

MS-Access

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204100 IT AND MODERN LIFE



MS-Access 2016

7.1 Database Basics & Table

7.2 Form

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7.5 Working with Multiple Tables

- Dealing with Relationships

7.5 Working with Multiple Tables

How to set up and use relationships



7.5 Working with Multiple Tables

- (1) Relationship Basics**
- (2) Example: Create another Table**
- (3) Defining Relationship between Tables**
- (4) Creating a Query using the Relationship**
- (5) Creating a Report**
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(1) Relationship Basics

Primary Key

A field with **no duplicating values** (or, all values in this field are unique) used to identify a record from another in the same table.

Relationship

A link between a record in one table to record(s) in another table

Foreign Key

A field used in the relationship to show which record is related with which. It will be linked to the primary key of record in **another table** this record is related to.

We need to be very careful about changing value of the foreign keys (and primary keys linked to them) since it will affect the relationship. There are special rules (Cascade) that help enforce the integrity of the keys, making sure the relationship is always valid.



(2) Example: Create another Table

- ❖ We will work with **MyStudent** database (<https://goo.gl/kRccNK>), that has **Student** table
- ❖ We are interested in knowing who are the students' advisors
- ❖ Therefore, we will create another table: **Teacher**
- ❖ For the teachers, we are interested in the following details:
teacher ID, names, office location, and telephone number
- ❖ We define field name and data type as followed:

Field Name	Data Type	Example
idTeacher	Short Text 4	1234
firstName	Short Text 20	Prakarn
lastName	Short Text 20	Unachak
roomNo	Short Text 6	CSB107
tel	Short Text 10	053123456

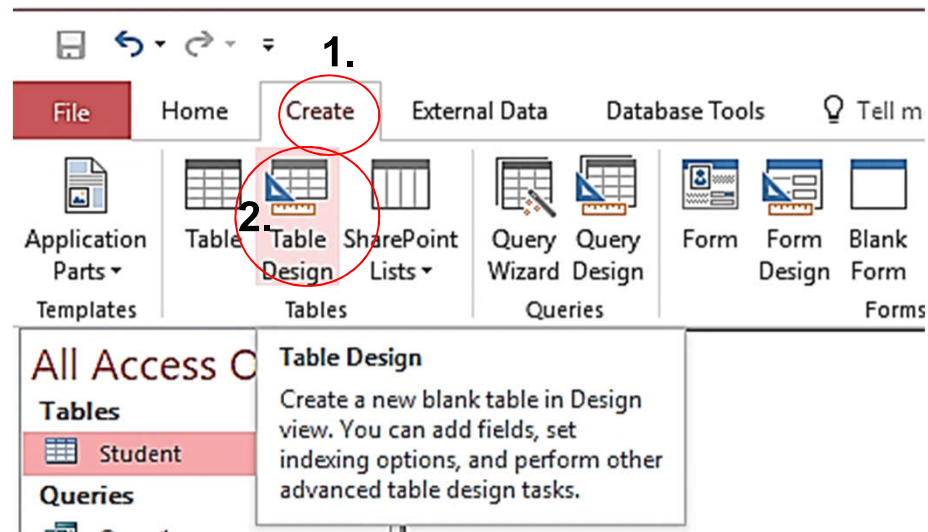


(2) Create another Table (cont.)

Now we will start the process of creating **Teacher** table in **MyStudent**

1. Click **Create** tab

2. Click **Table Design**



This will appear



(2) Create another Table (cont.)

We will be taken to table Design view, where we can add fields as designed

The screenshot shows the 'Table1' design view in Microsoft Access. The table has three columns: 'Field Name', 'Data Type', and 'Description (Optional)'. The 'Field Name' column is highlighted in yellow. Below the column headers, there are several empty rows for adding fields. At the bottom of the window, the 'Field Properties' task pane is visible, with the 'General' tab selected. The 'Lookup' tab is also visible, indicating that the user can configure a lookup field.

Field Name	Data Type	Description (Optional)

Field Properties

General Lookup



(2) Create another Table (cont.)

3. Name the field, set the data type, and set the field size:

idTeacher	Short Text 4
firstName	Short Text 20
lastName	Short Text 20
roomNo	Short Text 6
tel	Short Text 10

Table1

Field Name	Data Type
idTeacher	Short Text
firstName	Short Text
lastName	Short Text
roomNo	Short Text
tel	Short Text

General Lookup

Field Size	10
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	



(2) Create another Table (cont.)

4. Define the primary key for Teacher table. We will use **idTeacher** for primary key

4.1 Click **idTeacher** field

4.2 Under **Design** tab, Click **Primary Key**

4.1

Field Name	Data Type
idTeacher	Short Text
firstName	Short Text
lastName	Short Text
roomNo	Short Text
tel	Short Text


4.2

File Create External Data Database Tools Design

View Primary Key Builder Test Validation Rules Insert Rows Delete Rows Modify Lookups Property Indexes Sheet Show/Hide

(2) Create another Table (cont.)

We will get the following. Note the key icon

Table1		
	Field Name	Data Type
	idTeacher	Short Text
	firstName	Short Text
	lastName	Short Text
	roomNo	Short Text
	tel	Short Text



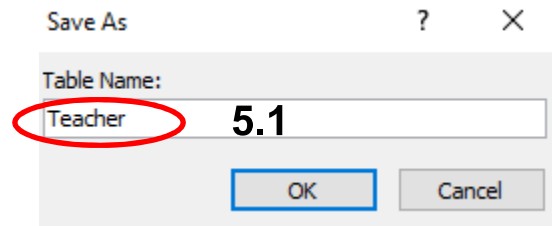
(2) Create another Table (cont.)

5. Save the table. You will be prompted to name the table

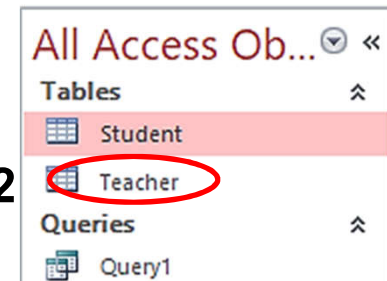
5.1 Type in the name of the table

- In this example, we will use **Teacher**
- Click **OK**

5.2 At the navigation pane, Teacher table will appear



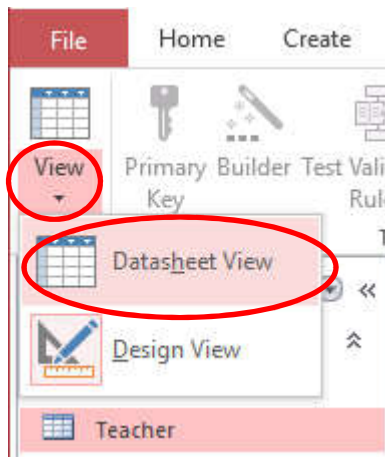
5.2



(2) Create another Table (cont.)

6. Now we will fill in records into **Teacher** table

- With Teacher selected, click **View**
- Select **Datasheet View**



- We can now enter data into **Teacher** table

Teacher						
	idTeacher	firstName	lastName	roomNo	tel	Click to Add
*						



(2) Create another Table (cont.)

For this example, we will fill in these records:

Teacher					
idTeacher	firstName	lastName	roomNo	tel	Click to Add
1001	Prakarn	Unachak	CSB107	053555555	
1002	Mary	Lewis	EB5101	053123456	
1003	Jackie	Chan	CSB110	0979551131	
*					

Then click **Save** to save the data



(3) Defining Relationship between Tables

- ❖ In a database: records in one table can have a relationship with records in another table. For example:
 - Between **Student** and **Course** → Which courses has a student **enrolled in**?
 - Between **Product** and **Factory** → Which factory **produce** which products?

