Marwadi University	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Data Visualization and Dashboard (01CT0410)	**Aim: To perform blending among multiple tables using tableau**	
Experiment No: 09	**Date: 21-02-2024**	**Enrollment No: 92200133030**

Aim: To perform blending among multiple tables using tableau

IDE: Tableau

Theory:

It is often necessary to combine data from multiple places—different tables or even data sources—to perform a desired analysis. Depending on the structure of the data and the needs of the analysis, there are several ways to combine the tables.

Relationships vs Joins

The default method in Tableau Desktop is to use relationships. Relationships preserve the original tables' level of detail when combining information. Relationships also allow for context-based joins to be performed on a sheet-by-sheet basis, making each data source more flexible. Relationships are the recommended method of combining data in most instances. For more information, see How Relationships Differ from Joins.

However, there may be times when you want to directly establish a join, either for control or for desired aspects of a join compared to a relationship, such as deliberate filtering or duplication.

Common issues

- To view, edit, or create joins, you must open a logical table in the relationship canvas—the area you see when you first open or create a data source—and access the join canvas.
- **Published Tableau data sources cannot be used in joins.** To combine published data sources, you must edit the original data sources to natively contain the join or use a data blend.
- When joining tables, the fields that you join on must be the same data type. If you change the data type after you join the tables, the join will break.
- Fields used in the join clause cannot be removed without breaking the join. To join data and be able to clean up duplicate fields, use Tableau Prep Builder instead of Desktop

Create a join

1. To create a join, connect to the relevant data source or sources. See Connect to Your Data.

   These can be in the same data source (such as tables in a database or sheets in an Excel spreadsheet) or different data sources (this is known as a cross-database join). If you combined tables using a cross-database join, Tableau colors the tables in the canvas and the columns in the data grid to show you which connection the data comes from.

Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
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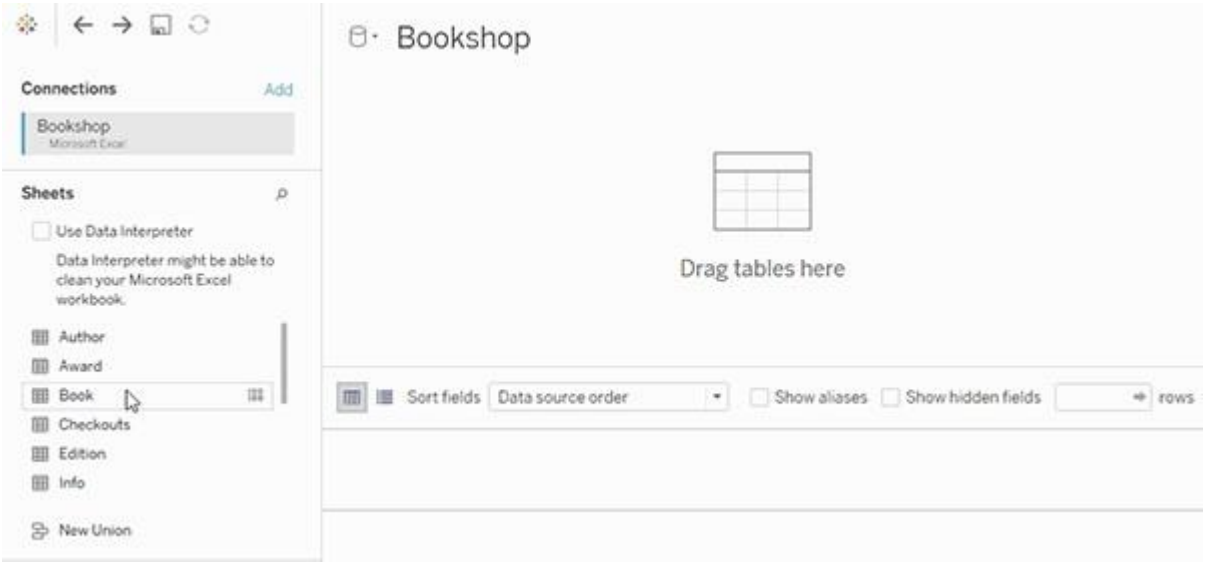
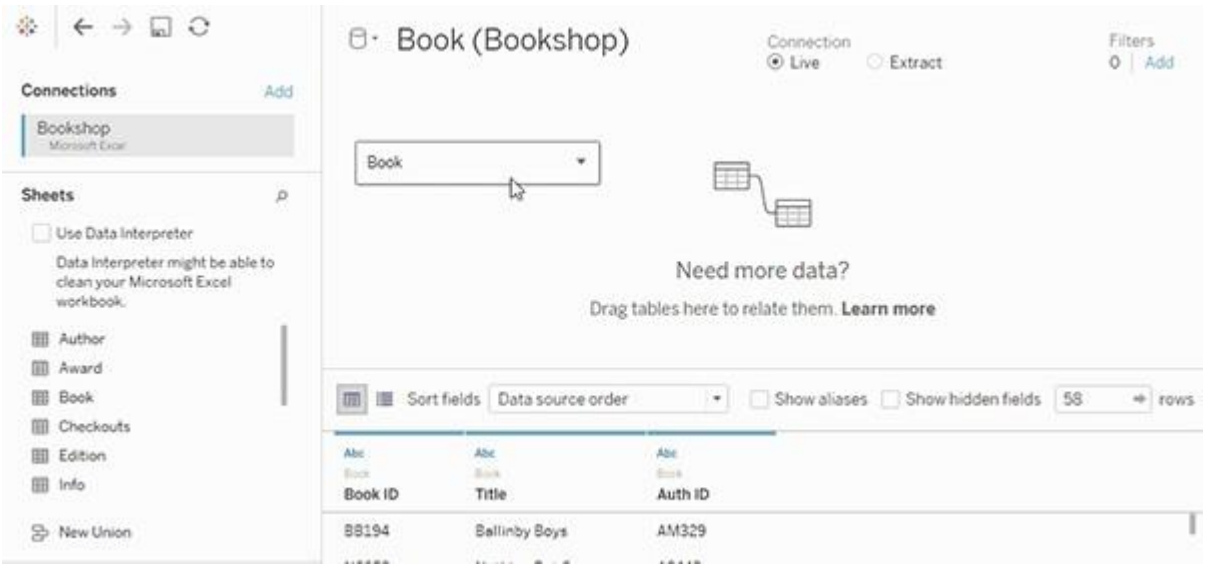
2. Drag the first table to the canvas.

