Apache Spark Assignment-1

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Q) Architecture of Spark.

Apache Spark is a distributed computing framework designed for large-scale data processing. Its architecture ensures high performance, scalability, and versatility, making it suitable for a wide range of data analytics tasks. Here's a breakdown of its key components:

1. **Core Components**:
    - **Driver**:
        a. The central coordinating entity that manages the SparkContext.
        b. Converts user-defined code into a Directed Acyclic Graph (DAG) of tasks and schedules their execution on worker nodes.
    - **Cluster Manager**:
        a. Allocates resources to Spark applications.
        b. Supported managers include Spark Standalone, Apache Mesos, Hadoop YARN, and Kubernetes.
2. **Execution Layer:**
    - **RDDs (Resilient Distributed Datasets)**:
        a. Immutable distributed collections of objects forming Spark's core abstraction.
        b. Operations on RDDs are lazy and only executed when an action (e.g., collect, count) is invoked.

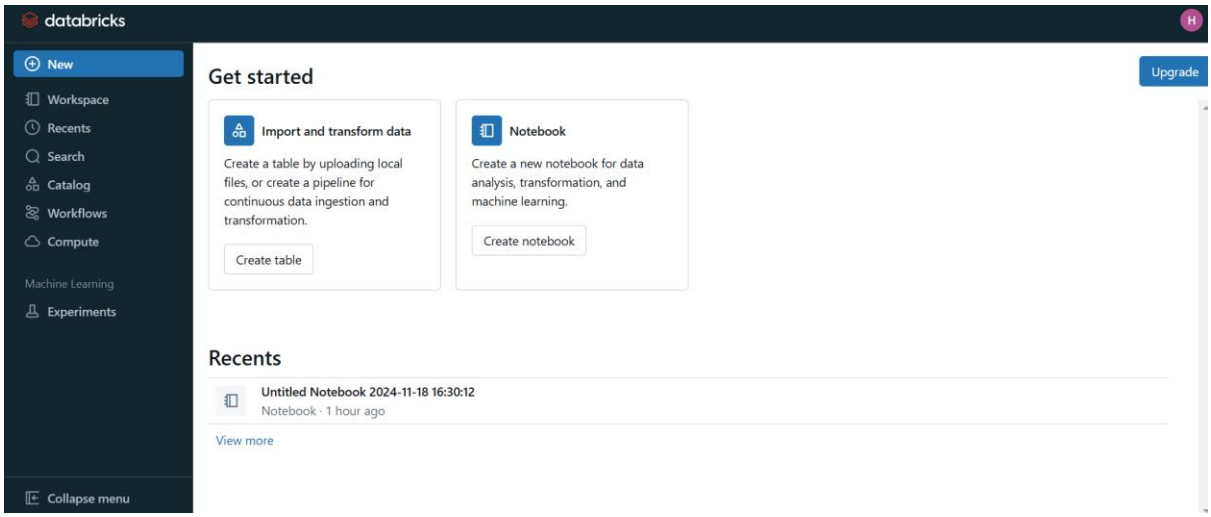
3. **Storage Layer**:
    - Spark supports in-memory storage for intermediate results, which accelerates iterative algorithms.
4. **Execution Modes**:
    - **Standalone Mode**: Spark runs independently with its cluster manager.

- **Cluster Mode**: Applications are deployed and managed using external cluster managers.
- **Local Mode**: Ideal for development and testing, everything runs on a single machine.

