

Practical 11

Aim : Data Modelling and Analytics with Pivot Table in Excel

Data Model is used for building a model where data from various sources can be combined by creating relationships among the data sources. A Data Model integrates the tables, enabling extensive analysis using PivotTables, Power Pivot, and Power View.

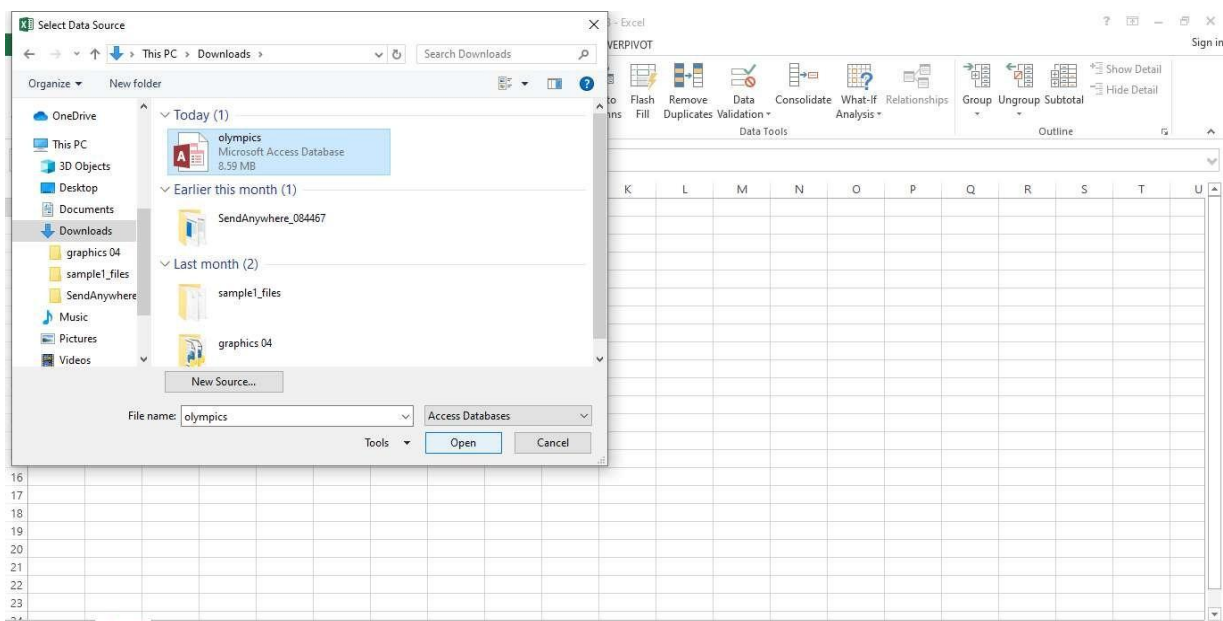
A **Data Model** is created automatically when you import two or more tables simultaneously from a database. The existing database relationships between those tables is used to create the Data Model in Excel.

Step 1 – Open a new blank Workbook in Excel.

Step 2 – Click on the **DATA** tab.