From the example

- A teacher (from **Teacher** table) is the advisor to students (from **Student** table)
- We have 2 tables

Teacher

Student

- The relationship we found:
 - An advisor will advise one or more students
 - But a student will only have (main) advisor





(3) Defining Relationship between Tables (cont.)

- Therefore, with the two tables we have: **Teacher** and **Student**



- These two tables are related
- Then we need to define the relationship
 - To answer:
 - For this student, who is the advisor?
 - For this teacher, which students are under his/her advise?

Usually, we will define the relationship on paper, then create it in MS Access

- Start with drawing relationship between the tables, starting with this symbol 
- The put the name of the relationship (advise) on the symbol 
- The link the symbol to the tables, and write the one/many-to-one/many numbers



(3) Defining Relationship between Tables (cont.)



For the above image:

- One teacher advises **many** students
- But one student is advised by only **one** teacher
- This is a **one-to-many** relationship



(3) Defining Relationship between Tables (cont.)

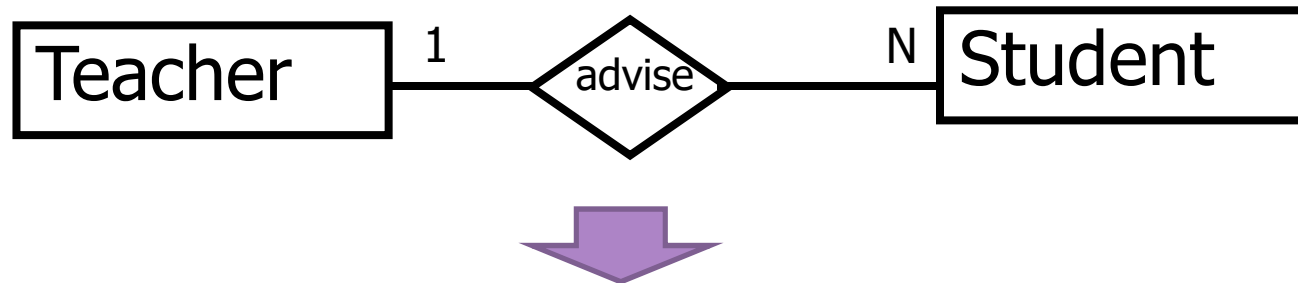
Now, we will create the relationship in **MyStudent** database

- First, we need to create a **foreign key** field (If one-to-many, always on many side)
- In this example, we need to add a field: **idTeacher**, into **Student** table, to define that this student has this teacher as an advisor. The foreign key **idTeacher** will have the data type of **Short Text** and field size of 4 bytes. (The same as **idTeacher** in **Teacher** table)
- Then we can create the relationship

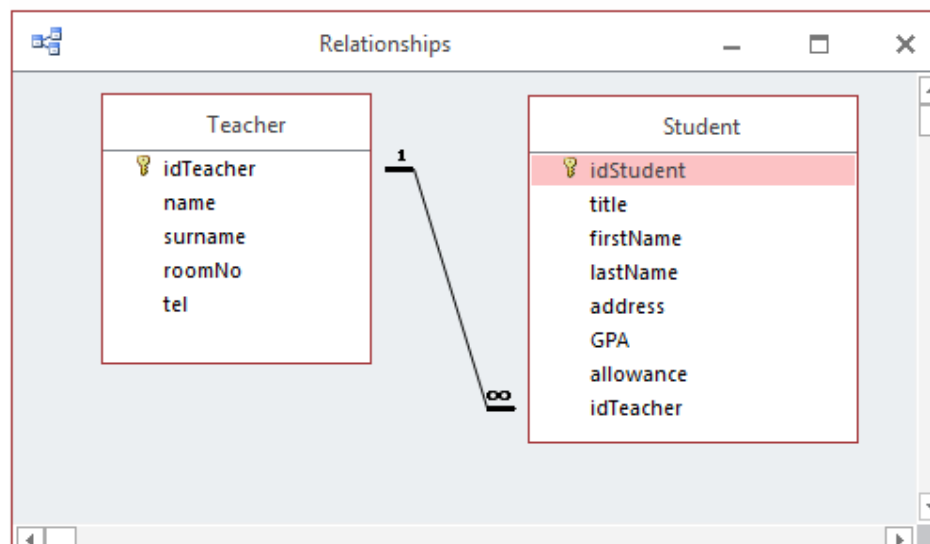


(3) Defining Relationship between Tables (cont.)

Start with the relationship design on paper



To the resulting relationship on MS-Access



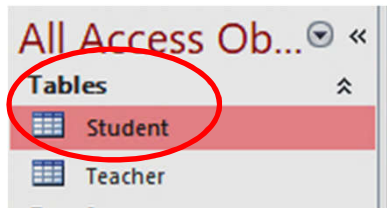
(3) Defining Relationship between Tables (cont.)

1. First we create a foreign key field, and fill in the data

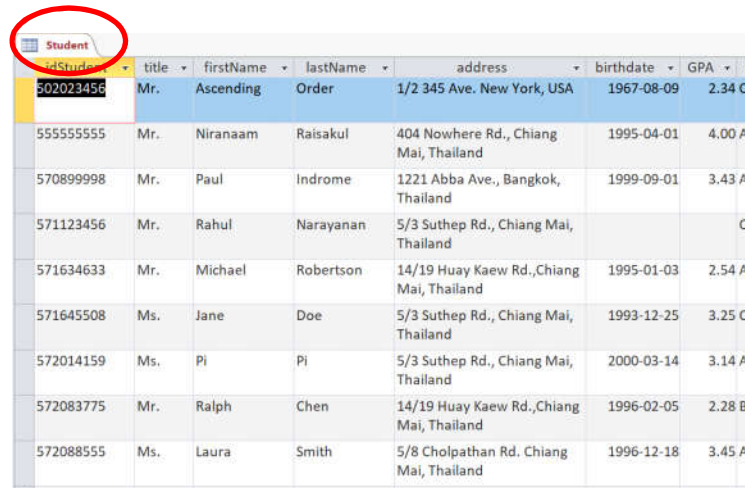
1.1 At navigation pane → click **Tables** to show the tables

1.2 Double click **Student** table to open it

1.3 Under Home tab, click **View** and select **Design View**

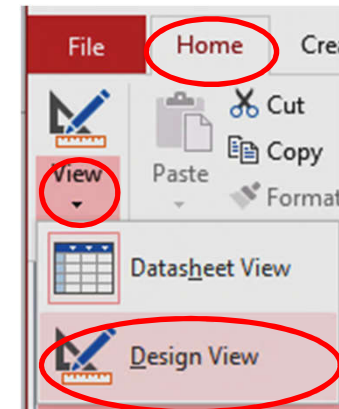


1.1

A screenshot of the 'Student' table in data view. The table name 'Student' is circled in red in the top left corner. The table contains several rows of student data.

idStudent	title	firstName	lastName	address	birthdate	GPA
502023456	Mr.	Ascending	Order	1/2 345 Ave. New York, USA	1967-08-09	2.34
555555555	Mr.	Niranaam	Raisakul	404 Nowhere Rd., Chiang Mai, Thailand	1995-04-01	4.00
570899998	Mr.	Paul	Indrome	1221 Abba Ave., Bangkok, Thailand	1999-09-01	3.43
571123456	Mr.	Rahul	Narayanan	5/3 Suthep Rd., Chiang Mai, Thailand		
571634633	Mr.	Michael	Robertson	14/19 Huay Kaew Rd., Chiang Mai, Thailand	1995-01-03	2.54
571645508	Ms.	Jane	Doe	5/3 Suthep Rd., Chiang Mai, Thailand	1993-12-25	3.25
572014159	Ms.	Pi	Pi	5/3 Suthep Rd., Chiang Mai, Thailand	2000-03-14	3.14
572083775	Mr.	Ralph	Chen	14/19 Huay Kaew Rd., Chiang Mai, Thailand	1996-02-05	2.28
572088555	Ms.	Laura	Smith	5/8 Cholphathan Rd. Chiang Mai, Thailand	1996-12-18	3.45

1.2



1.3



(3) Defining Relationship between Tables (cont.)

