

# **IT in Construction**

## **Lecture #5**

### **Construction Management Information System Detail Design and Implementation**

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**Construction Engineering and Management**



# Outline

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- Introduction
- Queries
- Forms

# Introduction

# Introduction

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- Up to this stage of the MIS development we could determine database structure (or data model) by determining data tables and their 3NF relationships and data media required for transferring data within the system and from/ to the database
- In detail design of an MIS system we need to develop data media recognized for the model
- Detail design and implementation has two stages:
  - 1) Collecting set of data required on the data flow media from different data tables: It is the subject of Queries!
  - 2) Presenting data collected on data flow media: It is our subject in forms development

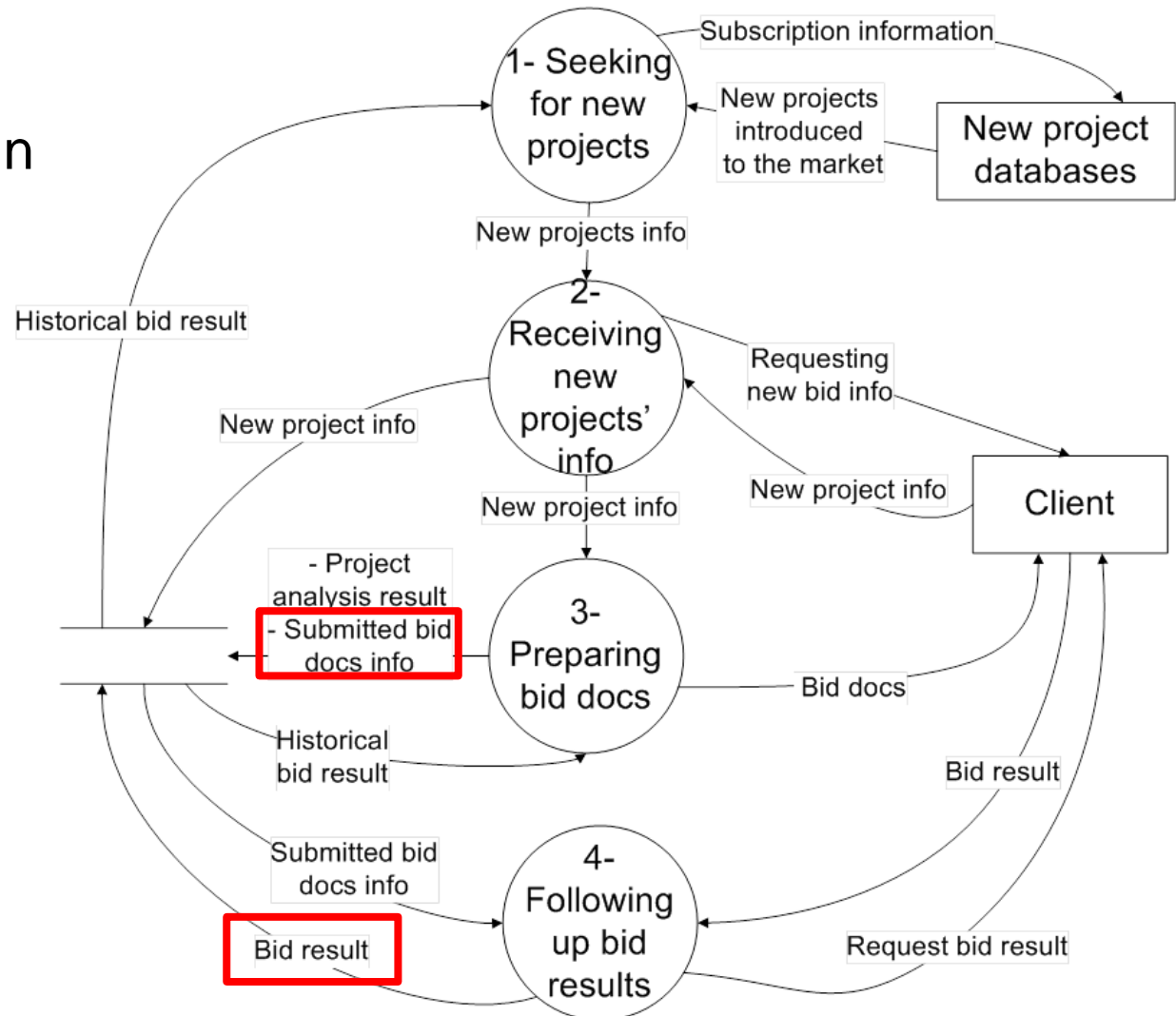
# Introduction

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## Example:

Remember data flow in our Bid Management System.

Lets focus on bid information!



# Introduction

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**Example:** Bid form from database is our main tool for bid data flow:

Data flow	Media
Sending subscription information	Email; Using provider's online form; Using provider's tel-lines; filling in client's form and sending by mail
Receiving new projects info (from data providers)	By Email; Letter; Directly reading from online account
Using historical bid results	A database-form ( <b>historical result form</b> )
Sending new projects' info	A database-form ( <b>announce project form</b> )
Storing new projects' info	A database-form ( <b>announce project form</b> )
Storing project analysis result	Copy of documents on the contracting manager's computer/ shelf; Info record on a database-form ( <b>announced project form</b> )
Storing submitted bid docs info	Original documents of documents on the contracting manager's computer/ shelf; Info record on a database form ( <b>bid form</b> )
Requesting new bid info (from client)	Verbally; phone; through email
Receiving new projects info (from client)	Verbally; phone; through email; letter
Submitting bid documents	Envelope; client's online website
Requesting bid results	Verbally; phone; through email
Receiving bid results	Verbally; phone; through email; letter
Storing bid results	Info record on a database form ( <b>bid form</b> )

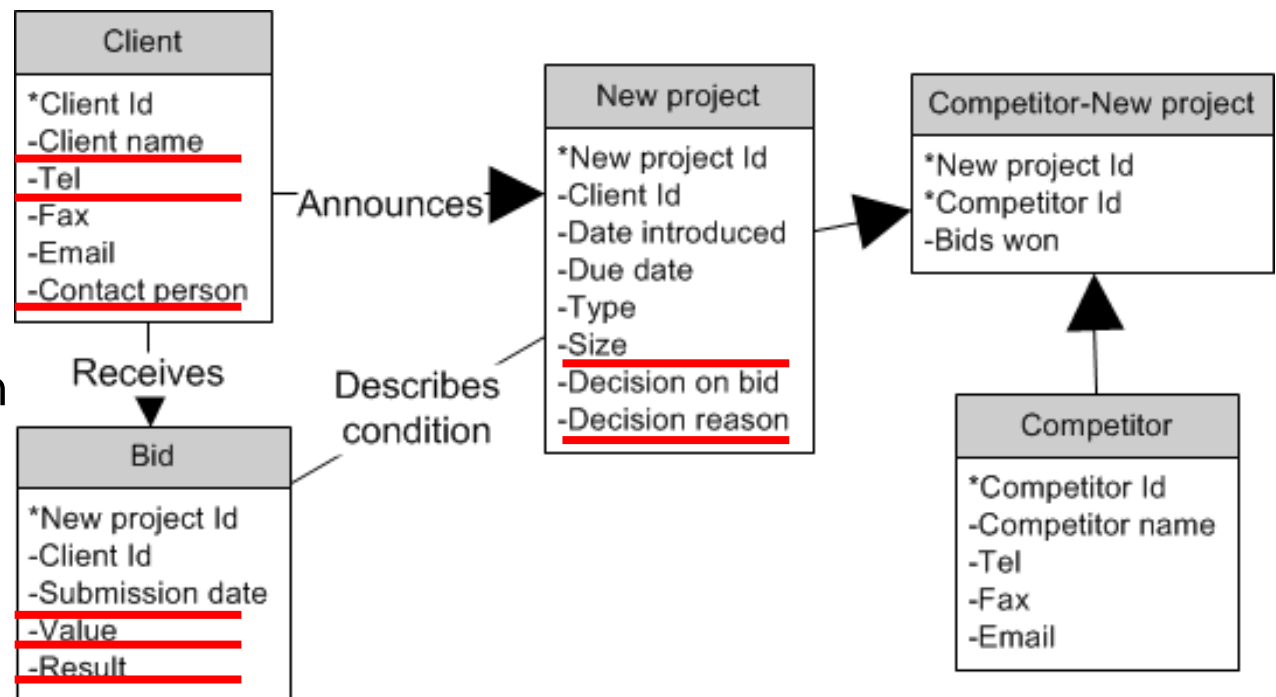
# Introduction

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## Example:

What information do we need to present on bid form?

- ▣ Project size
- ▣ Project type
- ▣ Bid decision reason
- ▣ Client name
- ▣ Client Tel
- ▣ Client contact person
- ▣ Submission date
- ▣ Value
- ▣ Result
- ▣ ...



# Introduction

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## **Example:**

- 1) Query helps us to find and collect related data from different data tables (New project, Client and Bid) of database
- 2) Bid form uses provided information by query to present data required on bid form

More information on each of these MIS development tools is discussed in the rest of the lecture!



# Queries

# Introduction to queries

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- In general, a query is a form of questioning, in a line of inquiry, and is used for communication with database!
- By using queries, selective set of data from/to different data tables can be selected/ inserted!
- In databases, queries are usually commands that we use for communicating with the database engine. They can be sent to the database engine directly through command line (if provided by the database; MS Access does not have a command line), through interface programming codes or by using set of tools provided by database software packages!

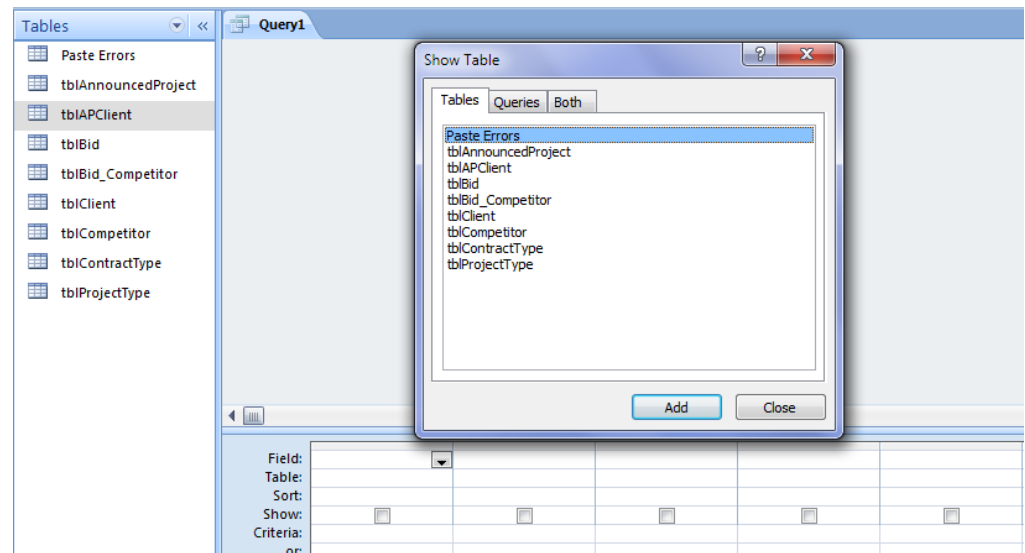
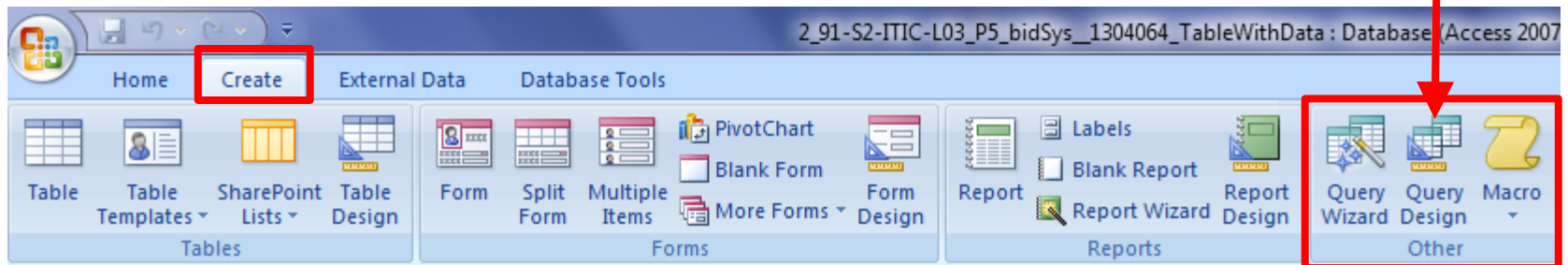
# Introduction to queries

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- Special language called Structured Query Language (SQL) has been developed for creating queried through scripts to the databases engine.
- To make the process of query development simpler, Microsoft has developed a special visual environment for query development for MS Access developers.
- Before start developing queries refer to data flow medial analysis results to determine data titles and data rows required for every media which has been identified.