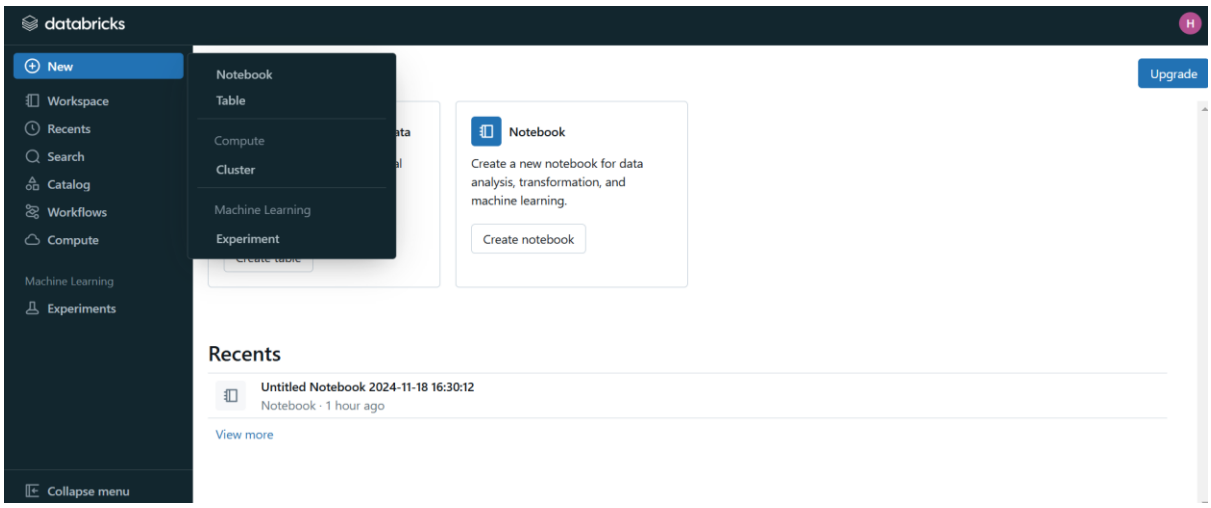
5. **Libraries and APIs**:
    - Built on the Spark Core, various libraries extend its functionality
    - Supports APIs in multiple languages (Scala, Python, Java, R).

Q) Steps of building a cluster in Spark.

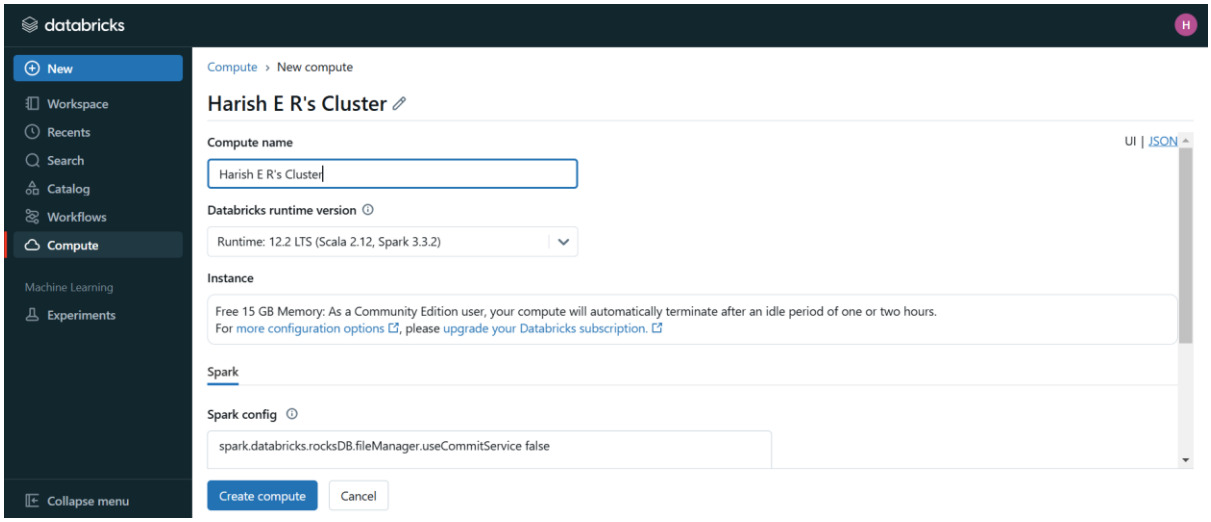
Step 1: **Login in the home page.**



Step 2: **Click on New -> Cluster:**



Step 3: **Create Cluster:**



Step 4: **View Cluster:**