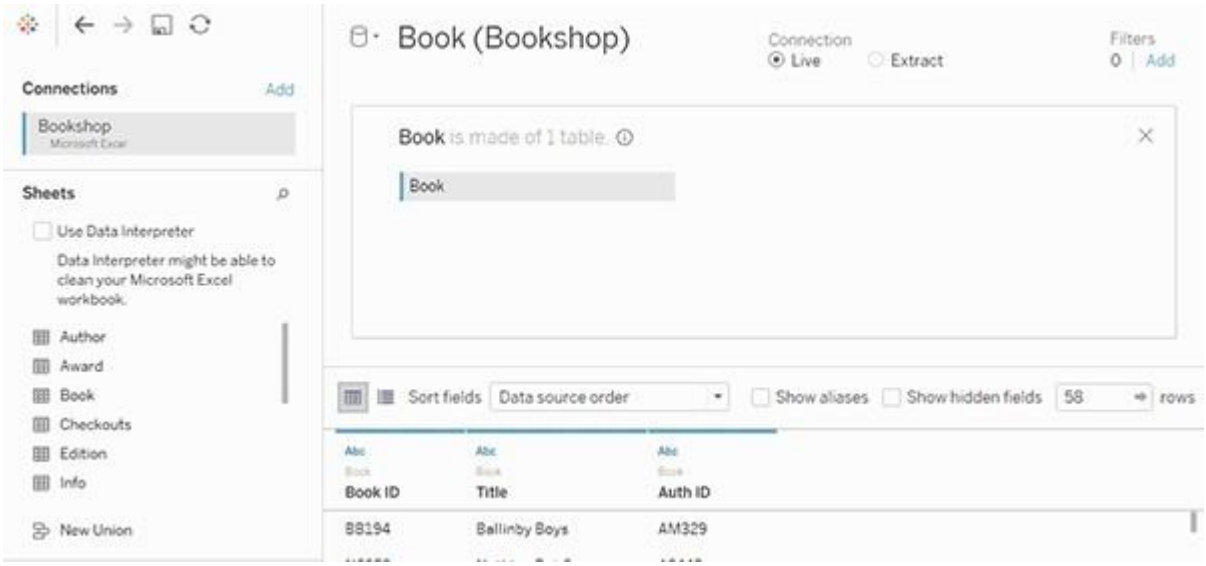


3. Select Open from the menu or double-click the first table to open the join canvas (physical layer).

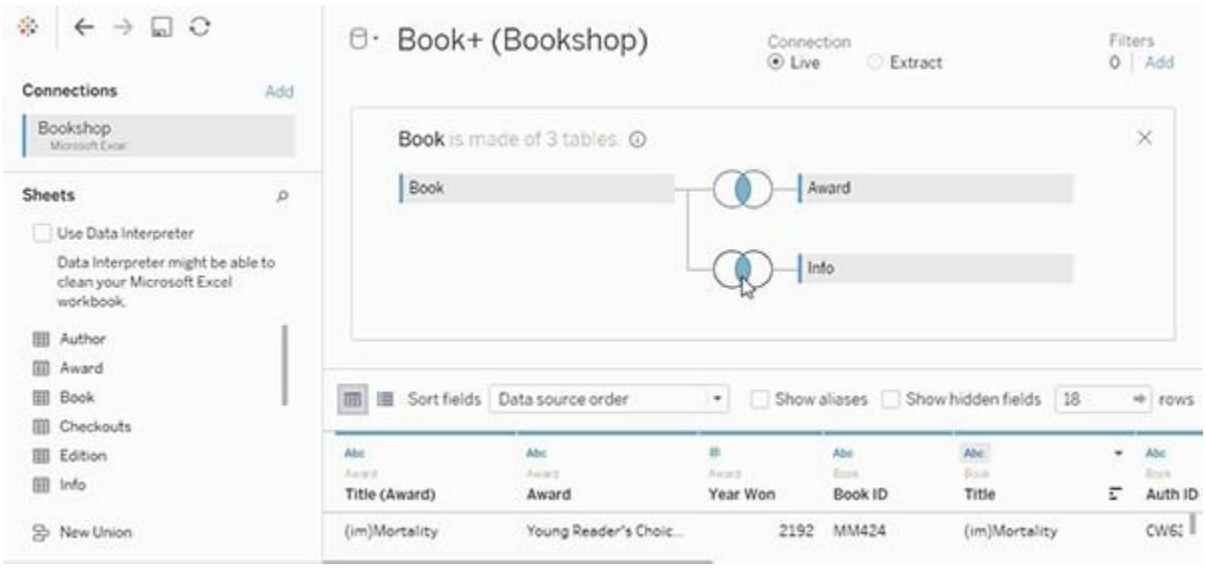


4. Double-click or drag another table to the join canvas.

Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Data Visualization and Dashboard (01CT0410)	**Aim: To perform blending among multiple tables using tableau**	
Experiment No: 09	**Date: 21-02-2024**	**Enrollment No: 92200133030**



5. Click the join icon to configure the join. Add one or more join clauses by selecting a field from one of the available tables used in the data source, choosing a join operator, and a field from the added table.



6. When finished, close the join dialog and join canvas.

Marwadi University	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
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Experiment No: 09	**Date: 21-02-2024**	**Enrollment No: 92200133030**

Join types

In general, there are four types of joins that you can use in Tableau: inner, left, right, and full outer. If you aren't sure what join type you want to use to combine data from multiple tables, you should use relationships.