# Introduction to queries

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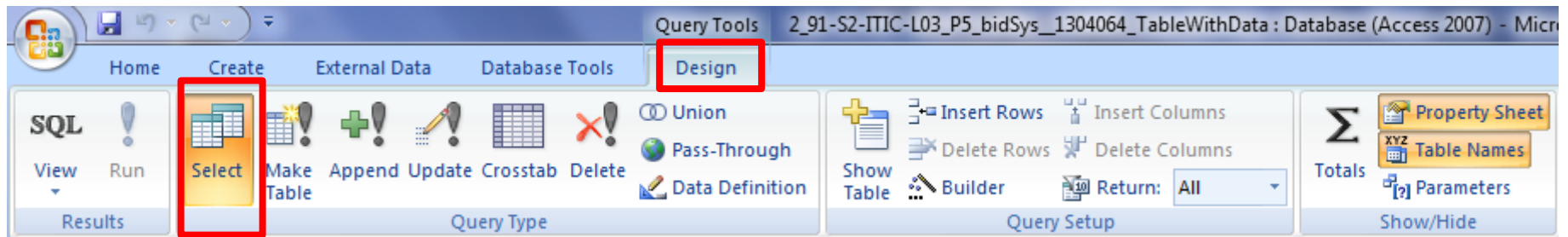
Hands on software (MS Access):

- Create query - design mode

# Select queries

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- Select queries are meant to retrieve required data tables stored in the database.



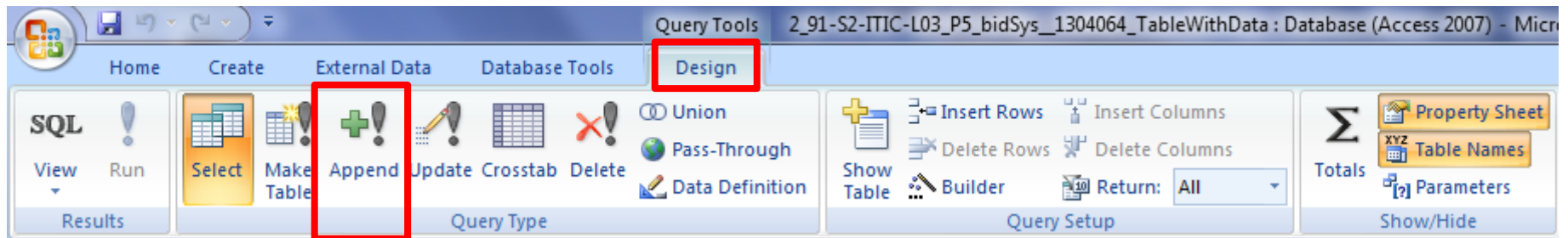
Hands on software (MS Access):

- Showing all records all fields
- Presenting selected fields
- Conditions on selected fields
- Calculated columns
- Aggregation queries
- Queries on several tables
- Queries on queries
- Column properties
- SQL ([Quick guide](#), [Detail guide](#))

# Append (insert) queries

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- Append (insert) queries are meant to add new data-rows to the required data tables within the database.



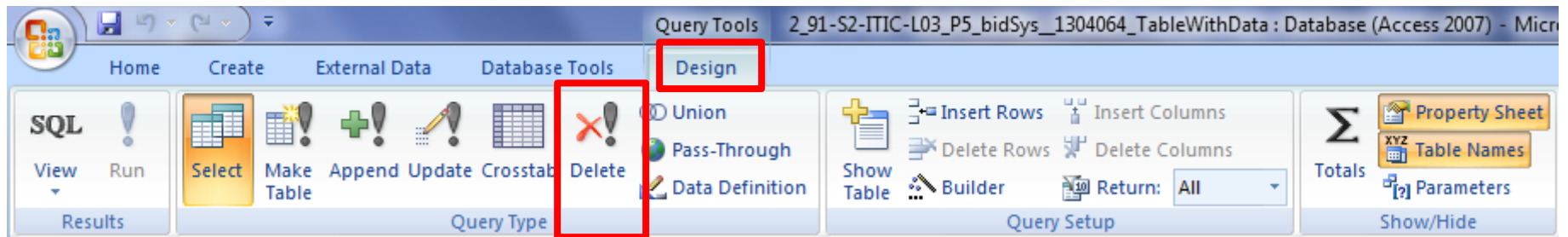
Hands on software (MS Access):

- Direct data entry
- Append data by query
- Append from other tables
- Properties
- SQL

# Delete queries

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- Delete queries are meant to delete data-rows from to the required data tables within the database.



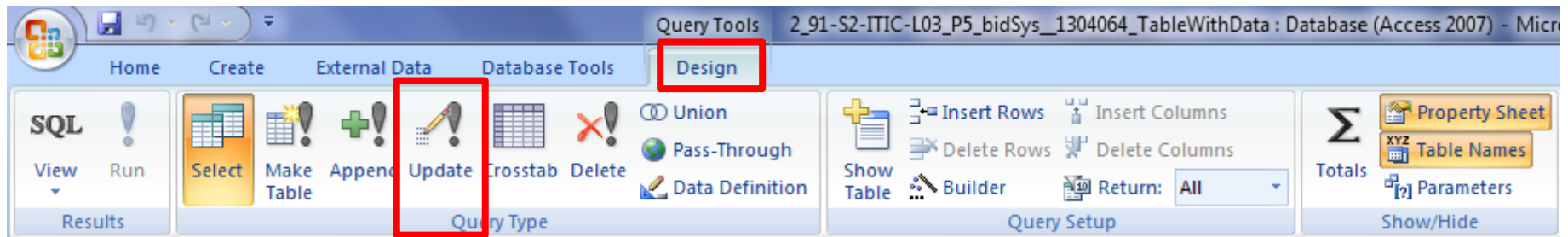
Hands on software (MS Access):

- Creating a delete query
- SQL

# Update queries

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- Update queries are meant to update data items within currently stored data-rows in the database.



Hands on software (MS Access):

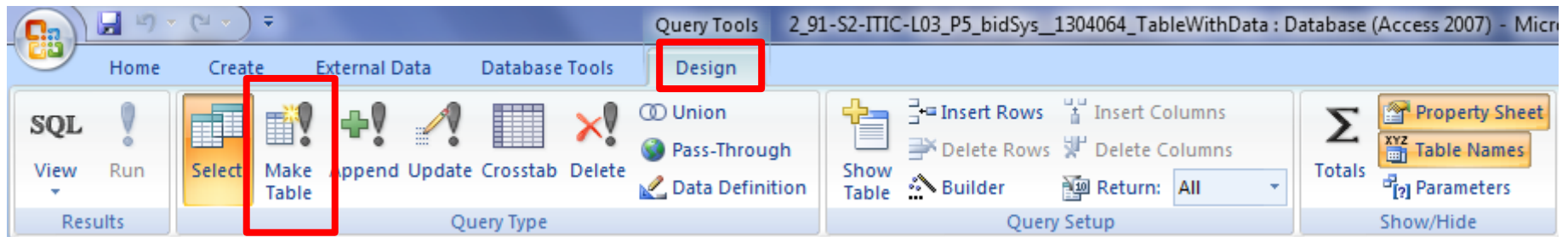
- Creating an update query
- SQL



# Make table queries

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- Update queries are meant to update data items within currently stored data-rows in the database.



Hands on software (MS Access):

- Creating a query
- SQL

# After class practice 1

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1) Use our bid management system data model to create MS Access database.



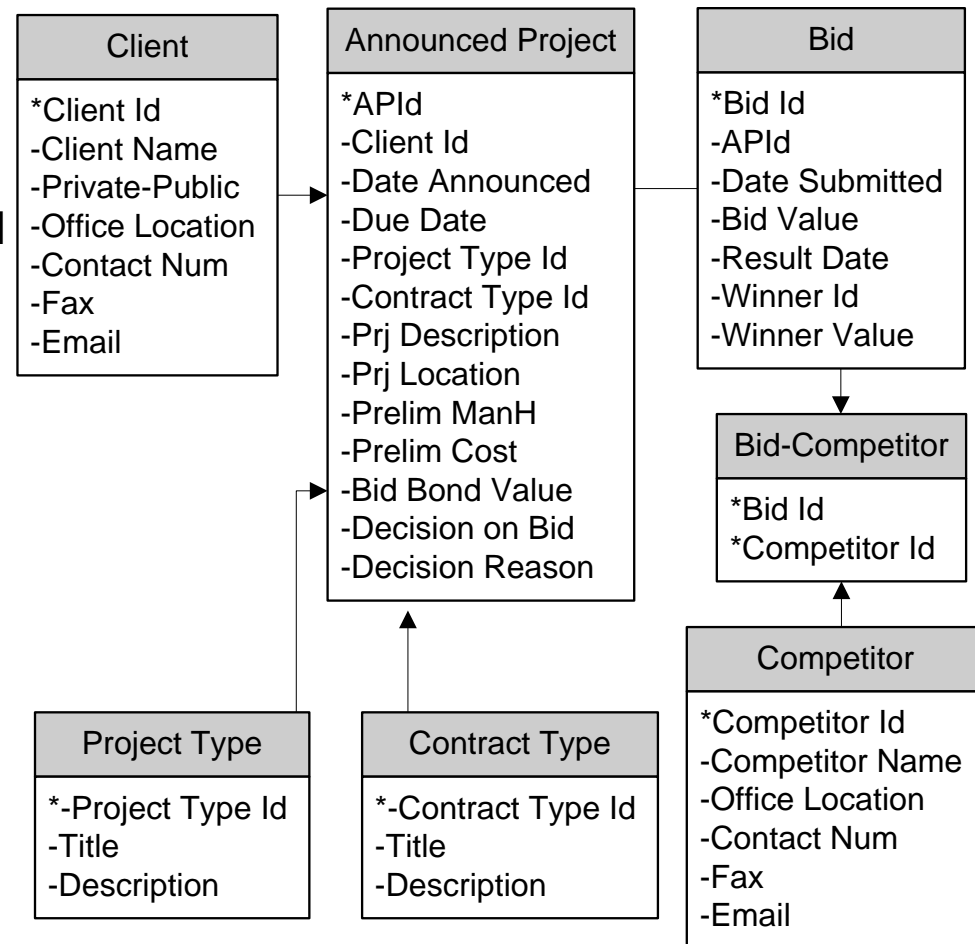
**Note:** No space should be used in field (or attribute) and Table (or entity) names in the database!

