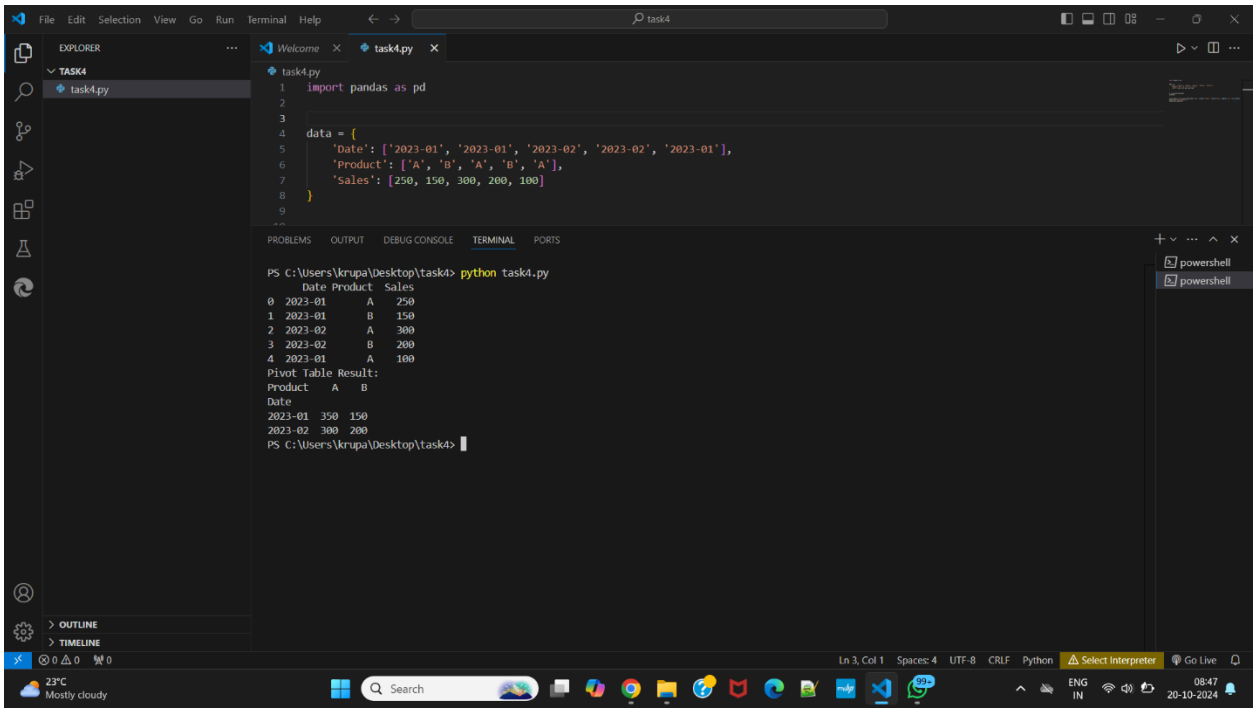
1. Task Description

Task Data manipulation

Use pandas' pivot and pivot_table functions to perform advanced data reshaping operations

2. Task Output Screenshot



3. Algorithms Used In Task :

1) Data Aggregation Algorithms:

Mean/Median Calculation: When using pivot_table(), the most common operation is calculating the mean or median of groups. Pandas internally runs an aggregation algorithm to compute these statistics across different groups.

Sum: Summing values in a grouped dataset is another common operation, which is performed efficiently using internal sum algorithms.

2) Sorting Algorithms:

Sorting Columns and Index: When reshaping the dataset using pivot(), pandas sorts the unique values of the columns to place them as headers. This uses sorting algorithms internally

3) GroupBy Operations:

- **GroupBy Algorithm**: Pandas implements an efficient algorithm to group rows based on certain keys (columns). This is a key step in both pivot() and pivot_table() when calculating summary statistics for each group of rows.

4) Sparse Data Handling:

- **Handling Missing Values**: When using pivot() or pivot_table(), pandas will fill in missing values (e.g., where no data exists for a particular combination of index and column). You can specify how missing values are handled using fill_value.

5. Memory Optimization Techniques for Big Datasets:

- **Chunked Processing**: For very large datasets, pandas uses algorithms that allow loading and processing data in chunks rather than all at once, optimizing memory usage.
- **Data Type Conversion**: Converting data types to more memory-efficient formats