Join Type	Result
Inner 	When you use an inner join to combine tables, the result is a table that contains values that have matches in both tables. When a value doesn't match across both tables, it is dropped entirely.
Left 	When you use a left join to combine tables, the result is a table that contains all values from the left table and corresponding matches from the right table. When a value in the left table doesn't have a corresponding match in the right table, you see a null value in the data grid.
Right 	When you use a right join to combine tables, the result is a table that contains all values from the right table and corresponding matches from the left table. When a value in the right table doesn't have a corresponding match in the left table, you see a null value in the data grid.
Full outer 	When you use a full outer join to combine tables, the result is a table that contains all values from both tables. When a value from either table doesn't have a match with the other table, you see a null value in the data grid.
Union 	Though union is not a type of join, union is another method for combining two or more tables by appending rows of data from one table to another. Ideally, the tables that you union have the same number of fields, and those fields have matching names and data types. For more information about union, see Union Your Data.

Marwadi University	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
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Experiment No: 09	**Date: 21-02-2024**	**Enrollment No: 92200133030**

Options to combine data

There are several ways to combine data, each with their own strengths and weaknesses.

Relationships are the default method and can be used in most instances, including across tables with different levels of detail. Relationships are flexible and adapt to the structure of the analysis on a sheet by sheet basis. However, you can't create relationships between tables from published data sources.

Joins combine tables by adding more columns of data across similar row structures. This can cause data loss or duplication if tables are at different levels of detail, and joins must be established before analysis can begin. You can't use a published data source in a join.

Blends, unlike relationships or joins, never combine the data directly. Instead, blends query each data source independently, aggregate the results to the appropriate level, then present the results together visually in the view. Because of this, blends can handle different levels of detail and also work with published data sources. Blends don't create a new, blended data source (and therefore can't be published as a "blended data source"). Instead, they are simply blended results visualized per sheet.

Pre Lab Exercise:

a. What is a join in Tableau?

b. How do you perform a join in Tableau?

c. What is the difference between data blending and traditional joins in Tableau?

Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
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Experiment No: 09	Date: 21-02-2024	Enrollment No: 92200133030

Tasks:

Perform the following tasks:

Task 1: Create two sheets with the same feature set

Results:-

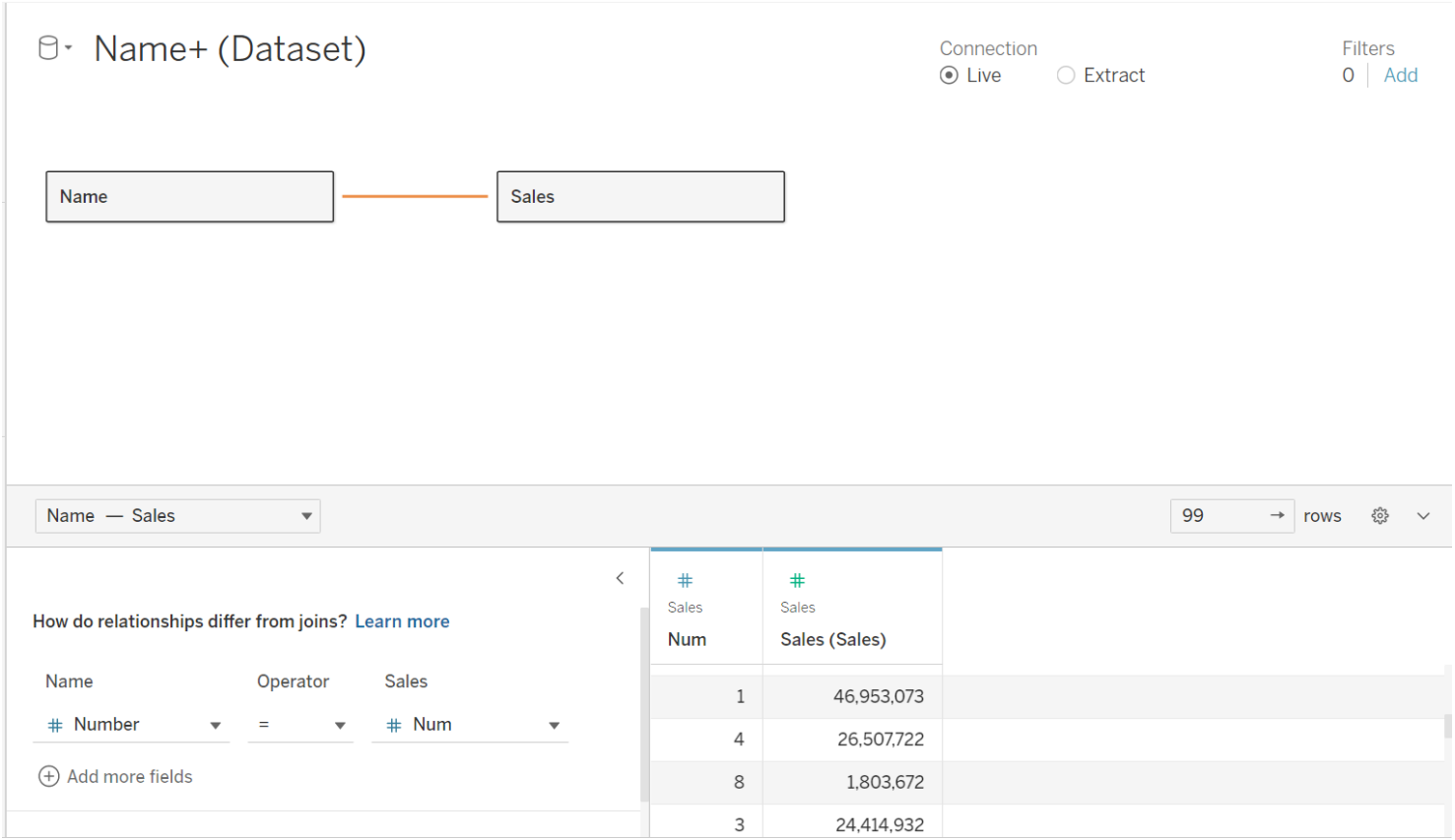
Num	Sales
10	44892982.00
10	22238436.00
4	49298321.00
11	42881231.00
8	39714862.00
9	15585994.00
2	28701693.00
8	47062939.00
3	25442409.00
4	8432235.00
11	13393428.00
9	47935845.00
12	14383815.00
5	42366545.00
5	773188.00
4	25444839.00
2	15648493.00
11	39435550.00
12	10167872.00
4	40364760.00
6	4556241.00
12	35368783.00
9	5667940.00
5	49090171.00