2) Create database relationship

3) Use data in the [MS-Excel file](#) to directly fill data in data tables


4) Create a query presents all project bids we have bided on in 2013

5) Create a query which shows different types of projects and contracts we have not won!



# After class practice 1

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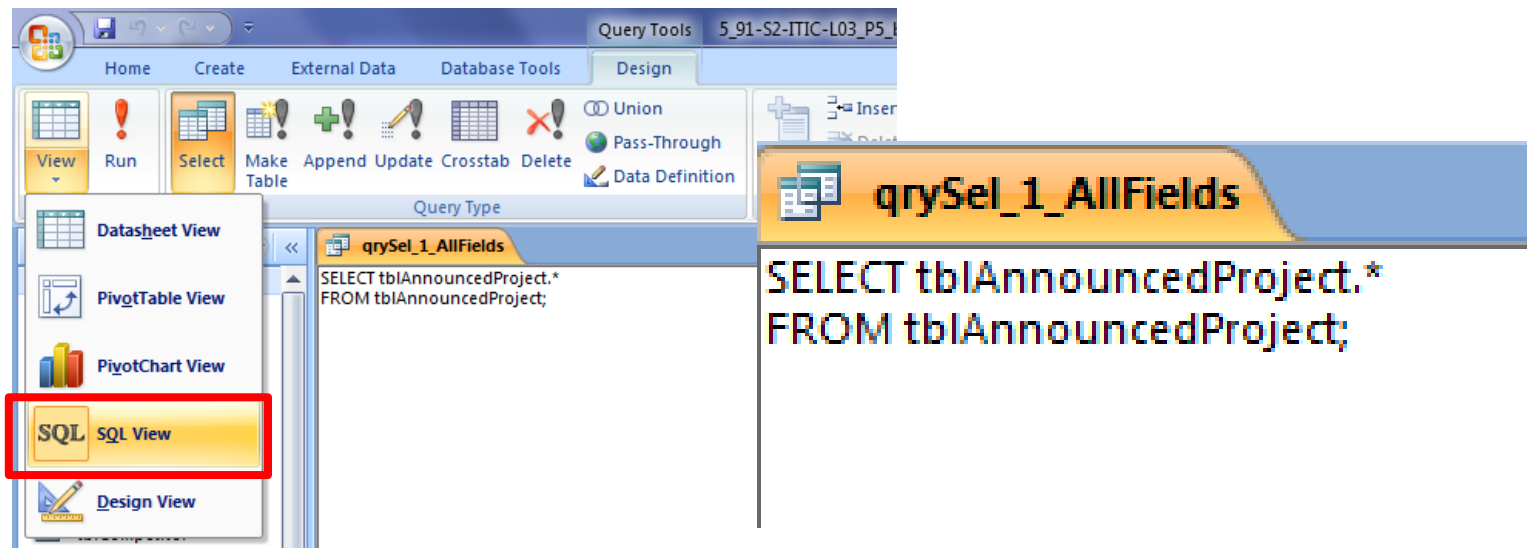
- 
- 6) Create a query which changes all Cost plus projects to Unit price projects!
  - 7) Create a query to insert a new project to the announced project table.  
The new project is very similar to “Sadr Highway” project, the only change is that it is going to be for “Hemmat Highway” and the date is 3 months later
  - 8) Create a query which shows the total value of all projects we have won!
  - 9) Create a query which deletes “Tehran” from our competitors!
  - 10) Create a new table the same as “Contract type” called “Subcontract type”

Compress your file (in a zip format) and send it to the TA

# Introduction to Structured Query Language (SQL)

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- ❑ SQL is a special language developed for communicating with database engine.
- ❑ All query features discussed and in last slides can be implemented directly by using SQL code.
- ❑ As a matter of fact, MS Access it self translates all those visual implementation of the queries to SQL codes and then communicates with database engine!



# Introduction to Structured Query Language (SQL)

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- Because of time constraint in the course and because MS Access can support all we are skipping required SQL codes in a visual manner we avoid entering SQL programming.
- If you were required SQL code for any types of queries you can easily develop it through MS Access query development tool and use the code
- You are absolutely encouraged navigating SQL codes of different queries developed by using MS Access query development tool.


# Data Forms

# Introduction to forms

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- Forms provide a more controlled and directed access to the data in a database application for the database users (remember how difficult and error-prone direct data input is!!!!)
- In most management information systems the main (or even usually the only) **interface** that users are dealing with are forms!

## Example 1:



**Sharif CEM**  
*Construction Engineering and Management Group*  
*Dr. Alvanchi's Student Performance Account*

Student ID:  Password:

Area Definition

Project\_ID:  Job\_ID:

Area_ID	Description
(New)	

Post Donations (receipts) for members

Batch Name:  User:  Posted:

Comments:

Default Account:

Dr. Account #	Description	Amount
1000	DESIGNATED FUNDS	\$20.00
4000	RECEIPTS	\$30.00

Ball:

Google

برای نمایش اصلاحیه تقویم آموزشی نیمسال جاری کلیک کنید

برای نمایش جدول تغییرات امتحانات اینجا کلیک کنید

سامانه آموزش دانشگاه صنعتی شریف - واحد فناوریهای معارف آموزشی و تحصیلات تکمیلی

نام دانشجو:

شماره کارتی:

رنگ عسکر:

Equipment Specification

Select an Equipment:

Equipment Detail | Repair Records | PM Records | Equipment Services | Equipment Service Schedule

Equip Code:  OldWSFCode:  Category:  Mfg:

Description:  SN:  SCode:  Model:

Assigned Department:  Charge Contr:  Locations:

In Service Date:  Cost (\$):

Warranty Exp. Date:  WarrantyNo:

Service Co. Name and Address:

Service Phones:

Warranty File:

# Introduction to forms

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- In information systems, forms are the main interactive media (or tools) which involves system users in creating, updating, transferring and removing data in computer databases!



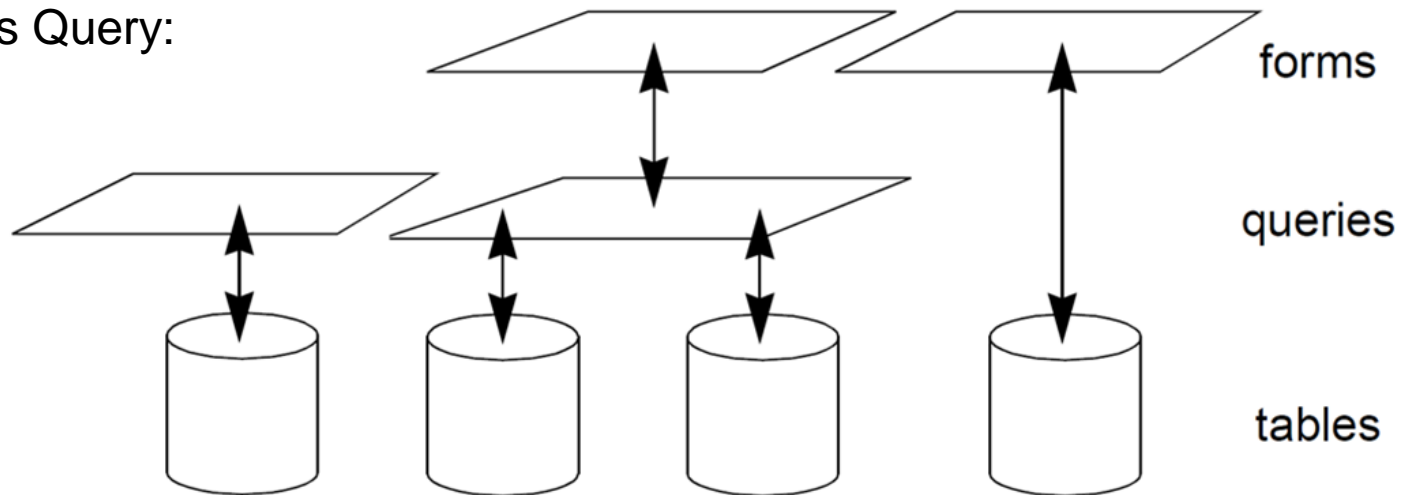
What other ways do you know that might be used for manipulating data in database?



# Introduction to forms

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Form Vs Query:



- Query and form can independently write/ call data into/ from database; however, we are forced to use queries if we want our forms' data go into/ come from several data tables.
- Use of queries for retrieving data from or updating databases is almost always limited to the information system administrator or through stored procedures within the databases.
- If we want to communicate with database interactively and via users, forms are our best tool for doing it.

# Introduction to forms

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How can we figure out what kinds of forms do we need in our system? Among different system analyzing tools which tool is more appropriate?

Using results achieved in our data flow media analysis

**Example:** Remember data flow media analysis we developed for our bidding management system

Data flow	Media
Sending subscription information	Email; Using provider's online form; Using provider's tel-lines; filling in client's form and sending by mail
Receiving new projects info (from data providers)	By Email; Letter; Directly reading from online account
Using historical bid results	A database-form ( <b>historical result form</b> )
Sending new projects' info	A database-form ( <b>announce project form</b> )
Storing new projects' info	A database-form ( <b>announce project form</b> )
Storing project analysis result	Copy of documents on the contracting manager's computer/ shelf; Info record on a database-form ( <b>announced project form</b> )
Storing submitted bid docs info	Original documents of documents on the contracting manager's computer/ shelf; Info record on a database form ( <b>bid form</b> )
Requesting new bid info (from client)	Verbally; phone; through email
Receiving new projects info (from client)	Verbally; phone; through email; letter

# Introduction to forms

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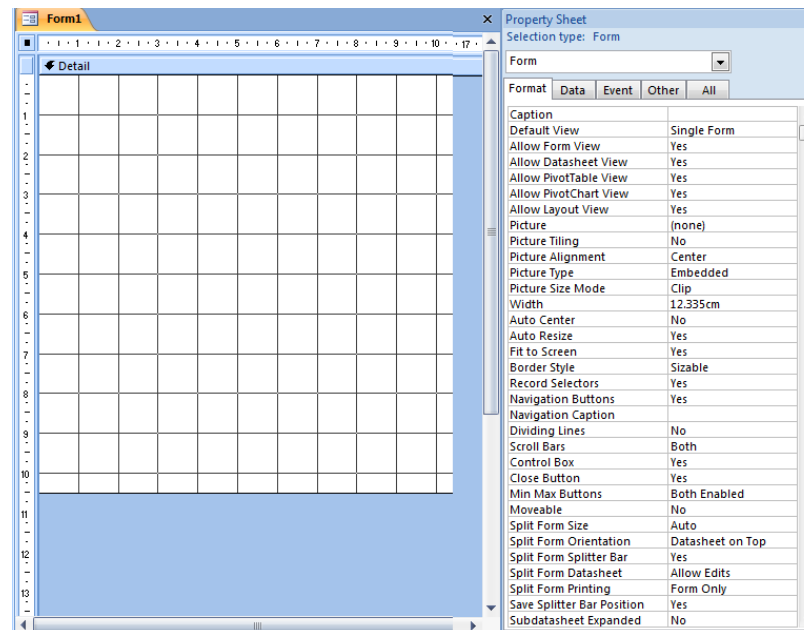
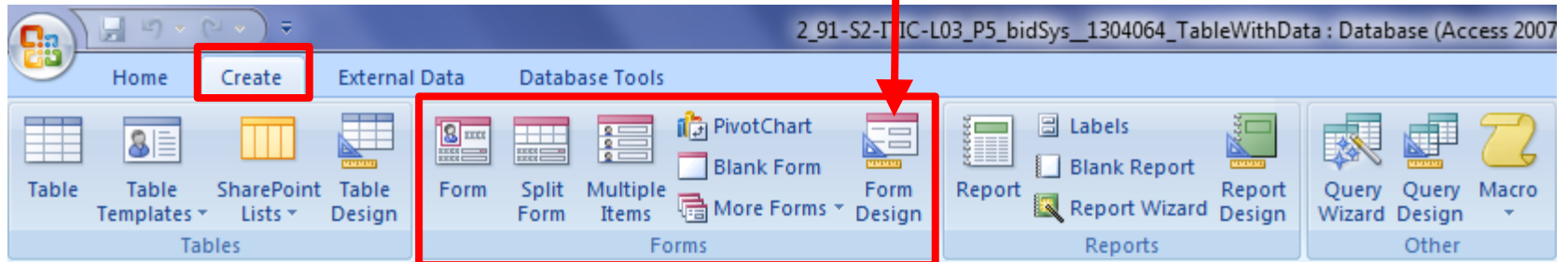


How can we figure out what kinds of information should go on a form ?

