@gmail.com	SQL, PowerBi	2	Finance Dashboard
Manoj	567XXX	m@gmail.com	Python, SQL	0	None
Teja	999XX	teja@gmail.com	Python, SQL	0	None
Lokesh	888XXX	LCU@gmail.com	Looker, Tableau	2	Finance Dashboards

Transformations Made on Data

- Remove unnecessary columns like Source, Address.
- Filter Out duplicate entries from multiple sources based on Email-Id.
- Delete all entries where skills don't match keywords.
- If the hiring is for 0-4years experienced candidates, above 4 years of experience will be skipped.
- Filter out candidates who have more than 4 years of experience."

Categorizing the obtained data

Persons: (Name, Email (Primary Key), Phone. No, Experience)

Person Skills (Email (foreign Key), Skills)

Person Projects (Email (Foreign Key),Projects)

Persons Table:

Full Name	Phone Number	Email Id
Teja Krishna	99XXXXX	teja@gmail.com
Jyostana	99XXX	joo@gmail.com
Tameem	99XXXX	tams@gmail.com

Mahendra	80XXX	mahi@gmail.com
Satyam	678XX	sat@gmail.com
Manoj	567XXX	m@gmail.com
Lokesh	888XXX	LCU@gmail.com

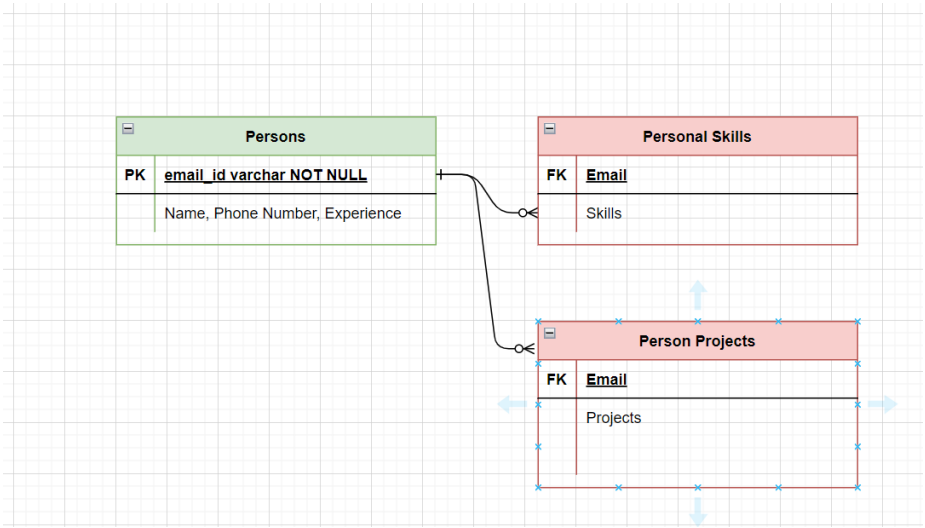
Person Skills:

Email Id	Skills
teja@gmail.com	Python, SQL
joo@gmail.com	MI, AI, Deep learning
tams@gmail.com	SQL
mahi@gmail.com	DS, AI
sat@gmail.com	SQL, PowerBi
m@gmail.com	Python, SQL
LCU@gmail.com	Looker, Tableau

Person Projects:

Email Id	Project Worked
teja@gmail.com	None
joo@gmail.com	Model Building
tams@gmail.com	None
mahi@gmail.com	ML models
sat@gmail.com	Finance Dashboard
m@gmail.com	None
LCU@gmail.com	Finance Dashboards

Entity Relationship Model:



Technologies Used:

Data Extraction/Ingestion Tools:

- Flume
- Kafka
- Sqoop

Data Transformation/Processing:

- Map-Reduce
- Spark