Number	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December

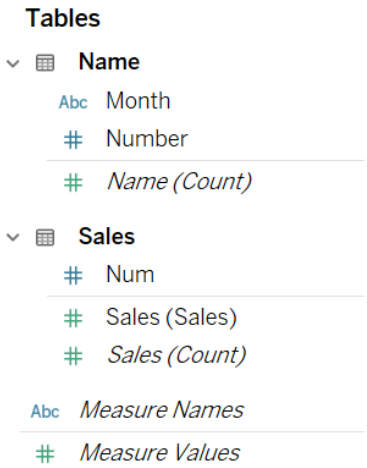
Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Data Visualization and Dashboard (01CT0410)	Aim: To perform blending among multiple tables using tableau	
Experiment No: 09	Date: 21-02-2024	Enrollment No: 92200133030

Task 2: Check in tableau to analyse the cross-items in-between the tables.

Results:-

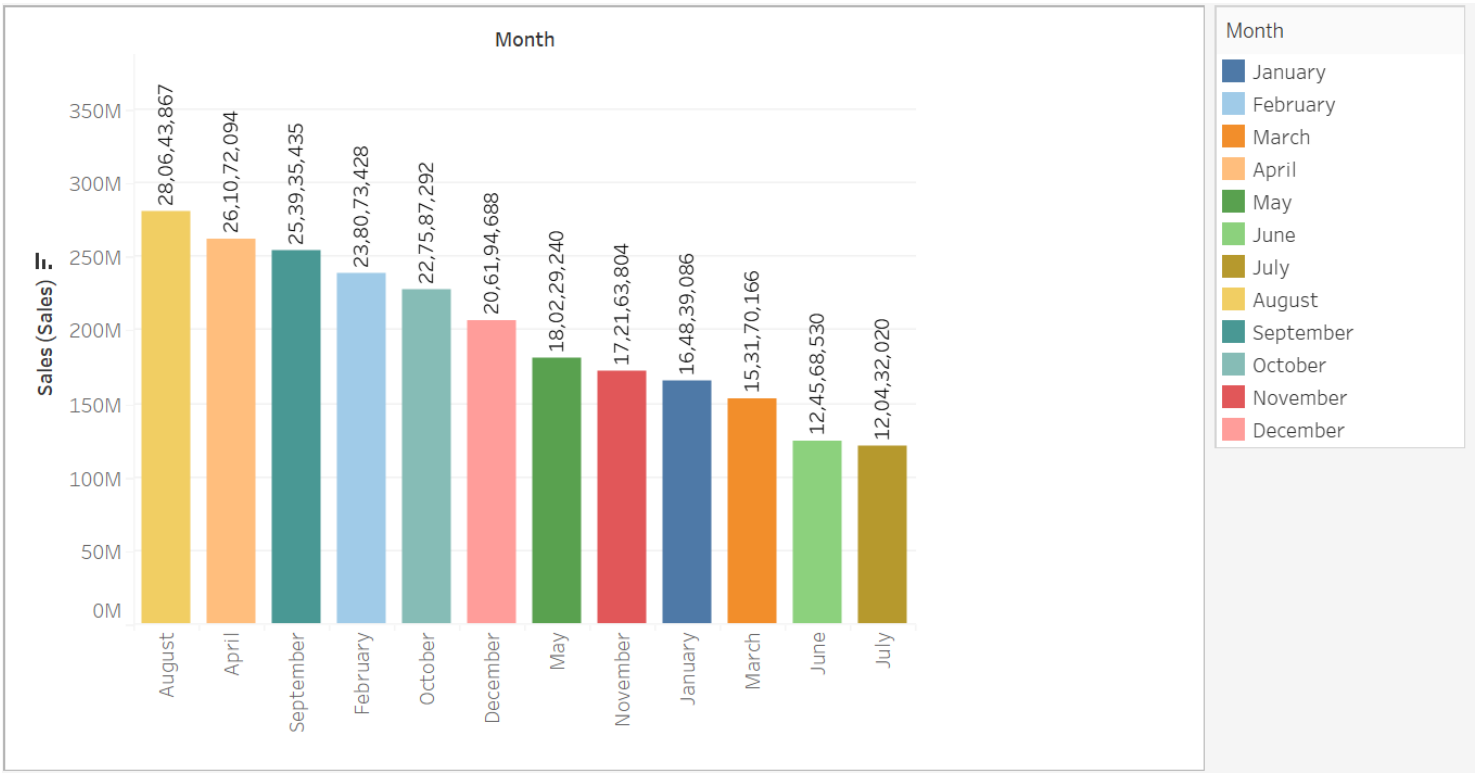


Task 3: Join the tables



Marwadi University	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Data Visualization and Dashboard (01CT0410)	**Aim: To perform blending among multiple tables using tableau**	
Experiment No: 09	**Date: 21-02-2024**	**Enrollment No: 92200133030**

Task 4: Perform the analysis in-between the two separate tables



Observation and Result Analysis:

Write the final observation and process corresponding to each task

1. **Before joining two tables**

2. **After joining two tables**

Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Data Visualization and Dashboard (01CT0410)	Aim: To perform blending among multiple tables using tableau	
Experiment No: 09	Date: 21-02-2024	Enrollment No: 92200133030

Post Lab Exercise:

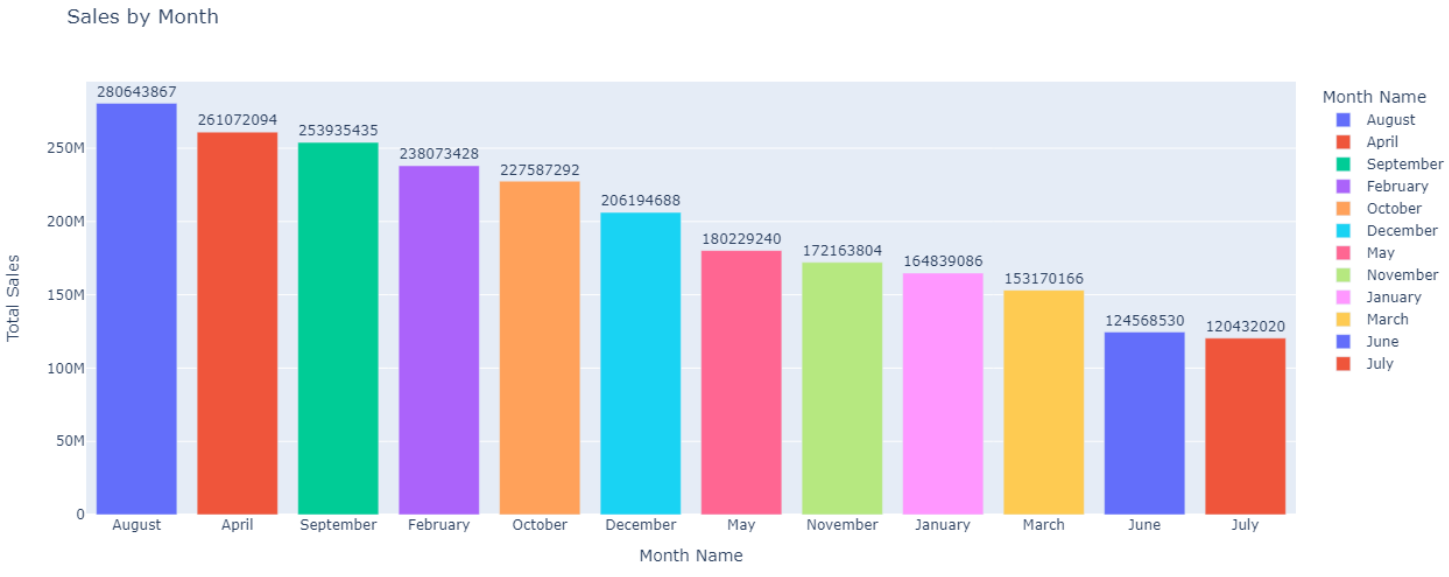
Exercise-1:

Python Implementation of joining the two tables and performing the same analysis you did in task 4.

Code:-

```
import pandas as pd
import plotly.express as px
Dataset_Sales_and_Numbers = pd.read_excel("./Dataset.xlsx", "Sales")
Dataset_Nubers_and_Months = pd.read_excel("./Dataset.xlsx", "Name")
Merged_Dataset = pd.merge(Dataset_Sales_and_Numbers, Dataset_Sales_and_Numbers, on="Number")
Final_Dataset = Merged_Dataset[["Month", "Sales"]]
Final_Dataset = Final_Dataset.groupby("Month").sum().reset_index()
Final_Dataset = Final_Dataset.sort_values(by="Sales", ascending=False)
Final_Dataset["Sales_Label"] = Final_Dataset["Sales"].astype(str)
Figure = px.bar(Final_Dataset,x="Month", y="Sales",color="Month", title="Sales by Month",labels={"Sales": "Total Sales", "Month": "Month Name"},text="Sales_Label",)
Figure.update_traces(textposition="outside")
Figure.write_html("sales_by_month_plot.html")
```

Result :-



Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Data Visualization and Dashboard (01CT0410)	Aim: To perform blending among multiple tables using tableau	
Experiment No: 09	Date: 21-02-2024	Enrollment No: 92200133030

Exercise-2:

Make the 4 spreadsheets/tables with 30 dummy data

Table 1: Gr. No | Student ID

Table 2: Student ID | Name

Table 3: Gr. No | SPI

Table 4: Name | 10th marks

GR No	Student ID
120836	93183406416
119586	92219461416
120089	92607352884
120268	92745389808
119868	92436927408
120240	92723797440
121002	93311418312
120348	92807082288
120206	92697578136
120387	92837157372
120624	93019921344
120795	93151789020
120057	92582675892
119769	92360582964
120000	92538720000
120225	92712230100
120189	92684468484
119940	92492450640
119929	92483967924
120094	92611208664
120343	92803226508
119623	92247994188
120934	93258979704
120751	93117858156
120426	92867232456
120497	92921984532
120046	92574193176
119702	92308915512
119854	92426131224
119770	92361354120

Student ID	Name
93183406416	Sophia Anderson
92219461416	Liam Martinez
92607352884	Emma Thompson
92745389808	Noah Garcia
92436927408	Olivia Nguyen
92723797440	Ethan Ramirez
93311418312	Isabella Taylor
92807082288	Mason Patel
92697578136	Ava Hernandez
92837157372	Elijah Brown
93019921344	Charlotte Smith
93151789020	Lucas Kim
92582675892	Mia Johnson
92360582964	Benjamin Jones
92538720000	Harper Davis
92712230100	Alexander Wilson
92684468484	Amelia Miller
92492450640	William Rodriguez
92483967924	Grace Thomas
92611208664	James Clark
92803226508	Evelyn Harris
92247994188	Logan Walker
93258979704	Aria Robinson
93117858156	Jackson Lee
92867232456	Madison Martinez
92921984532	Samuel Turner
92574193176	Lily Wright
92308915512	Daniel Adams
92426131224	Chloe Baker
92361354120	Oliver Cooper

Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
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Experiment No: 09	Date: 21-02-2024	Enrollment No: 92200133030