- Depending on the application of a form and data flow in the system some or all of fields (attributes) created for data tables (entities) are used in forms!
- So, for properly creating a form we need to review the form's mission by looking at the related data flows (in dfd) and data tables involved (3NF ERD or data model)!
- At the rest of this lecture we discuss different features of form development in MS. Access!

# Creating forms


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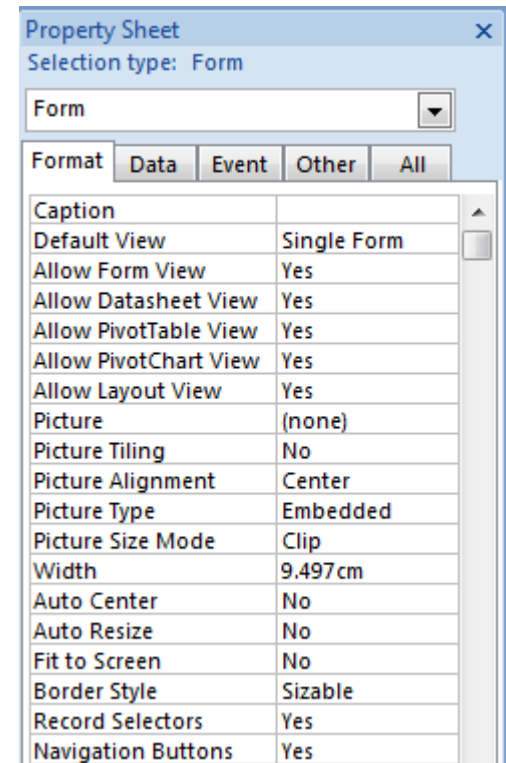
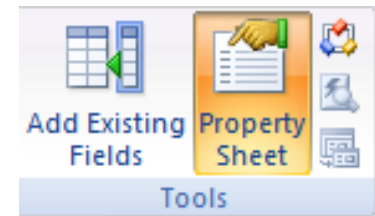


# Form properties

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- By selection the form and then selecting: Design> Property Sheet, Form Property Sheet will appear/ disappear (consecutively). Form properties are divided into four main parts: 1) Format (for adjusting form appearance) 2) Data (for setting up form's link to the database) 3) Event (for handling actions required on specific events happened!) 4) Other (for adjusting other features which are out of mentioned categories) (All, as the last category, includes all properties!)
- There are many properties available for the form. In this lecture we just discuss some of most applicable properties.

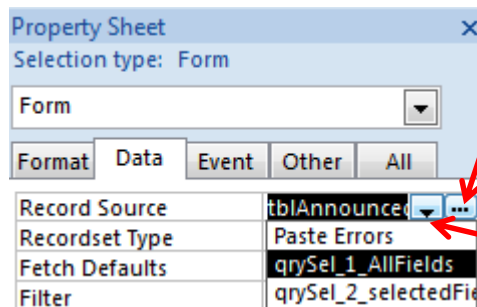
 **Note:** Most properties configure the form specifications on the *Form View* !



# Form properties - data

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- **Record Source:** Determines record set to be linked to the form as explained in the Form fields slides. You either select record set from drop-down list of tables and queries or directly develop a customized query (same as query design area).

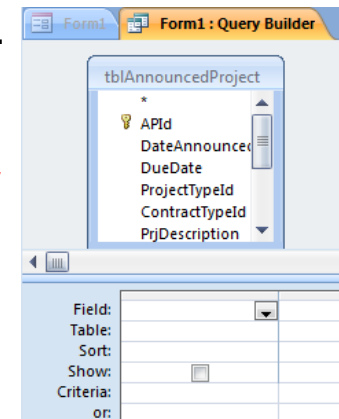


Open customized query development area

Show drop-down list of tables and queries



Customized query development area

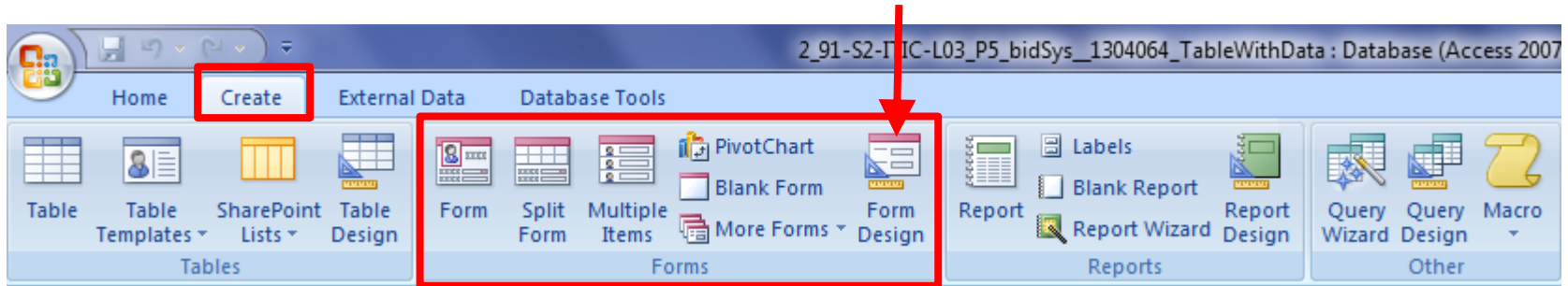


- **Allow Additions:** Determines whether the a new record can be added on the Form View (Yes) or not (No).
- **Allow Deletions:** Determines whether the a *whole* record can be deleted on the Form View (Yes) or not (No).
- **Allow Edits:** Determines whether record fields can be edited on the Form View (Yes) or not (No).

# Form fields

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- Forms can be created (recommended method) by following: Create>Form Design



- To be able to be linked to the database (data tables and queries) we need to link our form to a data-table or query by selecting the form, and following: Design> Property Sheet> Data> Record Source

Make sure the form is selected!

The diagram illustrates the process of linking a form to a data source. It starts with a screenshot of a form named 'Form1' in Design view. A red circle highlights the 'Form1' tab, with a red arrow pointing to it and the text 'Make sure the form is selected!'. A blue arrow points from the form to a 'Tools' task pane. In the 'Tools' pane, the 'Property Sheet' button is highlighted with a red box and has a red arrow pointing to it with the text 'Select the Property Sheet on Design tab'. Another blue arrow points from the 'Property Sheet' button to a 'Property Sheet' window. In the 'Property Sheet' window, the 'Data' tab is selected. The 'Record Source' property is highlighted with a red box, and a red arrow points to it with the text 'Select your desired table or query from the list of Record Source!'. The 'Record Source' dropdown menu is open, showing a list of tables and queries, including 'tblAnnouncedProje'.

Select the Property Sheet on Design tab

Select your desired table or query from the list of Record Source!

Property Sheet

Selection type: Form

Form

Format Data Event Other All

Record Source: tblAnnouncedProje

Recordset Type: Paste Errors

Fetch Defaults: qrySel\_1\_AllFields

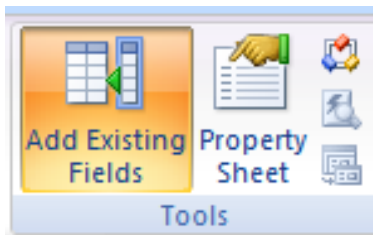
Filter: qrySel\_2\_selectedFields

# Form fields

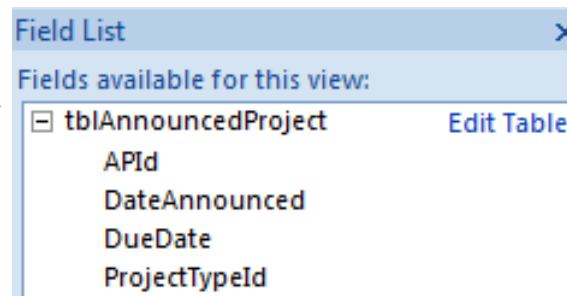
32

- Field list becomes accessible by selecting: Design> Add Existing Fields. You can then adjust field locations, sizes and the distance between label and field by selecting and dragging the label and the field borders!

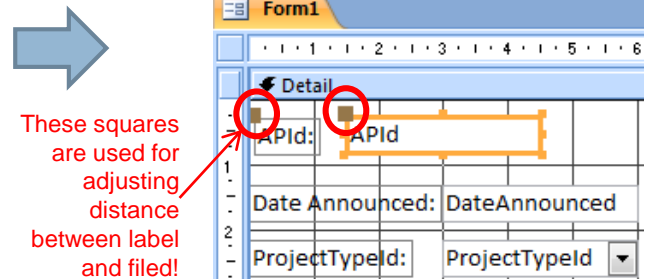
Select the Add Existing Sheet on Design tab



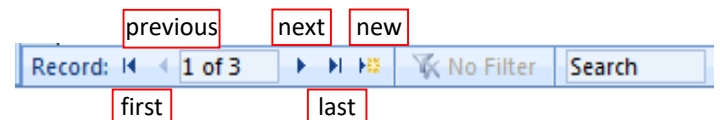
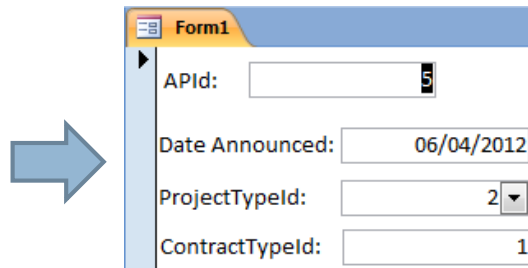
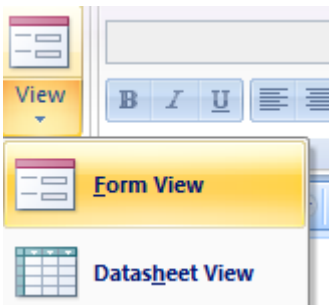
Select your desired fields by double clicking on them or dragging them on the form



Adjust the field and label size. Note different shapes of the cursor when approaching the borders when they are selected!



- Select: Design>View> Form View to see field values. As default, the first record of the record resource you have selected will be shown. Push the record selectors at the bottom to change the record/ go to the new record mode.





# Controls

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- There are different controls (Design> Controls) to be placed on forms. Some of them are meant to be linked (bound) to a field and present database data in their own way of data presentation and some others are used for the presentation and explanation purposes (are unbound)! By moving the cursor on the top of each control, a tool tip will be presented showing the control name. By clicking (or double-clicking) on a control, the control is selected and you can then draw the control on the specific location on the form that you like to use the control. You can also easily copy and paste the controls on form and populate them !