- ❖ Under Design View, we can add idTeacher as foreign key
 - ❖ Click The box below **E-mail address**
 - ❖ Type in **idTeacher** under **Field Name**
 - ❖ Select **Short Text** for data type
 - ❖ And set field size to 4

Field Name	Data Type	Description (Optional)
idStudent	Short Text	รหัสนักศึกษา มช
title	Short Text	คำนำหน้าชื่อ เช่น นางสาว นาย
firstName	Short Text	
lastName	Short Text	
address	Short Text	
GPA	Number	
allowance	Number	
idTeacher	Short Text	

Field Properties

General Lookup

Field Size: 4

Format:

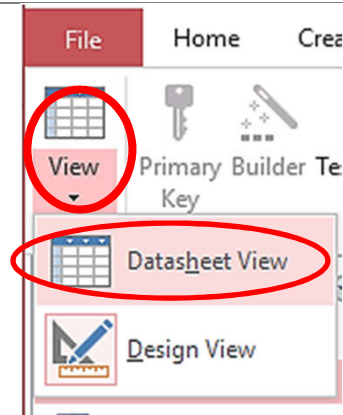
click ปุ่ม save เพื่อจัดเก็บตาราง



(3) Defining Relationship between Tables (cont.)

Then we enter the data

- Click **View** and select **Datasheet View**
- At datasheet view, we can enter the teacher id, assigning teachers to students



Student	Teacher			
bloodType	Pet	Allownance	E-mail Address	idTeacher
O-			a.order@gmail.com	1001
A+	Cro	500	niranaam.r@cmu.ac.th	1001
A-		12321	paul.i@cmu.ac.th	1002
O-	Cat	4500	rahul.narayanan@gmail.com	1003

The teacher ID entered here must exist in teacher ID in **Teacher** table

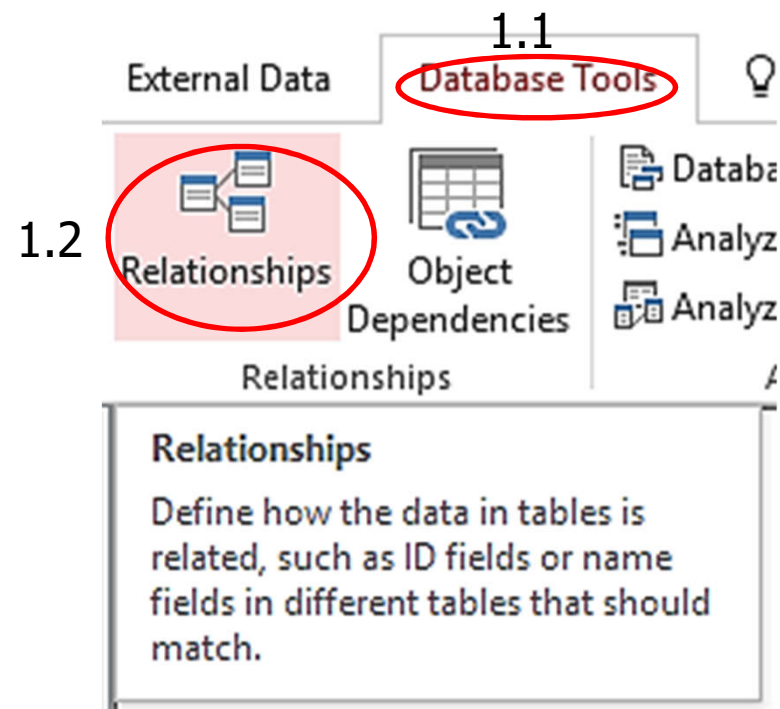
- Then save the table



(3) Defining Relationship between Tables (cont.)

With foreign key defined and data entered, we can now create the relationship itself.

1. Click **Database tools** tab
2. Click **Relationships**



(3) Defining Relationship between Tables (cont.)

If no table is selected, **Show Table** dialog will appear to let us choose

3.1

- You can also click **Show Table** under **Relationship Tools: Design** tab to open the dialog

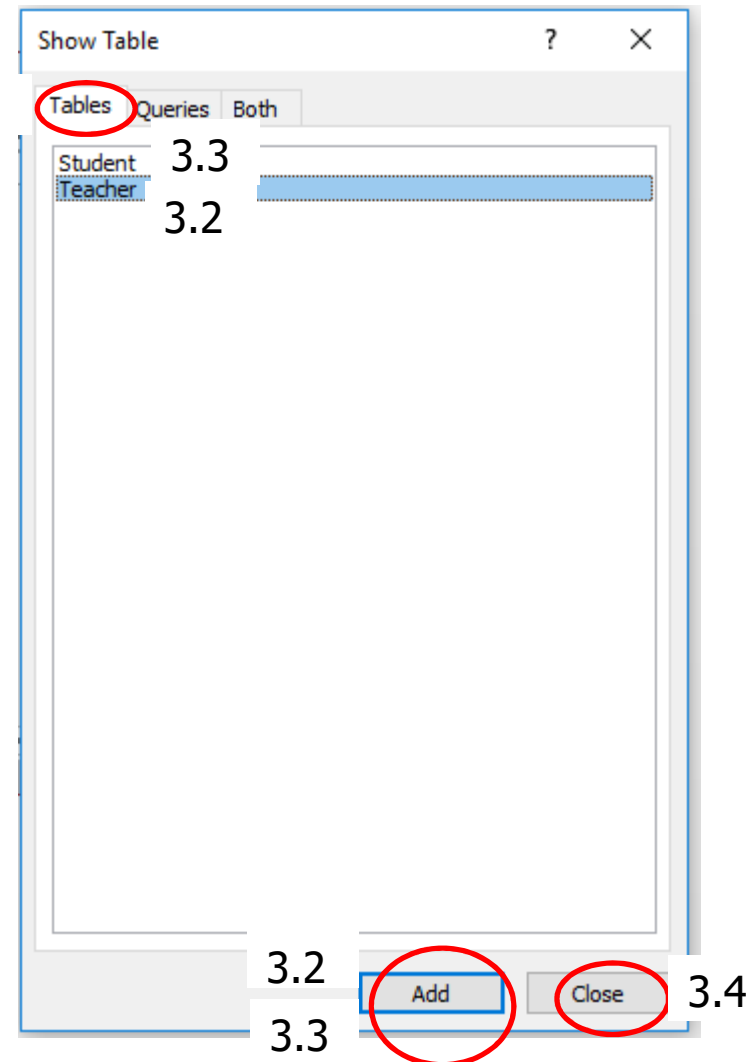
3. Do the following:

3.1 Click **Tables** tab on the dialog

3.2 Select **Teacher** then click **Add**

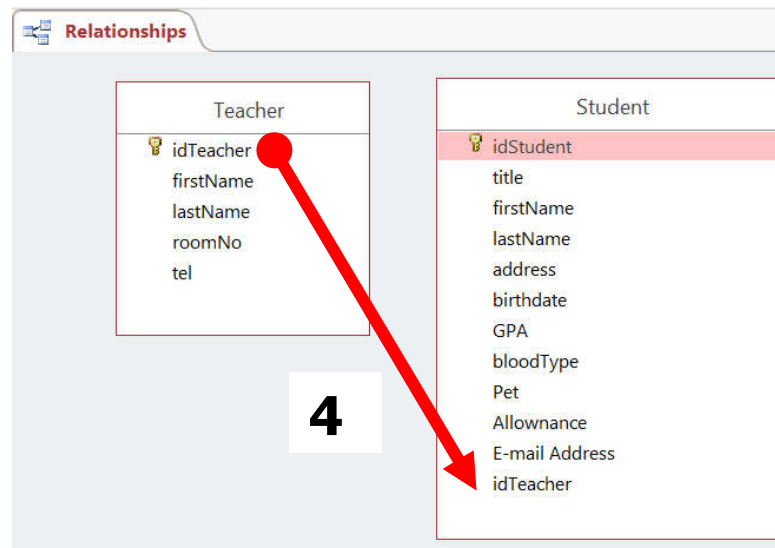
3.3 Select **Student** then click **Add**

3.4 Click **Close**



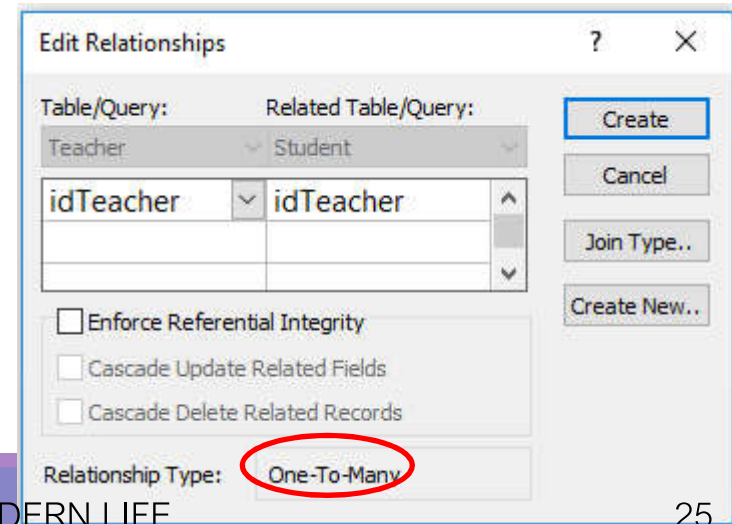
(3) Defining Relationship between Tables (cont.)

We will get the following:



4. Link the two tables as followed:

- Click and drag **idTeacher** field on **Teacher** table to **idTeacher** field on **Student** table
- A dialog will appear



(3) Defining Relationship between Tables (cont.)

5. Then, we have some option to enable

5.1

- **Enforce Referential Integrity** enforces that the foreign key (many side) values must exist as the primary keys on another table (one side)
- **Cascade Update Related Fields.** If the primary key that the foreign key is linked to (On the one side) has change value, the matching foreign keys (on the many side) will change the values to match. Relationship is maintained
- **Cascade Delete Related Records.** When you delete a record on the one side, the linked record (the one whose foreign keys match the primary key of the deleted record) on the many side table will be deleted as well.
- We will check **Enforce Referential integrity** and **Cascade Update**.

5.2 Click **Create**

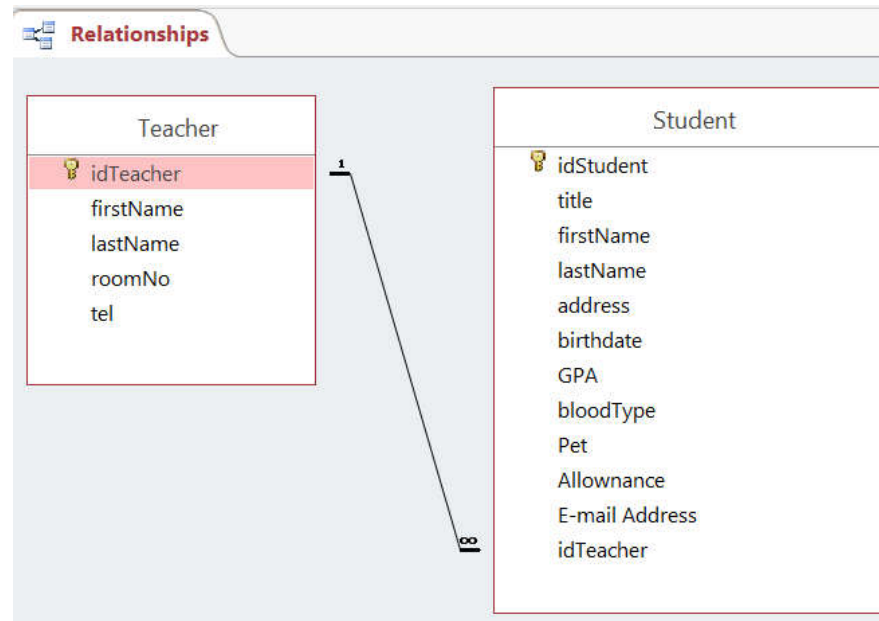
5.1

5.2



(3) Defining Relationship between Tables (cont.)

- This will appear
- Save the relationship

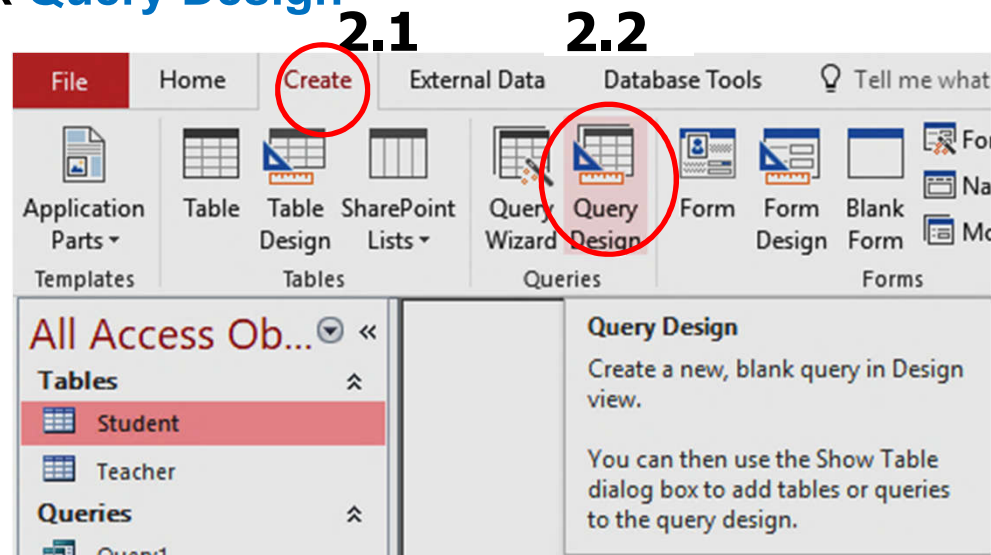


- Again, the meaning of this one-to-many relationship between **Teacher** table and **Student** table is:
 - ☐ One teacher advises **many** students
 - ☐ But one student is advised by only **one** teacher



(4) Multiple-table Query

- To find something about the data in the database, we will need a query
- Question: **we want to know which teachers advise which students**
- To create a query that work with multiple (related) tables:
 1. Still using **MyStudent** database
 2. Do the following:
 - 2.1 Click **Create** tab
 - 2.2 Click **Query Design**



(4) Query (cont.)