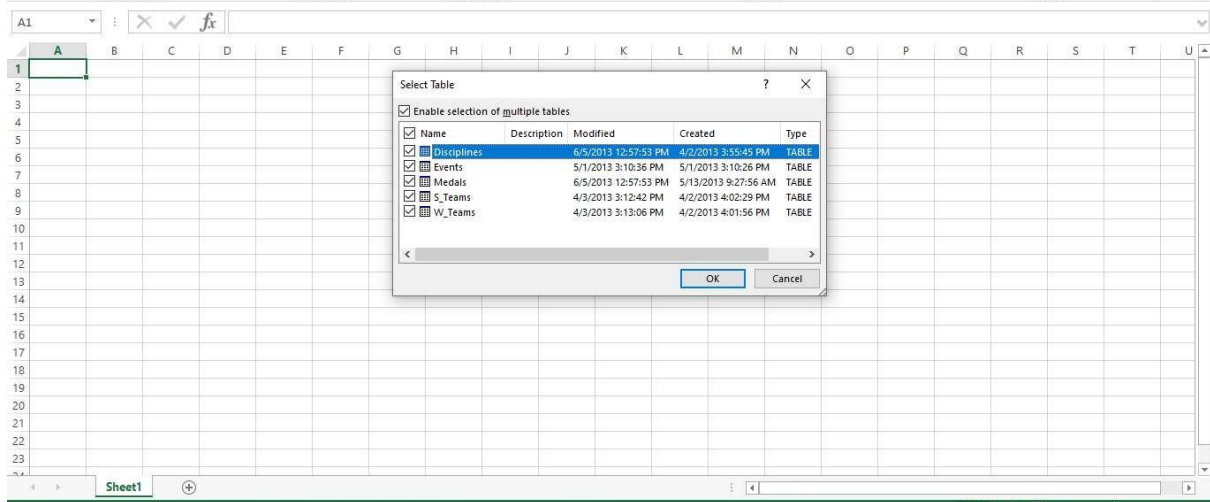
Step 3 – In the **Get External Data** group, click on the option **From Access**. The **Select Data Source** dialog box opens.

Step 4 – **Select Events.accdb**, Events Access Database file.



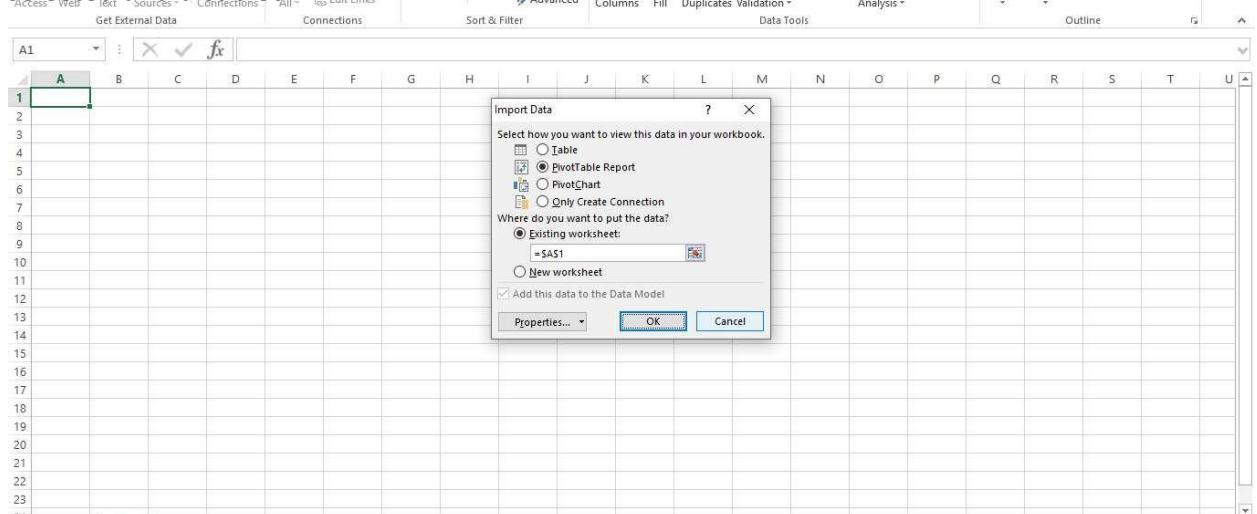
Step 5 – The Select Table window, displaying all the tables found in the database, appears.

Step 6 Tables in a database are similar to the tables in Excel. Check the 'Enable selection of multiple tables' box, and select all the tables. Then click **OK**.



Step 7 – The Import Data window appears. Select the PivotTable Report option. This option imports the tables into Excel and prepares a PivotTable for analyzing the imported tables.

Notice that the checkbox at the bottom of the window – 'Add this data to the Data Model' is selected and disabled.



Step 8 – The data is imported, and a PivotTable is created using the imported tables.