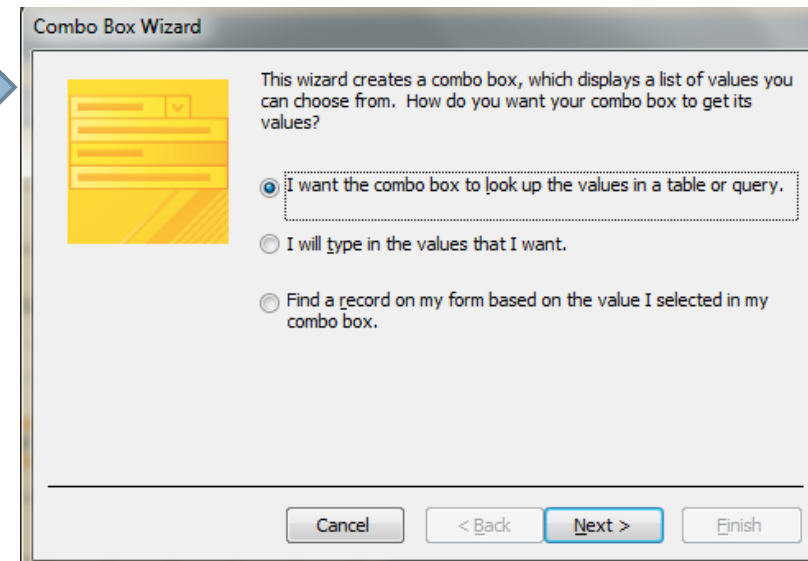
Set of form controls provided by MS Access



A label and a line control on the form (unbound)



A Combo Box Wizard automatically gets open by drawing it on the form!



- By drawing some of to be bounded controls on the form, a control wizard gets open helping the user on customizing and bounding the control to the database. You can either follow up the wizard steps or cancel the wizard and set the control manually!

# Controls

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- Labels and text boxes are among the most applicable controls. By default when you select a field (previous subject), the supporting control is a text box, which is linked (bound) to the field, and a label as a caption which is unbounded but by default gets the name of the linked field. By default by choosing a text box a supporting label is also attached to it. You can select and delete the label in cases you do not need it on the form.

A bound text box, drawn on the form as  
a form field

Date Announced:	DateAnnounced
-----------------	---------------

An unbound text box, drawn on the form  
as directly from control!

Text42:	Unbound
---------	---------

- More explanation on how we can bound and customize controls will be given later on in the lecture!

# Form creation and initial settings

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Hands on software (MS Access):

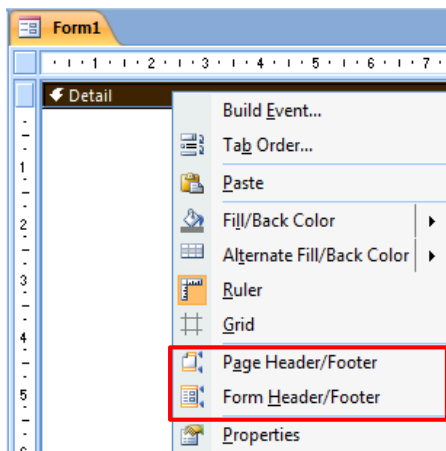
- Create a form linked with a table (tblAnnouncedProject)
- Adding fields to the form
- Removing extra information
- Adjusting field names
- Create queries for the forms
- Working with controls (Combo boxes, Labels, Textbox, ..)

# Form environment

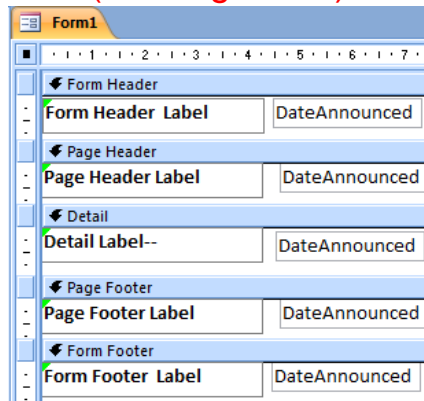
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- A form is divided into three parts: 1) detail (where usually fields are presented and by default is visible); 2) Form header/footer (presents data at the top of the form in the form view - Design> View> Form View); 3) Page header/ footer (presents data at the top of the page in the print view->Print). By right-clicking on the detail-ribbon on the top of the form (when no header/footer is chosen) or by right-clicking on the header/footer ribbons, a pop-up form drops down in which you can select/ unselect form/page header/footer.

Right-click on the detail ribbon to see the pop-up menu

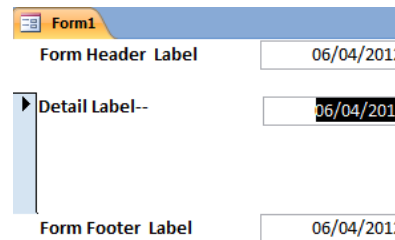


A form with all headers/footers selected (in design view)

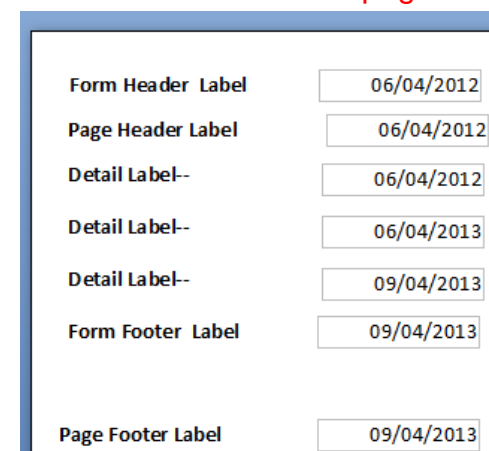


Form header/footer stays at the top/ bottom on the Form View.

Page header/footer are not shown



On the print, form header comes at the beginning, form footer goes at the end of data presented on the detail part. Page header goes on the top of each page and page footer goes on the bottom of each page



# Form properties - format

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- **Caption:** Sets the title of the form to be shown on the Form View!

Property Sheet  
Selection type: Form

Form

Format Data Event Other All

Caption **New Projects Announced**

Default View Single Form

Allow Form View Yes

Allow Datasheet View Yes



**New Projects Announced**

APId: 5

Date Announced: 06/04/2012

DueDate: 29/04/2012

- **Default view:** Determines the default presentation view of the form when it is opened!

There are 6 possible default view options

Property Sheet  
Selection type: Form

Form

Format Data Event Other All

Caption New Projects Announced

Default View **Single Form**

Allow Form View Single Form

Allow Datasheet View Continuous Forms

Allow PivotTable View Datasheet

Allow PivotChart View PivotTable

Allow Layout View PivotChart

Picture Split Form

By default  
"Single Form" is  
the default view

**New Projects Announced**

APId: 5

Date Announced: 06/04/2012

DueDate: 29/04/2012

ProjectType: 2

ContractType: 1

ContractType: 1

PrjLocation: Tehran

PrelimManH: 1000000

"Continuous  
Forms"

**New Projects Announced**

APId: 5

Date Announced: 06/04/2012

DueDate: 29/04/2012

ProjectType: 2

ContractType: 1

ContractType: 1

PrjLocation: Tehran

PrelimManH: 1000000

APId: 6

Date Announced: 06/04/2013

DueDate: 29/04/2013

ProjectType: 1

ContractType: 3

ContractType: 3

PrjLocation: Mazandaran

PrelimManH: 500000

"Datasheet"

**New Projects Announced**

APId	Date Announced
5	06/04/2012
6	06/04/2013
7	09/04/2013
*(New)	03/05/2013

"Split Form"

**New Projects Announced**

APId: 5

Date Announced: 06/04/2012

DueDate: 29/04/2012

ProjectType: 2

ContractType: 1

ContractType: 1

PrjLocation: Tehran

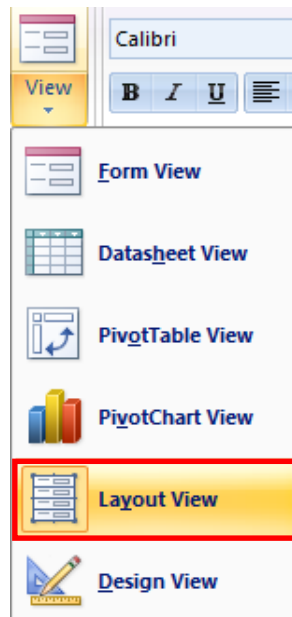
PrelimManH: 1000000

APId	Date Announced
5	06/04/2012
6	06/04/2013
7	09/04/2013
*(New)	03/05/2013

# Form layout view

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- All view types of the form have been discussed in different parts of the lecture except Layout View! Layout View is used for adjusting the form's layout when it is presented at the Form View. It looks like the Form View, but gives the capability to do layout and size adjustment on the form controls (easier than the Design View)!



In Layout View the form looks like the Form View but you can adjust its layout

The screenshot shows a form titled 'New Project Announced' in Layout View. The form contains several text boxes with labels and values. The 'APId' text box is highlighted with an orange border. The other text boxes are: 'DueDate' (29/04/2012), 'Date Announced' (06/04/2012), 'ContractTypeld' (1), 'PrjLocation' (Tehran), and 'PrelimManH' (1000000).

New Project Announced	
APId:	5
DueDate:	29/04/2012
Date Announced:	06/04/2012
ContractTypeld:	1
PrjLocation:	Tehran
PrelimManH:	1000000

# Form properties - format

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- **Record Selectors:** Determines whether record selector be shown (Yes) on the Form View or not (No).

Record selector: Yes

A screenshot of a form titled "New Project Announced". The form contains several input fields: APId (with a dropdown arrow), DueDate (29/04/2012), Date Announced (06/04/2012), ContractTypeld (1), PrjLocation (Tehran), and PrelimManH (1000000). A red arrow points to the top-left corner of the form, indicating the record selector.

Record selector: No

A screenshot of a form titled "New Project Announced". The form contains several input fields: APId (with a dropdown arrow), DueDate (29/04/2012), Date Announced (06/04/2012), ContractTypeld (1), PrjLocation (Tehran), and PrelimManH (1000000). There is no record selector visible in the top-left corner.

- **Navigation Buttons:** Determines whether navigation buttons be shown (Yes) on the Form View or not (No).

A screenshot of a form titled "New Project Announced". The form contains several input fields: APId (with a dropdown arrow), DueDate (29/04/2012), Date Announced (06/04/2012), ContractTypeld (1), PrjLocation (Tehran), and PrelimManH (1000000). At the bottom of the form, there is a navigation bar with buttons for "Record", "1 of 3", and "No Filter". A red arrow points to the "1 of 3" button.

Navigation Buttons: Yes

A screenshot of a form titled "New Project Announced". The form contains several input fields: APId (with a dropdown arrow), DueDate (29/04/2012), Date Announced (06/04/2012), ContractTypeld (1), PrjLocation (Tehran), and PrelimManH (1000000). There are no navigation buttons visible at the bottom of the form.