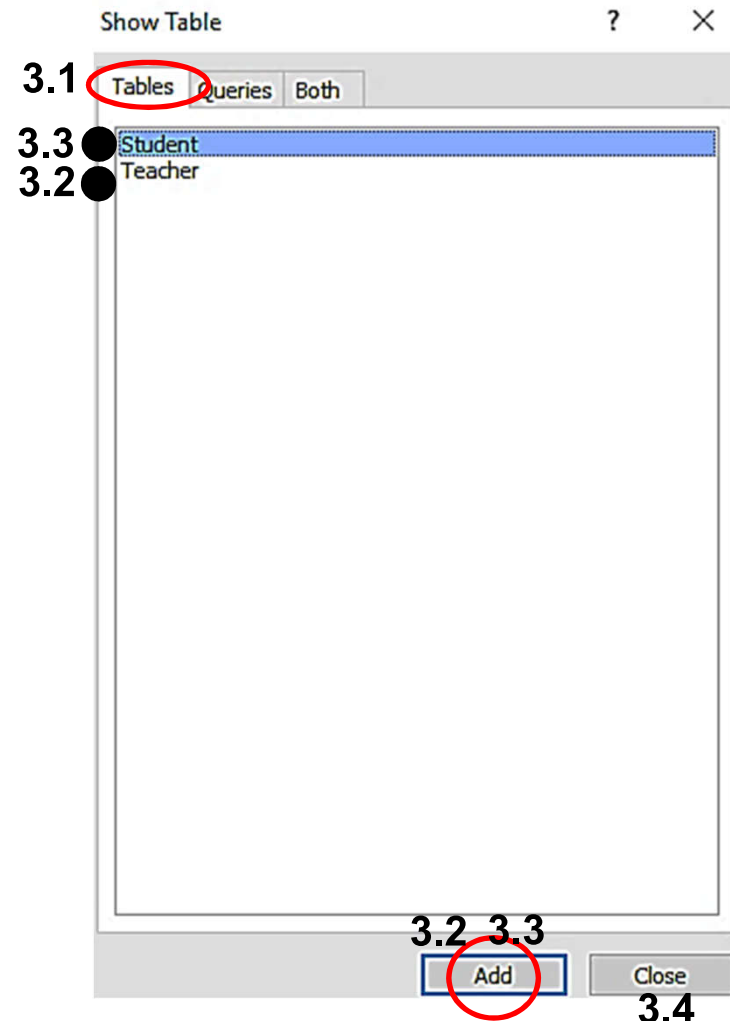
3. **Show Table** dialog will appear
(Or you can click on the button to make it appear)

3.1 Click **Tables** tab

3.2 Add **Teacher**

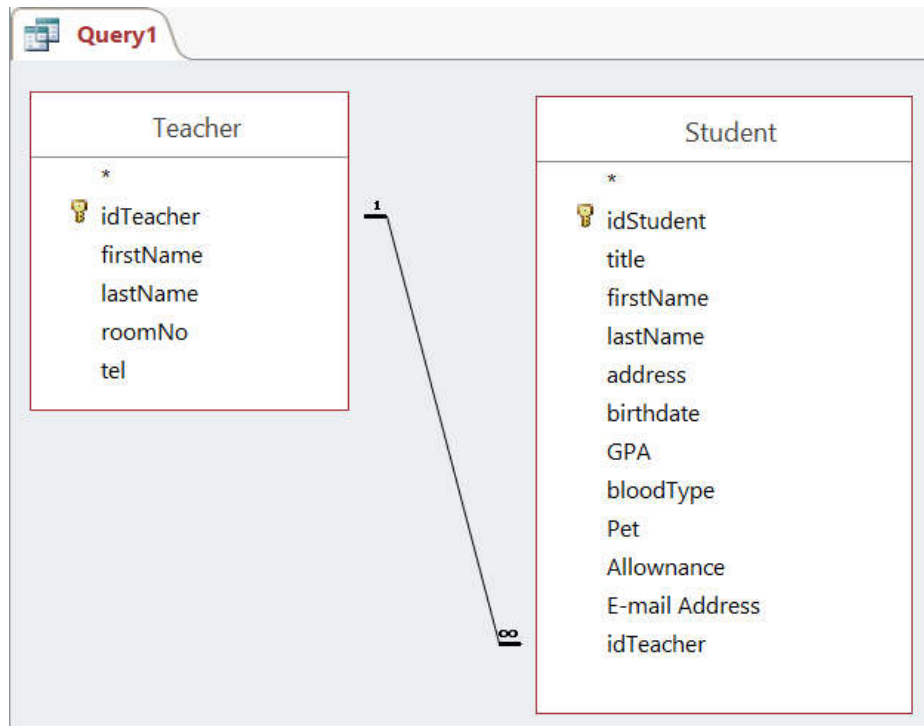
3.3 Add **Student**

3.4 Click **Close**



(4) Query (cont.)

We are now in the query's **Design** view



Question: we want to know which teachers advise which students.



(4) Query (cont.)

❖ From **Teacher** table, select fields: (Note the **Table:** row)

- **firstName**
- **lastName**
- **roomNo**

❖ From **Student** table, select fields:

- **idStudent**
- **firstName**
- **lastName**
- **address**

The symbol ✓ on **Show:** row under a field means that that field will be shown on the query's result

Field:	firstName	lastName	roomNo	idStudent	firstName	lastName	address
Table:	Teacher	Teacher	Teacher	Student	Student	Student	Student
Sort:							
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:							
or:							



(4) Query (cont.)

Then, at Design tab, click  to get the query result

Advisor	Student	Teacher					
Teacher.first	Teacher.lastl	roomNo	idStudent	Student.first	Student.lastl	address	
Prakarn	Unachak	CSB107	502023456	Ascending	Order	1/2 345 Ave. New York, USA	
Prakarn	Unachak	CSB107	555555555	Niranaam	Raisakul	404 Nowhere Rd., Chiang Mai	
Prakarn	Unachak	CSB107	571645508	Jane	Doe	5/3 Suthep Rd., Chiang Mai, T	
Mary	Lewis	EB5101	570899998	Paul	Indrome	1221 Abba Ave., Bangkok, Tha	
Mary	Lewis	EB5101	571634633	Michael	Robertson	14/19 Huay Kaew Rd.,Chiang I	
Mary	Lewis	EB5101	572083775	Ralph	Chen	14/19 Huay Kaew Rd.,Chiang I	
Jackie	Chan	CSB110	571123456	Rahul	Narayanan	5/3 Suthep Rd., Chiang Mai, T	
Jackie	Chan	CSB110	572014159	Pi	Pi	5/3 Suthep Rd., Chiang Mai, T	
Jackie	Chan	CSB110	572088555	Laura	Smith	5/8 Cholpathan Rd. Chiang M	
*							

Save this query, we will name it **AdvisorStudent**



(4) Query (cont.)

You can sort the result by teacher's first name, then by student ID:

- At **firstName** field, under **Sort** select **Ascending**
- At **idStudent** field, under **Sort** select **Ascending**
- Click Run !