The screenshot shows the Microsoft Excel interface with a PivotTable named 'PivotTable5' on 'Sheet1'. The PivotTable is located in the range A3:U23 and has 'Row Labels' in column A. The data in the PivotTable is as follows:

Row Labels	
Alpine Skiing	
Archery	
Artistic G.	
Athletics	
Badminton	
Baseball	
Basketball	
Basque Pelota	
Beach volley.	
Biathlon	
BMX	
Bobsleigh	
Boxing	
Canoe / Kayak F	
Canoe / Kayak S	
Cricket	
Croquet	
Cross Country S	
Curling	
Cycling Road	

The 'PivotTable Fields' task pane on the right shows the following configuration:

- ACTIVE** tab selected.
- Choose fields to add to report:**
 - Disciplines:** ☒ Discipline, ☐ DisciplineID, ☐ SportID
 - Events:** ☐ EventID
 - Event:** ☐ Event
- Drag fields between areas below:**
 - FILTERS:** (Empty)
 - COLUMNS:** (Empty)
 - ROWS:** Discipline
 - VALUES:** (Empty)
- ☐ Defer Layout Update
- UPDATE** button

Explore Data Using PivotTable

Step 1 – You know how to add fields to PivotTable and drag fields across areas. Even if you are not sure of the final report that you want, you can play with the data and choose the best suited report.

In **PivotTable Fields**, click on the arrow beside the table - Medals to expand it to show the fields in that table. Drag the **NOC_CountryRegion** field in the Medals table to the COLUMNS area.

Step 2 – Drag Discipline from the Disciplines table to the ROWS area.

Step 3 – Filter Discipline to display only five sports: Archery, Diving, Fencing, Figure Skating, and Speed Skating. This can be done either in PivotTable Fields area, or from the Row Labels filter in the PivotTable itself.

Step 4 – In PivotTable Fields, from the Medals table, drag Medal to the VALUES area.

Step 5 – From the Medals table, select Medal again and drag it into the FILTERS area.

The screenshot shows an Excel spreadsheet with a PivotTable. The PivotTable is located in the range A3:T23. The PivotTable Fields task pane is open on the right side of the screen. The task pane shows the following configuration:

- ACTIVE** | ALL
- Choose fields to add to report:
 - ☐ Sport
 - ☐ DisciplineID
 - ☐ Event
 - ☒ Medal
 - ☐ MedalKey
 - ☐ DisciplineEvent
- Drag fields between areas below:
 - FILTERS**: Medal
 - COLUMNS**: NOC_CountryRegion
 - ROWS**: Discipline
 - VALUES**: Count of Medal
- ☐ Defer Layout Update
- UPDATE

Step 6 – Click the dropdown list button to the right of the Column labels.

Step 7 – Select Value Filters and then select Greater Than.

Step 8 – Click OK

The screenshot shows the same Excel spreadsheet as before, but with a dropdown menu open for the Column labels. The dropdown menu shows the following options:

- Sort A to Z
- Sort Z to A
- More Sort Options...

The 'More Sort Options...' option is selected, and the 'Value Filters' section is expanded, showing a list of countries and regions with checkboxes. The list includes:

- (Select All)
- ☒ AFG
- ☒ AHO
- ☒ ALG
- ☒ ANZ
- ☒ ARM
- ☒ AUS
- ☒ AUT
- ☒ AZE

The Value **Filters dialog** box for the count of Medals is **greater than** appears.

Step 9 – Type 80 in the Right Field.

Step 10 – Click OK.

The PivotTable displays only those regions, which has more than total 80 medals.

Medal	All	ANZ	ARG	ARM	AUS	AZE	BEL	BER	BLR	BRA	BUL	CAN	CHI	CHN	CMR	COL	CRO	CUB	CZE	DEN	DOM	EGY	ESP	EST	EUA	EUN	FIN	FRA	FRG	GBR	GDR	GEO	GER	GHA	GUY	
Archery					2																															
Badminton																																				
Baseball					24																															
Basketball				24	48																															
Boxing		6	1	24	1	4	4																													
Cricket																																				
Grand Total		6	1	48	1	78	4	55	1	2	61	41	26	3	91	2	3	12	186	1	17	2	4	31	1	6	18	20	103	6	77	13	1	28	3	1

Create Relationship between Tables

Relationships let you analyze your collections of the data in Excel, and create interesting and aesthetic reports from the data you import.