Navigation Buttons: No

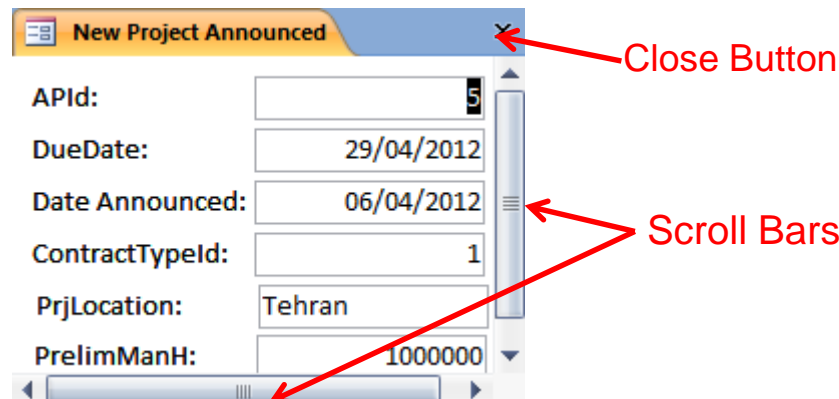
A screenshot of the "Property Sheet" for the form. The "Selection type" is set to "Form". The "Format" tab is selected. The "Record Selectors" and "Navigation Buttons" properties are highlighted with a red box, both set to "Yes".

Property Sheet	
Selection type: Form	
Form	
Format Data Event Other All	
Allow Layout View	Yes
Picture	(none)
Picture Tiling	No
Picture Alignment	Center
Picture Type	Embedded
Picture Size Mode	Clip
Width	6.587cm
Auto Center	No
Auto Resize	No
Fit to Screen	No
Border Style	Sizable
Record Selectors	Yes
Navigation Buttons	Yes
Navigation Caption	

# Form properties - format

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- **Scroll Bars:** Determines whether scroll bars be shown on the Form View when some controls are outside of the form limits or not!



- **Close Button:** Determines whether form's close button be active at the Form View or not!
- **Orientation:** Determines the text orientation on the form controls from right-to-left or left-to-right!

Property Sheet	
Selection type: Form	
Form	
Format	Data
Allow Layout View	Yes
Picture	(none)
Picture Tiling	No
Picture Alignment	Center
Picture Type	Embedded
Picture Size Mode	Clip
Width	6.651cm
Auto Center	No
Auto Resize	No
Fit to Screen	No
Border Style	Sizable
Record Selectors	No
Navigation Buttons	No
Navigation Caption	
Dividing Lines	No
Scroll Bars	Both
Control Box	Neither
Close Button	Horizontal Only
Min Max Buttons	Vertical Only
Moveable	Both
Split Form Size	Auto
Split Form Orientation	Datasheet on Top
Split Form Splitter Bar	Yes
Split Form Datasheet	Allow Edits
Split Form Printing	Form Only
Save Splitter Bar Position	Yes
Subdatasheet Expanded	No
Subdatasheet Height	0cm
Grid X	10
Grid Y	10
Layout for Print	No
Orientation	Left-to-Right
Palette Source	(Default)



# Form basic formatting

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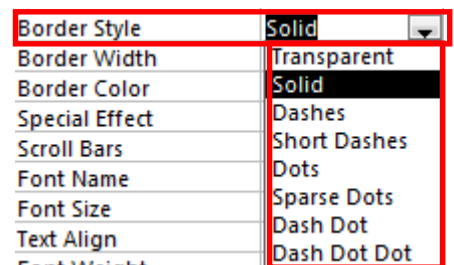
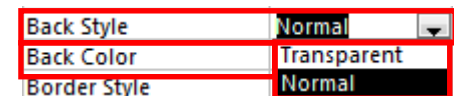
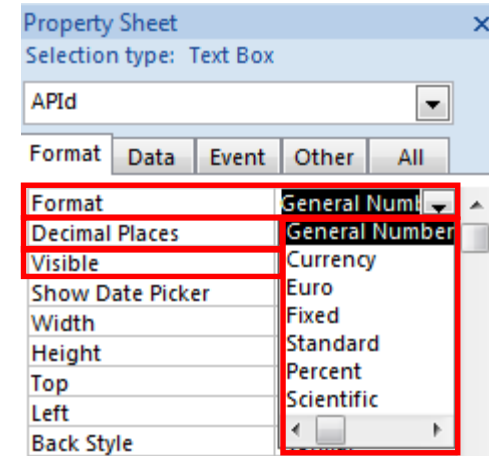
Hands on software (MS Access):

- Form environment (header/footer)
- Form view
- Layout view
- Record navigation

# Text box properties - format

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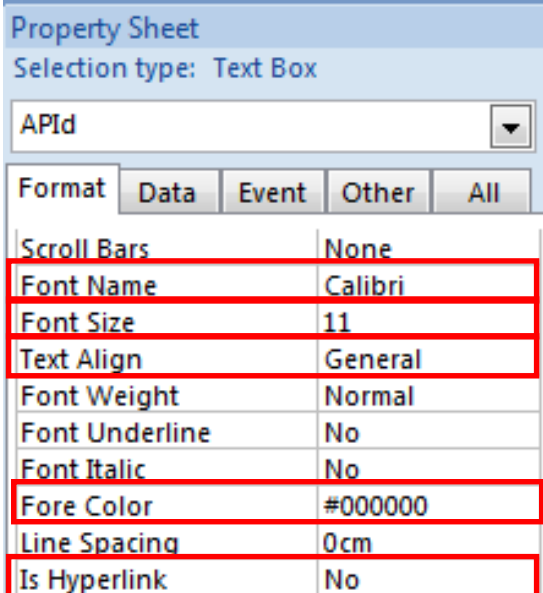
- **Format:** It is basically applicable for numerical values. The value types are very close to ones we had for MS Excel.
- **Decimal Places:** It determines the decimal place of the numerical values!
- **Visible:** It determines whether text box should be visible (Yes) on the Form View or not (No)!
- **Back Style:** To select Normal back style or Transparent!
- **Back Color:** Gives option to select the back color from the list or to pick a color from the color picker.
- **Border Style:** Different border styles can be picked from the drop-down list (try different styles so that you can see the changes!).



# Text box properties - format

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- **Font Name:** Selecting the font name.
- **Font Size:** Determining the font size.
- **Text Align:** Determining the text alignment.
- **Is Hyperlink:** Set it as Yes if you have a url (web) address on the text box shown and you want the user to be able to go to that address when is required!
- **Fore Color:** Gives option to select the font color from the list or to pick a color from the color picker.
- **Keyboard Language:** Determines the default keyboard language of the text box.



Property Sheet  
Selection type: Text Box

APIId

Format Data Event Other All

Scroll Bars	None
Font Name	Calibri
Font Size	11
Text Align	General
Font Weight	Normal
Font Underline	No
Font Italic	No
Fore Color	#000000
Line Spacing	0cm
Is Hyperlink	No

# Text box properties - data

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- **Control Source:** Determines the name of the field whose values are presented on the Form View in the text box!
- **Default Value:** Determines the default value of the text box where there is no other value is set for the text box!
- **Enabled:** If is set No shows the value of the text box in a shadowed format with no access for editing the value!

Disabled  
(Enable: No) →

textbox

APIId:	5
DueDate:	29/04/2012
Date Announced:	06/04/2012

- **Locked:** If is set Yes shows the value of the text box in a regular format but with no access for editing the value!

Property Sheet

Selection type: Text Box

APIId

Format Data Event Other All

Control Source	APIId
Text Format	Plain Text
Input Mask	
Default Value	
Validation Rule	
Validation Text	
Filter Lookup	Database Default
Enabled	Yes
Locked	No
Smart Tags	

# Text box properties - other

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- **Name:** Determines the name of text box. This name is usually used for referencing the text box on the programming mode!
- **Control Tip Text:** To determine the explanatory text which is shown when cursor stays on the text box for a bit!

APId:

DueDate:

Announced Project Id

- **Tab Index:** Tab index determines the order of filling the information on the form. It is called tab index since this order can be followed by consecutively pushing the Tab key! You can directly change the tab number to the order you desire or open the *Tab Order* by pushing the picker (...)
- **Tab Stop:** Determines whether the text box to be on the tab index list (Yes) or not (No). If text box is no on the tab index list, you will not reach it by pushing Tab key (just by using the cursor you can go to the text box).

Property Sheet  
Selection type: Text Box

APId

Format Data Event Other All

Name	APId
Datasheet Caption	
Enter Key Behavior	Default
ControlTip Text	Announced Project Id
Tab Index	0
Tab Stop	Yes

Tab Order

Section: Detail

Custom Order:

APId	=0 (Tab index starts with 0)
DueDate	=1
DateAnnounced	=2
ContractTypeId	...
PrjLocation	
PrelimManH	

Tab order can be set for the form Detail, header and footer


Order of the rows represent the Tab Order. You can change the order of the by selecting the row and dragging it to the order desired!


Click to select a row, or click and drag to select multiple rows. Drag selected row(s) to move them to desired tab order.

OK Cancel Auto Order

# Combo box properties - notes

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 **Note 1:** Most properties discussed for the text box have the same effects on the combo box. Here we only discuss some important properties for combo box which we did not discuss for the text box!

 **Note 2:** You can properly configure combo box by step by step following Combo Box Wizard which automatically appears after drawing the combo box on the form. In this section we discuss how you manually (by directly using properties) can configure a combo box! You will get a better understanding on the Wizard steps by understanding following properties as well. So, for now cancel the Wizard and start configuring the combo box manually!

# Combo box properties - format

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- **Column Count:** Determines maximum number of column to be shown on the combo box list!
- **Column Width:** Determines width of each column (separated by “;”) on the drop down list.
- **Column Heads:** Determines whether the column headings be shown on the list or not!
- **List Rows:** Determines maximum number of rows to be shown on the combo box list!
- **List Width:** Determines the width of the combo box to be shown!

Property Sheet  
Selection type: Combo Box  
Combo64

Format	Data	Event	Other	All
Format				
Decimal Places	Auto			
Visible	Yes			
Column Count	2			
Column Widths	3cm;1cm			
Column Heads	Yes			
List Rows	16			
List Width	4cm			

Combo box with 2 columns and 3 rows

Contract Type Id:

Title	CTId
Lumpsum	1
Unit Price	2
Cost plus	3

Combo box value

Column 2 Heading

# Combo box properties - data

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- **Control Source:** Determines the field name in which combo box value will be stored. Can be selected from the dropped down list.
- **Row Source:** Defines the record set is used for filling information on the combo box list! It can be selected from drop down list of queries and tables or by directly defining a query. Query development environment will be opened when “...” button in pushed!
- **Bound Column:** Determines the row source (= shown on the combo box list) column number whose data needs to be stored in the control source. For example: We have determined bound column number 2 which is CTId (or Contract Type Id) to be stored in the ContractTypeId field of the form!

Property Sheet	
Selection type: Combo Box	
Combo64	
Format	Data
Event	Other
All	
Control Source	ContractTypeId
Row Source	SELECT tblContractType...
Row Source Type	Table/Query
Bound Column	2
Limit To List	Yes
Allow Value List Edits	Yes
List Items Edit Form	
Inherit Value List	Yes
Show Only Row Source	No
Input Mask	
Default Value	
Validation Rule	
Validation Text	
Enabled	Yes
Locked	No
Auto Expand	Yes
Smart Tags	

Contract Type :

Lumpsum	
Title	CTId
Lumpsum	1
Unit Price	2
Cost plus	3

Value of column 1 is shown but column 2 is bounded and copied to the control source

Bound Column = 2

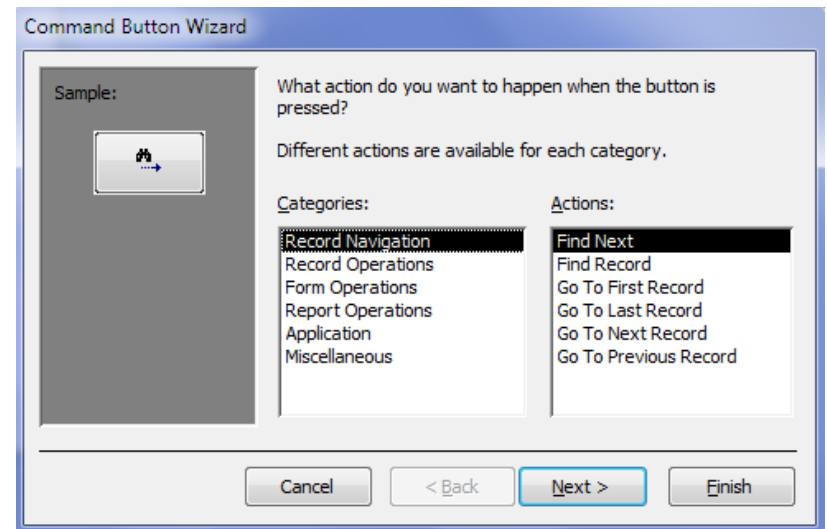
- **Limit to List:** Determines whether all data stored in the control sources need be on the combo box list (Yes) or not (No)!