Run

Field:	name	surname	roomNo	idStudent	title
Table:	Teacher	Teacher	Teacher	Student	Student
Sort:	Ascending			Ascending	
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Criteria:					
or:					

- You will get the following query results. Note that you can also use criteria for multi-table query

Teacher.first	Teacher.last	roomNo	idStudent	Student.first	Student.last	address
Jackie	Chan	CSB110	571123456	Rahul	Narayanan	5/3 Suthep Rd., Chiang Mai, T
Jackie	Chan	CSB110	572014159	Pi	Pi	5/3 Suthep Rd., Chiang Mai, T
Jackie	Chan	CSB110	572088555	Laura	Smith	5/8 Cholpathan Rd. Chiang M
Mary	Lewis	EB5101	570899998	Paul	Indrome	1221 Abba Ave., Bangkok, Tha
Mary	Lewis	EB5101	571634633	Michael	Robertson	14/19 Huay Kaew Rd.,Chiang I
Mary	Lewis	EB5101	572083775	Ralph	Chen	14/19 Huay Kaew Rd.,Chiang I
Prakarn	Unachak	CSB107	502023456	Ascending	Order	1/2 345 Ave. New York, USA
Prakarn	Unachak	CSB107	555555555	Niranaam	Raisakul	404 Nowhere Rd., Chiang Mai
Prakarn	Unachak	CSB107	571645508	Jane	Doe	5/3 Suthep Rd., Chiang Mai, T



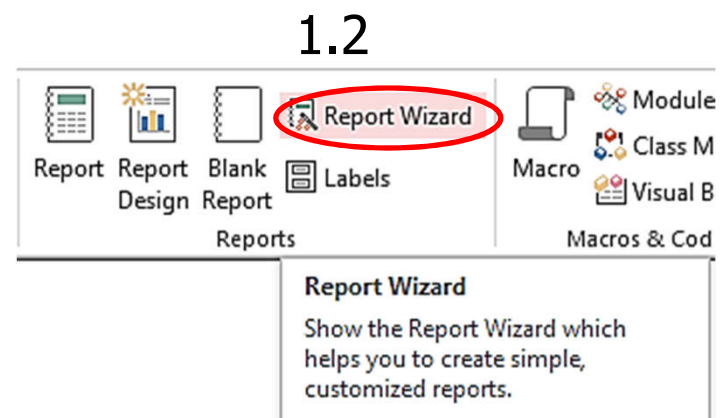
(5) Report

We now will take the result of **AdvisorStudent** query and put it on a report, for ease of reading.

1. We still works with **MyStudent** database

1.1 Click **Create** tab

1.2 Click **Report Wizard**



(5) Report (cont.)

2. We are now in **Report Wizard**

2.1 Select the data source under **Table/Queries**. For this example, select **Query: AdvisorStudent**



2.2 Select fields you want to show under **Available Fields**: For this example, choose all fields

2.3 Click **Next**

Report Wizard

Which fields do you want on your report?
You can choose from more than one table or query.

Tables/Queries
Query: AdvisorStudent

Available Fields:
Teacher.firstName
Teacher.lastName
roomNo
idStudent
Student.firstName
Student.lastName
address

Selected Fields:

2.1

2.2

2.3

Cancel < Back Next > Finish



(5) Report (cont.)

3. Select the table you want to view the data from

3.1 In this example, we choose **by Teacher**, with fields **firstName**, **lastName** and **roomNo**

3.2 click **Next**

3.1

Report Wizard

How do you want to view your data?

by Teacher
by Student

Show me more information

Teacher.firstName, Teacher.lastName, roomNo
idStudent, Student.firstName, Student.lastName, address

3.2

Cancel < Back Next > Finish

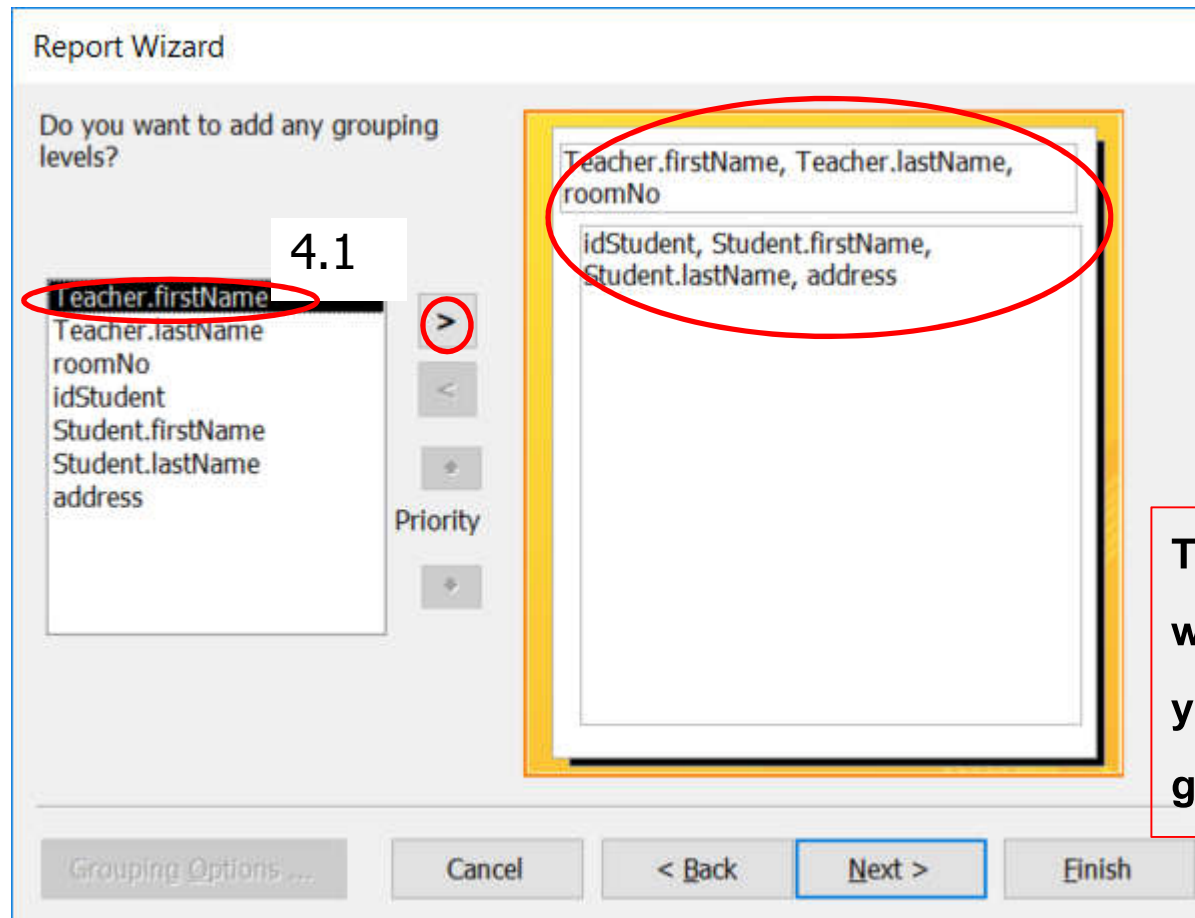
Since we have select to view from the “one” side, records from “many” side will be grouped under related records from the “one” side.



(5) Report (cont.)

4. Now we select additional grouping (optional)

4.1 For this example, select `Teacher.firstName`, then click 



Report Wizard

Do you want to add any grouping levels?

4.1

`Teacher.firstName`

`Teacher.lastName`

`roomNo`

`idStudent`

`Student.firstName`

`Student.lastName`

`address`

`Teacher.firstName, Teacher.lastName, roomNo`

`idStudent, Student.firstName, Student.lastName, address`

Priority

Grouping Options ...

Cancel

< Back

Next >

Finish

The preview will change as you select the grouping



(5) Report (cont.)

Report Wizard

Do you want to add any grouping levels?

Teacher.lastName
roomNo
idStudent
Student.firstName
Student.lastName
address

>
<
*
Priority
▼

Teacher.firstName
Teacher.lastName, roomNo
idStudent, Student.firstName,
Student.lastName, address

4.2

Grouping Options ... Cancel < Back Next > Finish

4.2 Then, click **Next**



(5) Report (cont.)

5. Next, we decide whether we want to sort the record, and by which field

5.1 In this example, click idStudent, to sort the record in the same group with Student ID, in Ascending order

5.2 click Next

Report Wizard

What sort order do you want for detail records?

You can sort records by up to four fields, in either ascending or descending order.