GR No	SPI
120732	8.7
120372	9.2
120522	7.9
119677	9.5
119863	8.1
119590	7.3
120272	9
119639	8.8
120542	9.7
119788	7.5
120075	8.3
120808	9.1
120177	7.8
120324	8.6
120112	9.3
119616	8.9
120762	7.2
119686	9.6
119795	8.4
120619	7.7
120394	9.4
119734	8.2
120755	7.6
120521	8.5
119586	9.8
120116	7.4
119898	8
120217	9.9
120034	7.1
120203	8.7

Name	10th Marks
Sophia Anderson	85.00%
Liam Martinez	80.00%
Emma Thompson	91.00%
Noah Garcia	89.00%
Olivia Nguyen	79.00%
Ethan Ramirez	84.00%
Isabella Taylor	88.00%
Mason Patel	90.00%
Ava Hernandez	94.00%
Elijah Brown	86.00%
Charlotte Smith	92.00%
Lucas Kim	82.00%
Mia Johnson	78.00%
Benjamin Jones	93.00%
Harper Davis	83.00%
Alexander Wilson	95.00%
Amelia Miller	87.00%
William Rodriguez	81.00%
Grace Thomas	89.00%
James Clark	94.00%
Evelyn Harris	84.00%
Logan Walker	79.00%
Aria Robinson	90.00%
Jackson Lee	92.00%
Madison Martinez	85.00%
Samuel Turner	93.00%
Lily Wright	89.00%
Daniel Adams	88.00%
Chloe Baker	91.00%
Oliver Cooper	87.00%

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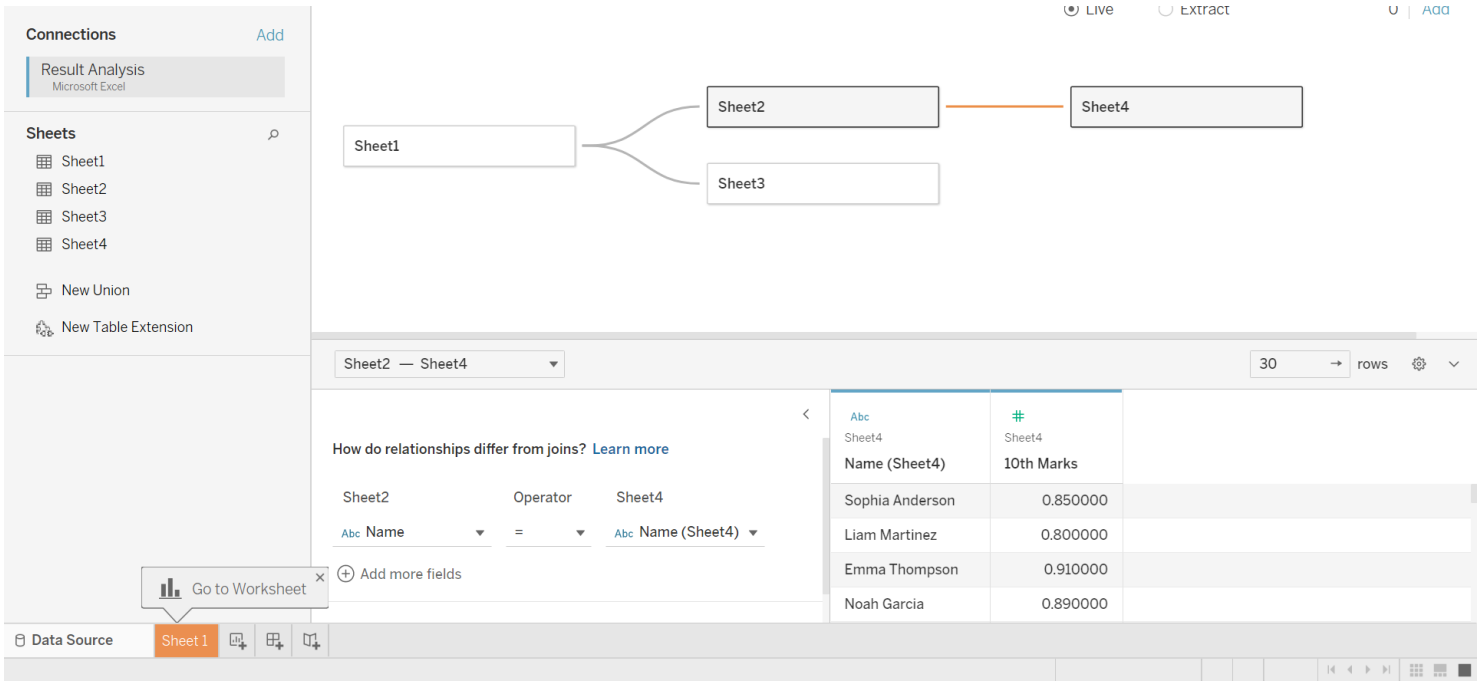
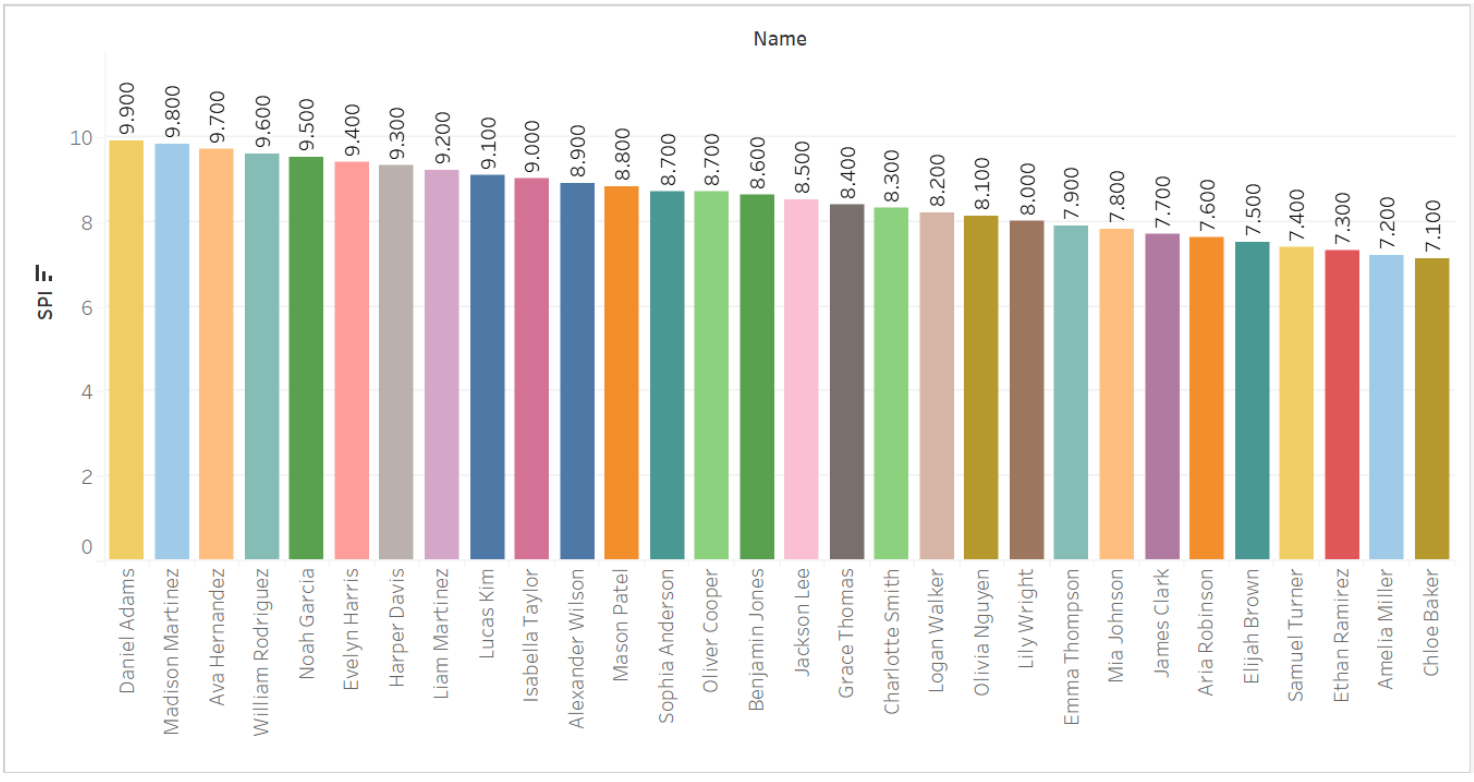
Implementation Using Tableau :-