# Button properties - wizard

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- Button is a control used for running different commands related to the form or to the database. By drawing a button control on a form the Command Button Wizard gets open for helping the form developer on different types of commands which might be required. The wizard automatically generates supporting VBA programming codes and suggests different button samples for different types of commands.
- There are a variety of VBA functions and form features for supporting button commands which is difficult to remember specially for the occasional form developers. It is recommended that you start developing form buttons with Wizard and then continue customizing and completing them using properties.
- Navigate and see different Categories and Actions and see different categories and actions available for supporting button.
- For example we want to create a Close button by pushing which the form is closed!  
*Categories: Form Operation > Actions: Close Form*



# Button properties - wizard

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Command Button Wizard

Sample:

Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

☐ Text:

☒ Picture: 

Exit Doorway  
Stop

☐ Show All Pictures

Cancel < Back Next > Finish



Command Button Wizard

Sample:

What do you want to name the button?

A meaningful name will help you to refer to the button later.

That's all the information the wizard needs to create your command button. Note: This wizard creates embedded macros that cannot run or be edited in Access 2003 and earlier versions.

Cancel < Back Next > Finish



New Projects Announced

APId:

Date Announced:

DueDate:


Project Type:

ContractTypeId:

ContractTypeId:

PrjLocation:

PrelimManH:

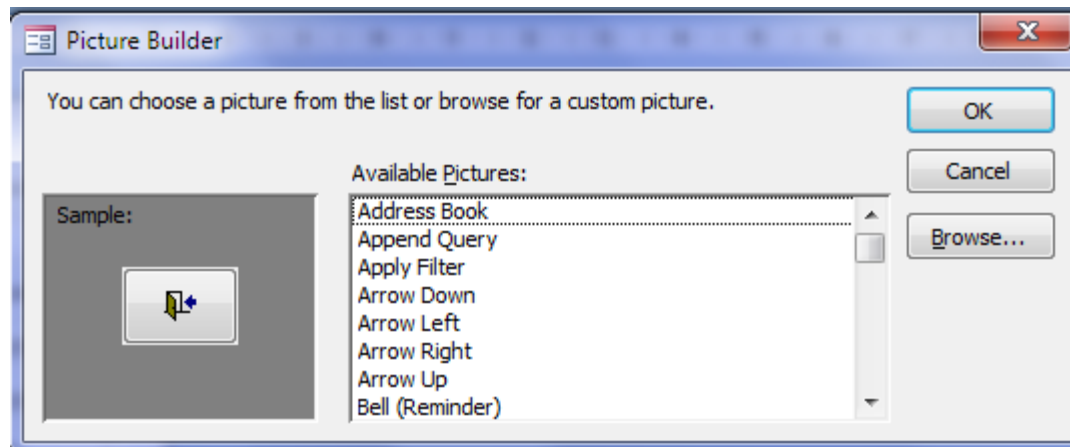
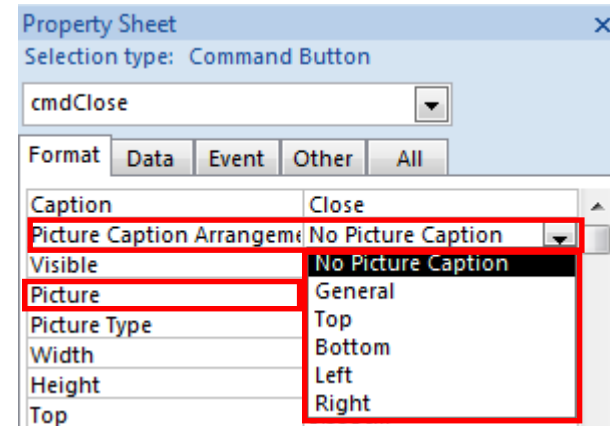


Close button created  
by use of wizard

# Button properties - format

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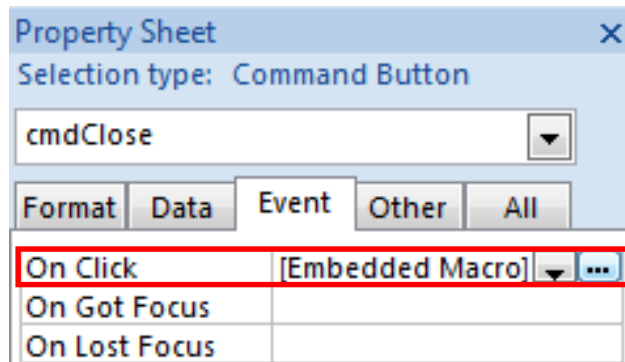
- **Picture Capture Arrangement:** Determines whether only Picture, or a combination between picture and the button caption be shown on the button.
- **Picture:** Can be added by pushing “...” button and working with the picture builder form.



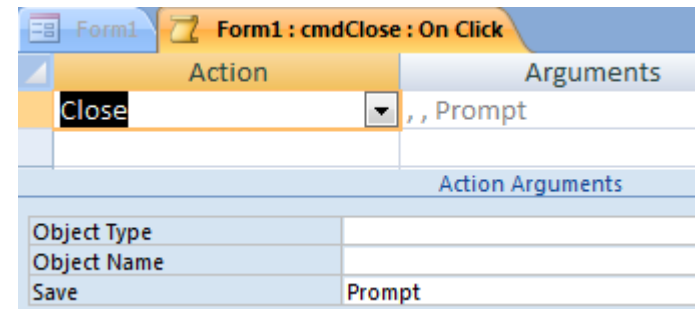
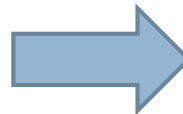
# Button properties - event

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- **Event** is an action or occurrence detected by the program which may be handled by the program.
- Buttons are usually used to let the user apply his/her actions by creating on-Click event (i.e., by pushing the button).
- A variety of events are defined for almost all controls. However, as a result of very their specific and advanced applications, we avoid explaining them.
- In this course we just discuss button's on-Click event handling. You are encouraged to explore other types of events.
- **On Click:** Defines the handling method when button's on-Click event is created!



By pushing "... " key,  
information of saved  
macro is shown

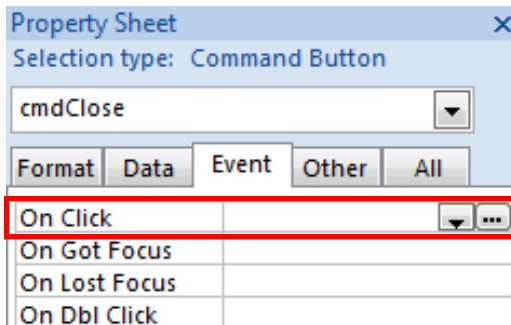


# Button properties - event

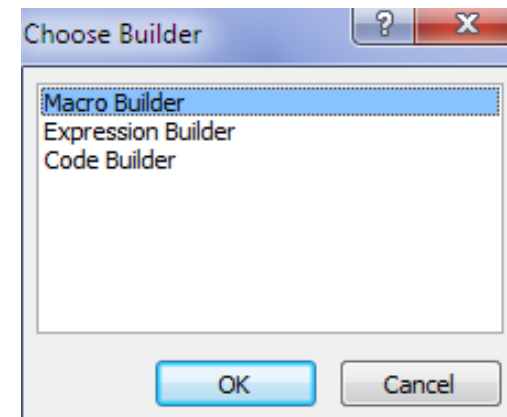
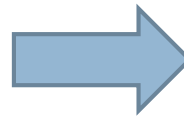
53

## □ On Click (cont'd):

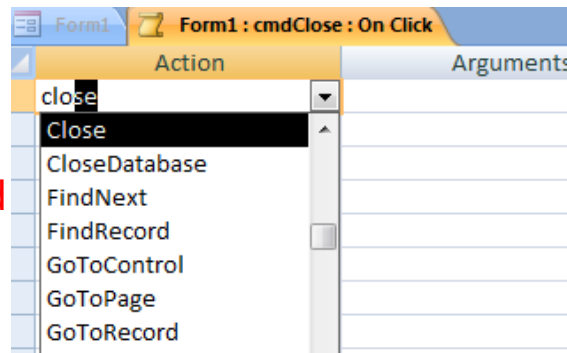
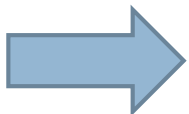
Let's see how we can develop the Close button without using the Wizard. First select and delete "Embedded Macro" next to the On Click event. Then push "... " key to see your On Click event handling options.



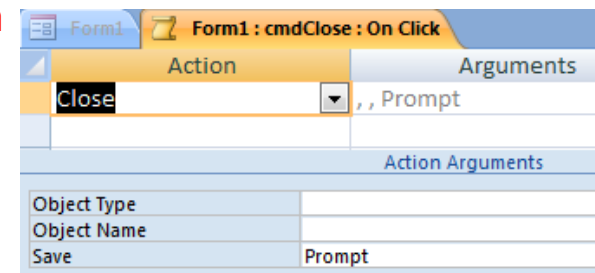
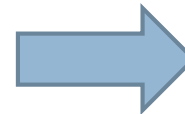
By pushing "... " key,  
event handling  
options are shown



Push OK when  
Macro Builder  
option is selected



Select close from  
Action column  
drop down list!