1	idStudent	↓	Ascending
2		↓	Ascending
3		↓	Ascending
4		↓	Ascending

5.1

5.2

Cancel < Back Next > Finish



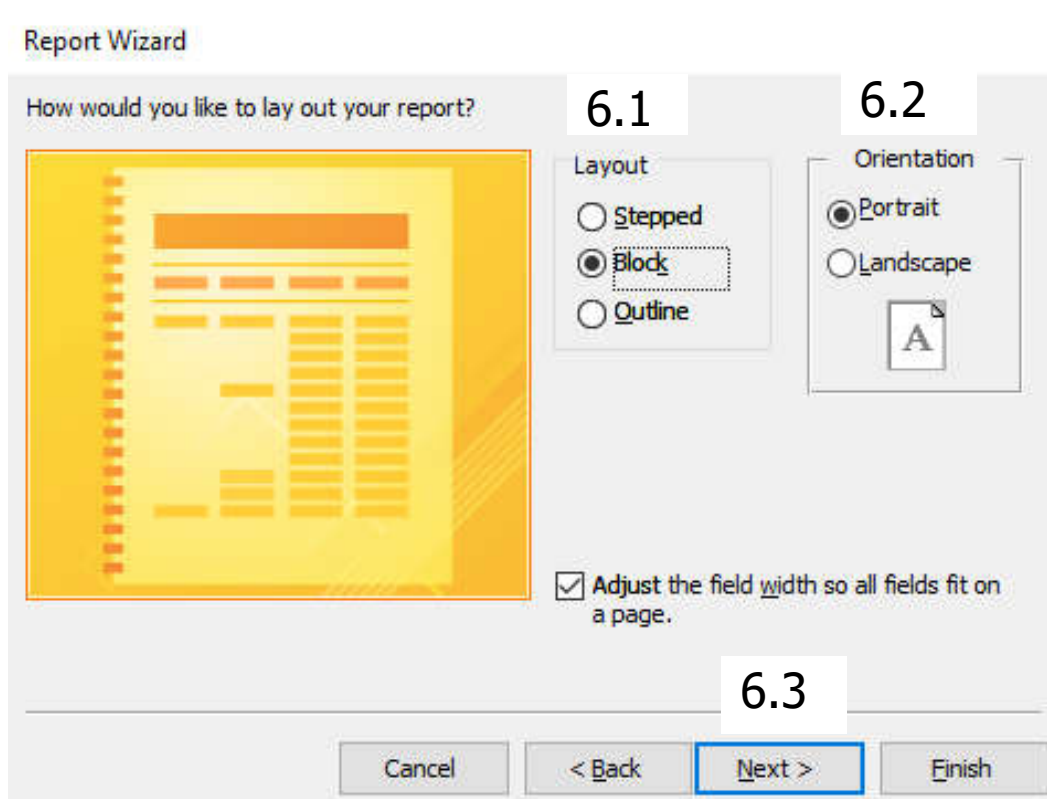
(5) Report (cont.)

6. Select layout of the report

6.1 First, select a layout. Pick **Block** for this example (preview on the left)

6.2 Next, pick an orientation. For this example, click **Portrait**

6.3 Click **Next**



The screenshot shows the 'Report Wizard' dialog box with the title 'How would you like to lay out your report?'. It is divided into two main sections: '6.1 Layout' and '6.2 Orientation'. In the '6.1 Layout' section, there are three radio button options: 'Stepped', 'Block' (which is selected and highlighted with a dotted border), and 'Outline'. To the left of these options is a preview of a report layout with a yellow background and a grid of fields. In the '6.2 Orientation' section, there are two radio button options: 'Portrait' (selected) and 'Landscape'. Below these options is a small icon of a document with the letter 'A'. At the bottom of the dialog, there is a checkbox labeled 'Adjust the field width so all fields fit on a page.' which is checked. At the very bottom, there are four buttons: 'Cancel', '< Back', 'Next >' (which is highlighted with a blue border), and 'Finish'.



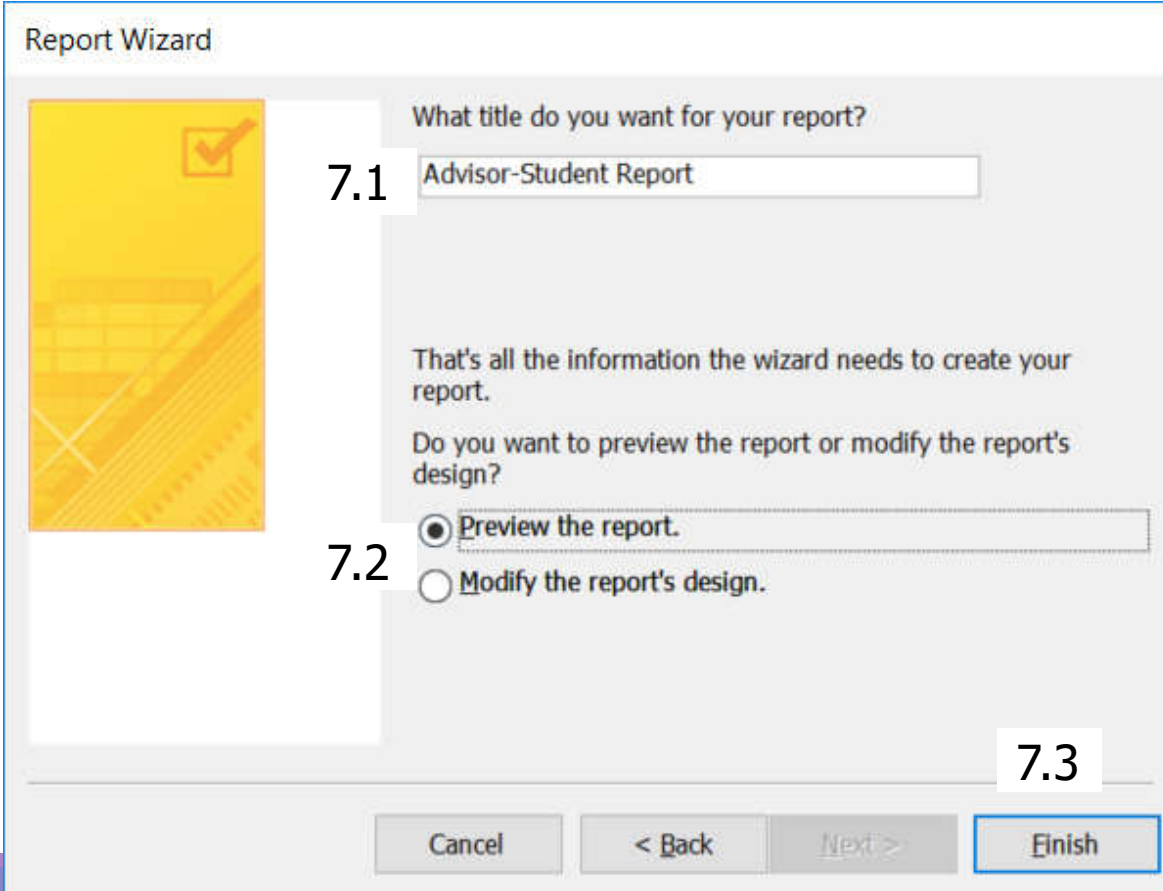
(5) Report (cont.)

7. Finishing touch: name the report and decide where to go next.

7.1 Give the report a title. For this example, use “**Advisor-Student Report**”

7.2 Select **Preview** the report, to see the report before printing.

7.3 Click **Finish**



Report Wizard

What title do you want for your report?

7.1 Advisor-Student Report

That's all the information the wizard needs to create your report.

Do you want to preview the report or modify the report's design?

7.2 ☒ Preview the report.
☐ Modify the report's design.

7.3

Cancel < Back Next > Finish



(5) Report (cont.)