Step 1 – Insert a new Worksheet.

Step 2 – Create a new table with new data. Name the new table as Sports.

Sports	SportsID
Aquatics	S1
Archery	S10
Athletics	S11
Badminton	S12
Baseball	S13
Basketball	S14
Basque Pelota	S15
Biathlon	S16
Bobsleigh	S17
Boxing	S18
Canoe / Kayak	S19
Cricket	S2
Croquet	S20
Curling	S21
Cycling	S22
Equestrian	S23
Fencing	S24
Football	S25
Golf	S26
Gymnastics	S27
Handball	S28
Hockey	S29

Step 3 – Now you can create relationship between this new table and the other tables that already exist in the Data Model in Excel. Rename the Sheet1 as **Medals** and Sheet2 as **Sports**.

On the **Medals** sheet, in the **PivotTable Fields List**, click All. A complete list of available tables will be displayed. The newly added table - Sports will also be displayed.

Medal	Discipline	CUB	FRA	KOR	URS	USA	YUG	Grand Total
Archery		15	46	52	7	52		172
Badminton		47		31				78
Baseball			111	48		68		227
Basketball		24	12	26	12	146	294	610
Boxing		5	63	19	19	51	109	277
Cricket				12				12
Grand Total		91	186	103	162	204	523	1376

Step 4 – Click on Sports. In the expanded list of fields, select Sports. Excel messages you to create a relationship between tables.

Medal	Discipline	CUB	FRA	KOR	URS	USA	YUG	Grand Total
Archery		15	46	52	7	52		172
S1		15	46	52	7	52		172
S10		15	46	52	7	52		172
S11		15	46	52	7	52		172
S12		15	46	52	7	52		172
S13		15	46	52	7	52		172
S14		15	46	52	7	52		172
S15		15	46	52	7	52		172
S16		15	46	52	7	52		172
S17		15	46	52	7	52		172
S18		15	46	52	7	52		172
S19		15	46	52	7	52		172
S2		15	46	52	7	52		172
S20		15	46	52	7	52		172
S21		15	46	52	7	52		172
S22		15	46	52	7	52		172
S23		15	46	52	7	52		172
S24		15	46	52	7	52		172
S25		15	46	52	7	52		172

Step 5 – Click on CREATE. The Create Relationship dialog box opens.

The screenshot shows the 'Create Relationship' dialog box in Excel. The 'Table' dropdown is set to 'Disciplines' and the 'Column (Foreign)' is set to 'SportID'. The 'Related Table' dropdown is set to 'Sports' and the 'Related Column (Primary)' is set to 'SportID'. The background shows a PivotTable with 'Medal' as the filter, 'Discipline' and 'SportsID' as rows, and 'Count of Medal' as the value field.

Step 6 – To create the relationship, one of the tables must have a column of unique, non-repeated, values. In the Disciplines table, SportID column has such values. The table Sports that we have created also has the SportID column. In Table, select Disciplines.

Step 7 – In Column (Foreign), select SportID.

Step 8 – In Related Table, select Sports.

Step 9 – In Related Column (Primary), SportID gets selected automatically. Click OK.

Step 10 – The PivotTable is modified to reflect the addition of the new Data Field Sport. Adjust the order of the fields in the Rows area to maintain the Hierarchy. In this case, Sport should be first and Discipline should be the next, as Discipline will be nested in Sport as a sub-category.

The screenshot shows the PivotTable Fields task pane in Excel. The 'ROWS' area contains 'Discipline' and 'SportsID'. The 'VALUES' area contains 'Count of Medal'. The 'FILTERS' area contains 'Medal'. The background shows a PivotTable with 'Medal' as the filter, 'Discipline' and 'SportsID' as rows, and 'Count of Medal' as the value field.