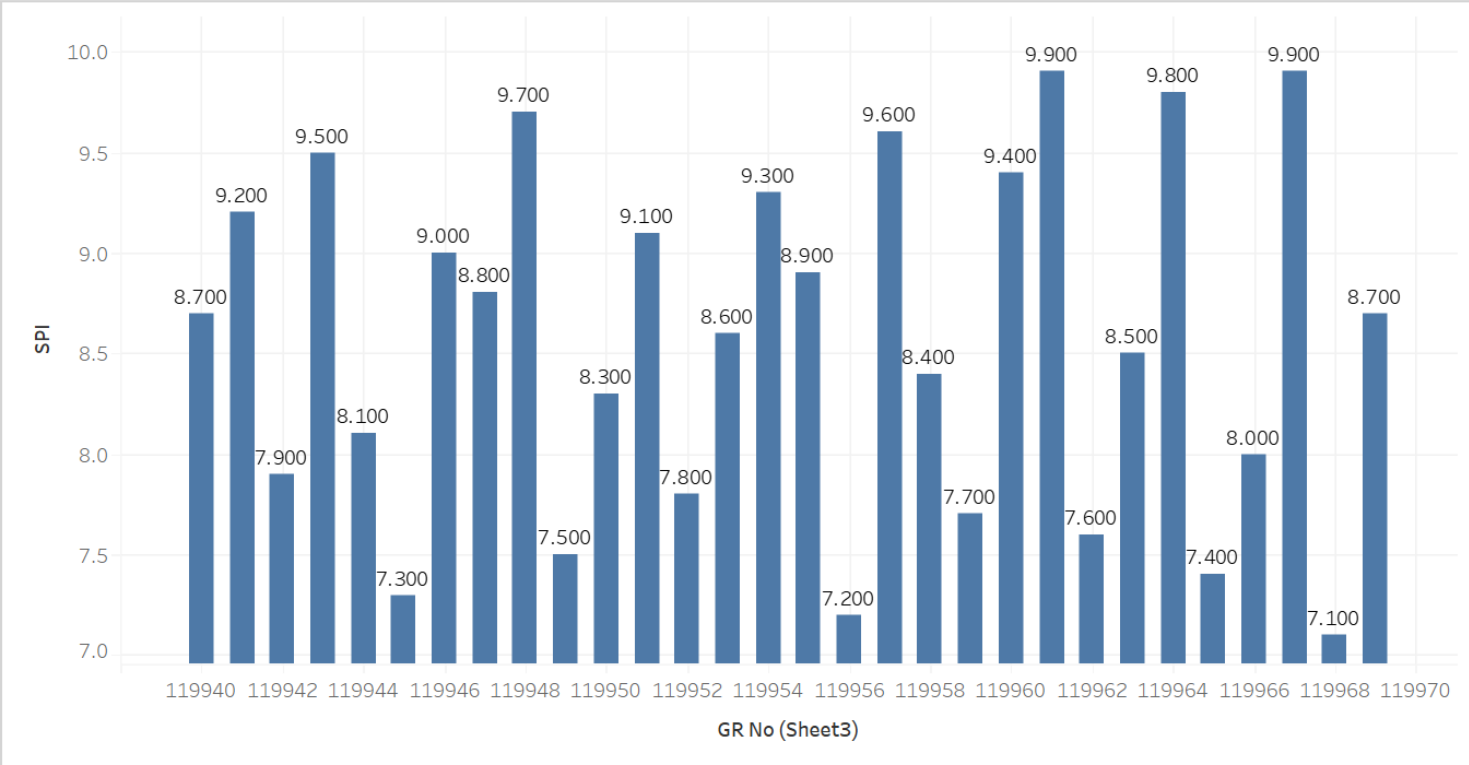


Perform the analysis of (Name vs SPI) and arrange in descending order



Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Data Visualization and Dashboard (01CT0410)	Aim: To perform blending among multiple tables using tableau	
Experiment No: 09	Date: 21-02-2024	Enrollment No: 92200133030