The result:

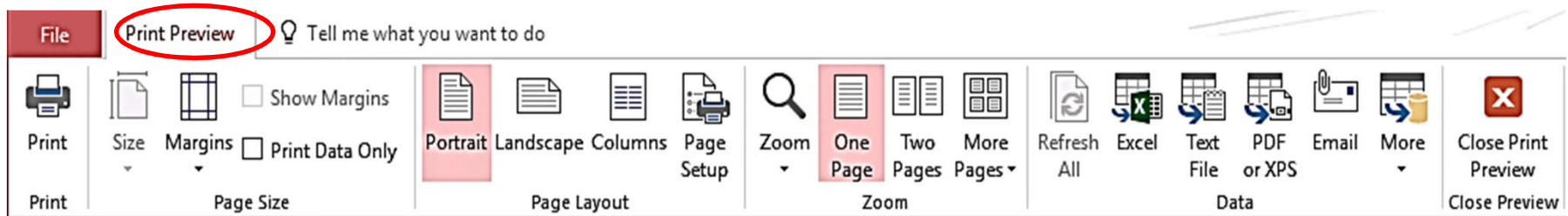
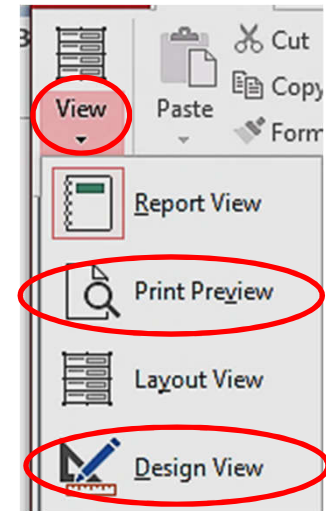
Advisor-Student Report

Teacher.firstName	Teacher.lastName	roomN	idStudent	Student.firstName	Student.lastName	address
Jackie	Chan	CSB11	5711234	Rahul	Narayanan	5/3 Suthep Rd., Chia
			5720141	Pi	Pi	5/3 Suthep Rd., Chia
Mary	Lewis	EB510	5720885	Laura	Smith	5/8 Cholpathan Rd.
			5708999	Paul	Indrome	1221 Abba Ave., Ba
			5716346	Michael	Robertson	14/19 Huay Kaew R
Prakarn	Unachak	CSB10	5720837	Ralph	Chen	14/19 Huay Kaew R
			5020234	Ascending	Order	1/2 345 Ave. New Y
			5555555	Niranaam	Raisakul	404 Nowhere Rd., C
			5716455	Jane	Doe	5/3 Suthep Rd., Chia



(5) Report (cont.)

- ❖ Go to Print Preview to see how the report would appear on paper
 - Print Preview tab will appear, where you can make some overall modification before printing
- ❖ Or go to Design View if you have



หากต้องจัดเก็บ รายงานนี้ให้ click save



(6) Form & Subform

- **Form** : is the user interface element that allow you to conveniently enter data into a table
- For this chapter, we'll cover **subform**, which is a form of records from the “many” table that will appear under record from “one” table the records are related to
- From the example, we have **Teacher** and **Student** tables, which are related
- The main form will show records from **Teacher** tables, while the subForms will display **student** records.
- You can use form/subform to add/edit/views data in both tables.

(6) Form & Subform (cont.)

To create Form/subform:

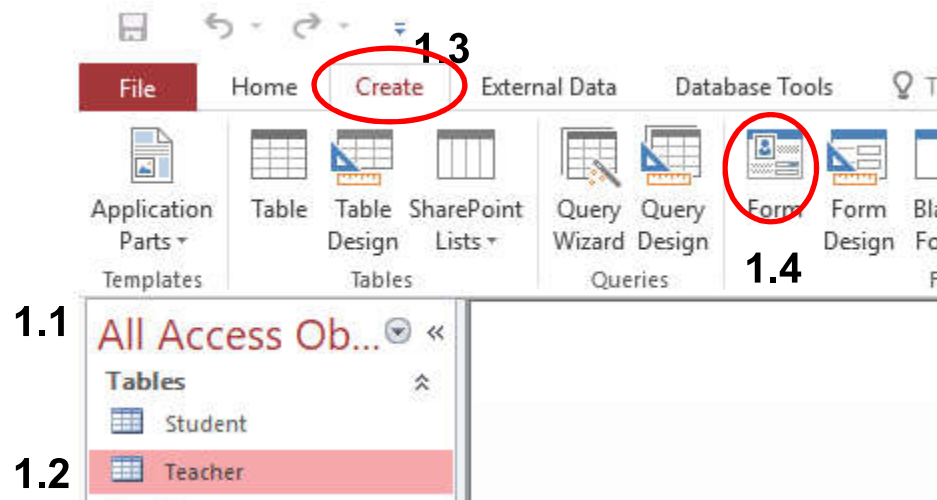
1. At navigation pane

1.1 Select **Table**

1.2 Click **Teacher**

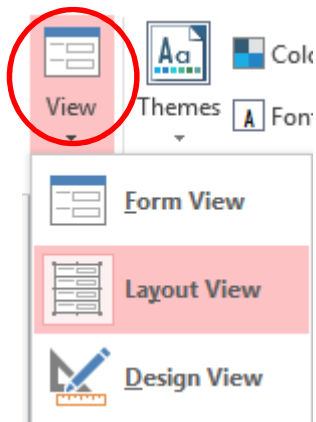
1.3 Go to **Create** tab

1.4 Click **Form**



(6) Form & Subform (cont.)

We will get a form and automatically go to **Layout** view



Teacher

Teacher

idTeacher: 1001

firstName: Prakarn

lastName: Unachak

roomNo: CSB107

tel: 053555555

idStudent	title	firstName	lastName	address	birth
502023456	Mr.	Ascending	Order	1/2 345 Ave. New York, USA	196
555555555	Mr.	Niranaam	Raisakul	404 Nowhere Rd., Chiang Mai, Thailand	199
571645508	Ms.	Jane	Doe	5/3 Suthep Rd., Chiang Mai, Thailand	199
*					

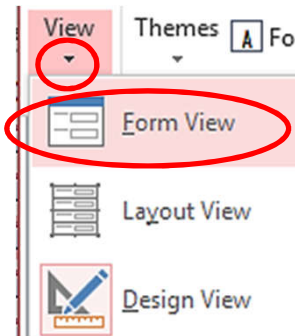
Record: 1 of 3 No Filter Search



(6) Form & Subform (cont.)

To view/enter/edit data:

- Click **View**, then select **Form View**

A screenshot of a 'Teacher' form. The form has fields for 'idTeacher', 'firstName', 'lastName', 'roomNo', and 'tel'. Below these fields is a subform containing a table of students. The table has columns for 'idStudent', 'title', 'firstName', 'lastName', 'address', 'birthdate', and 'GPA'. The table contains three rows of data. A red box highlights the '1 of 3' record indicator at the bottom of the subform.

idStudent	title	firstName	lastName	address	birthdate	GPA
502023456	Mr.	Ascending	Order	1/2 345 Ave. New York, USA	1967-08-09	2.34
555555555	Mr.	Niranaam	Raisakul	404 Nowhere Rd., Chiang Mai, Thailand	1995-04-01	4.00
571645508	Ms.	Jane	Doe	5/3 Suthep Rd., Chiang Mai, Thailand	1993-12-25	3.25

When you select a teacher, student he/she advises will appear in a subform, like a mini table, below teacher record

Here, Prakarn Unachak has 3 advisees.

Conclusion

To work with different types of data (tables) that are related, we need to:

- 1. Study the data**
- 2. Design the tables**
- 3. Define the relationship**