Perform the analysis of (Gr. No. vs SPI) and arrange in descending order



Implementation Using Python:-

Pre – Requisitesies :-

```
import pandas as pd
import plotly.express as px

GRNo_Student_ID = pd.read_excel('./Result Analysis.xlsx','Sheet1')
Student_ID_Name = pd.read_excel('./Result Analysis.xlsx','Sheet2')
GRNo_SPI = pd.read_excel('./Result Analysis.xlsx','Sheet3')
Name_10th_Marks = pd.read_excel('./Result Analysis.xlsx','Sheet4')
```

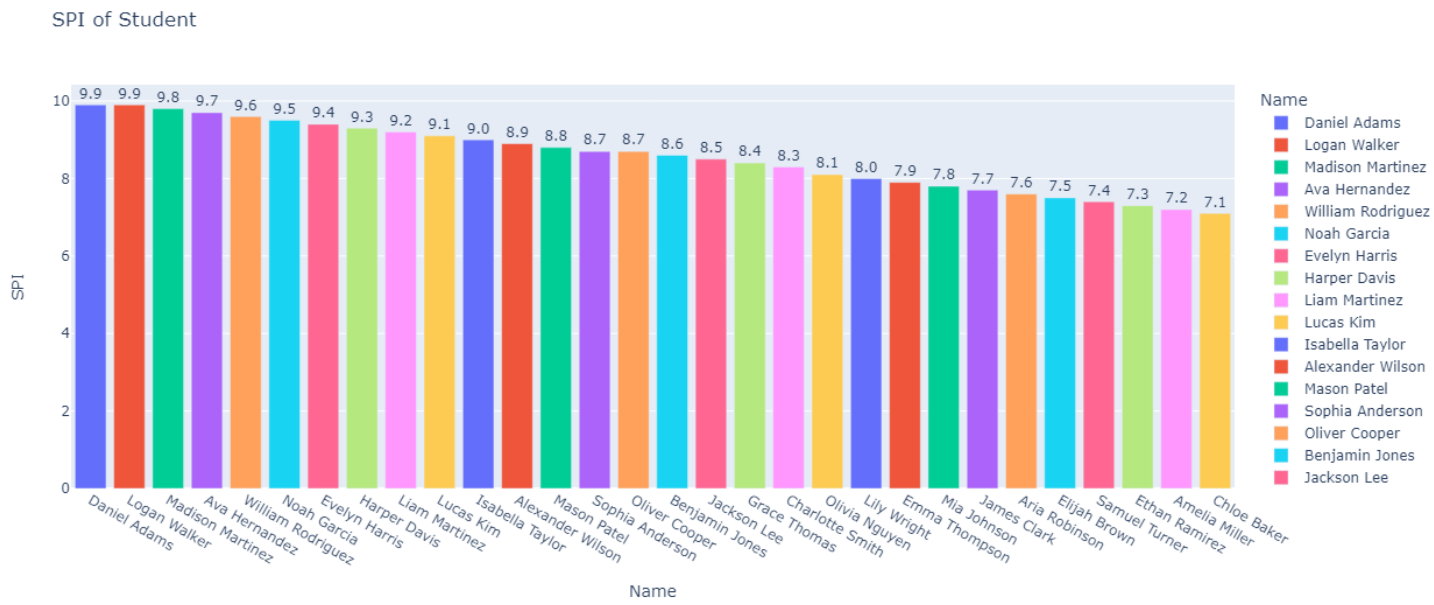
Marwadi University	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: Data Visualization and Dashboard (01CT0410)	**Aim: To perform blending among multiple tables using tableau**	
Experiment No: 09	**Date: 21-02-2024**	**Enrollment No: 92200133030**

Task – 1 :-Perform the analysis of (Name vs SPI) and arrange it in descending order

Code :-

```
Joint_Sheet2_and_Sheet2 = pd.merge(GRNo_Student_ID,
Student_ID_Name,on='Student ID')
Joint_GRNO_Name_SPI = pd.merge(Joint_Sheet2_and_Sheet2,GRNo_SPI,on='GR No')
Task_1_Datatset = Joint_GRNO_Name_SPI[['Name', 'SPI']]
Task_1_Datatset = Task_1_Datatset.sort_values(by='SPI' , ascending = False)
Task_1_Datatset['Text'] = Task_1_Datatset['SPI'].astype(str)
Task_1_Plot = px.bar(data_frame=Task_1_Datatset,x='Name' , y='SPI' , color = 'Name' ,
title='SPI of Student' , text='Text' , labels={'SPI' : 'SPI' , 'Name' : 'Name'})
Task_1_Plot.update_traces(textposition="outside")
Task_1_Plot.write_html('Name vs SPI.html')
```

Output :-



Marwadi University	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Data Visualization and Dashboard (01CT0410)	Aim: To perform blending among multiple tables using tableau	
Experiment No: 09	Date: 21-02-2024	Enrollment No: 92200133030

Task – 2 :- Perform the analysis of (Gr. No. vs SPI) and arrange it in descending order

Code :-

```
Task_2_Dataset = GRNo_SPI.sort_values(by='SPI' , ascending = False)
Task_2_Dataset["Text"] = Task_2_Dataset['SPI'].astype(str)
Task_2_Plot = px.bar(data_frame=Task_2_Dataset,x="GR No",y="SPI",color="GR
No",title="SPI of Student",text="Text",labels={"SPI": "SPI", "GR No": "GR No"},)
Task_2_Plot.update_traces(textposition="outside")
Task_2_Plot.write_html("GR No vs SPI.html")
```

Output :-