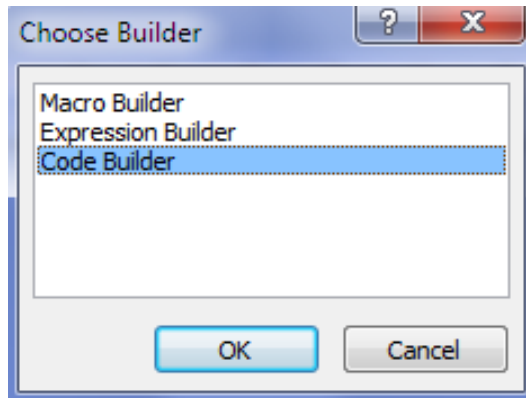
# Button properties - event

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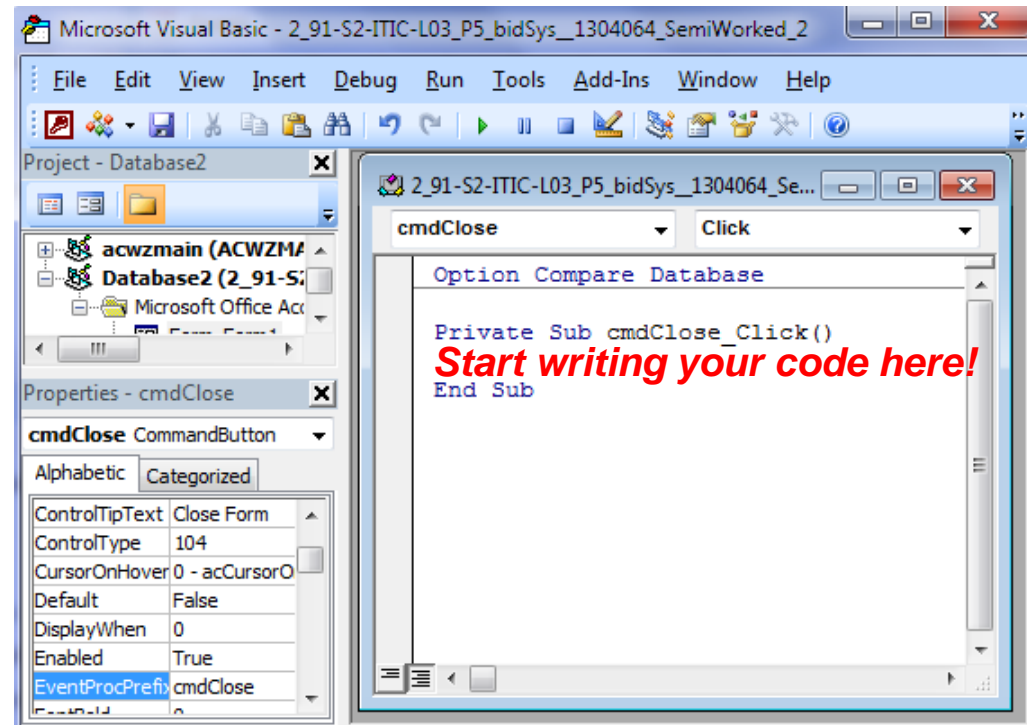
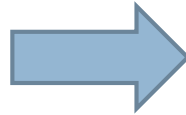
## □ On Click (cont'd):

Use of Code Builder instead of Macro;

Embedded Microsoft Visual Basic is opened!



Push OK  
when Code  
Builder option  
is selected

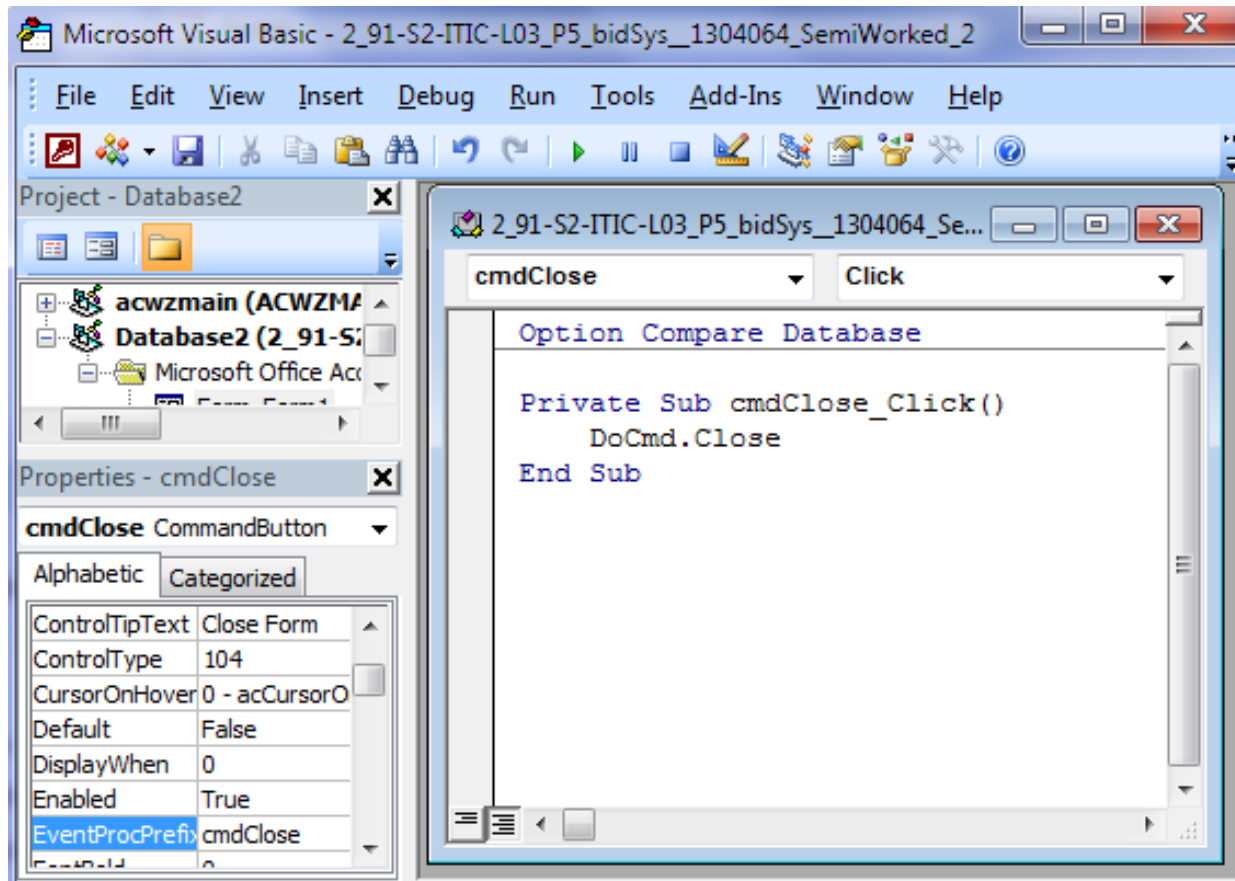


# Button properties - event

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## □ On Click (cont'd):

The supporting code for closing the form is: ***DoCmd.Close***



# Button properties - event

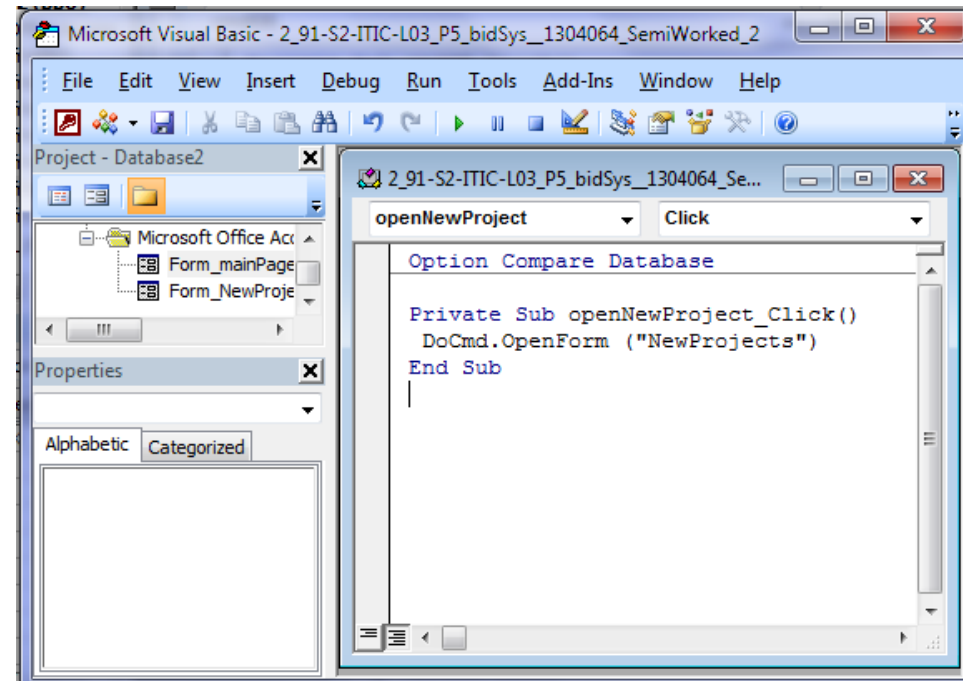
56

## □ On Click (cont'd):

For using buttons for opening other forms (for building up a menu), in the Code Builder environment use code: ***DoCmd.OpenForm ("frmMain")***




Select On-Click event for every button> go to Code Builder

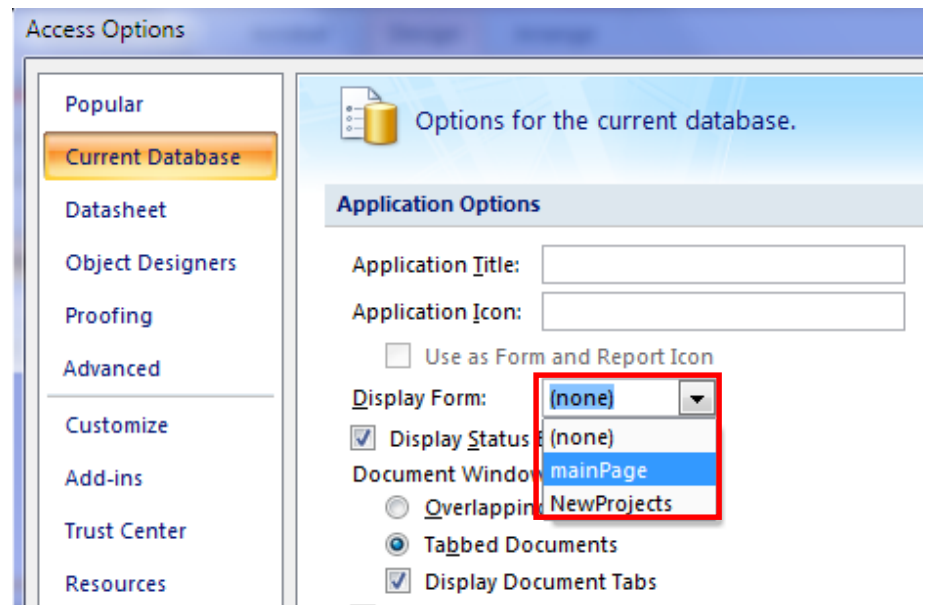
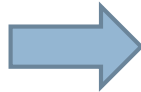
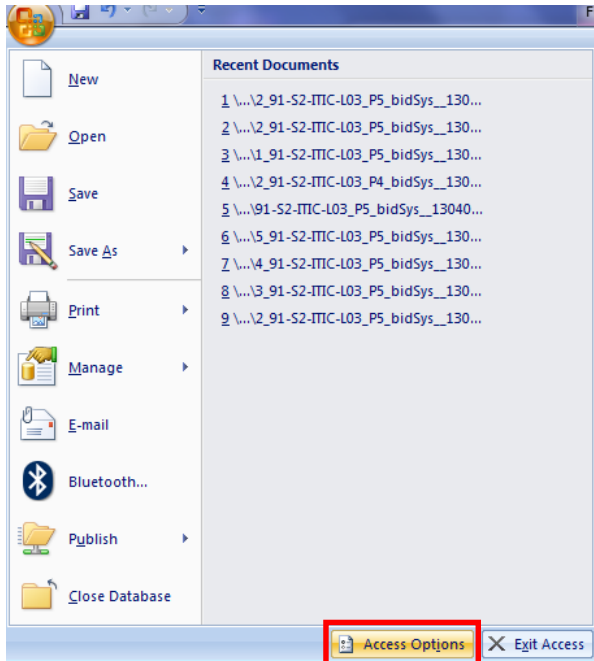




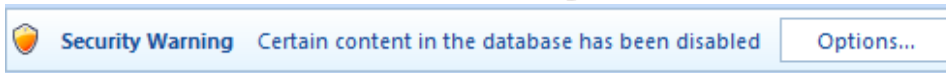
# Default form

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- Select:  > Access Options > Current Database > Display Form

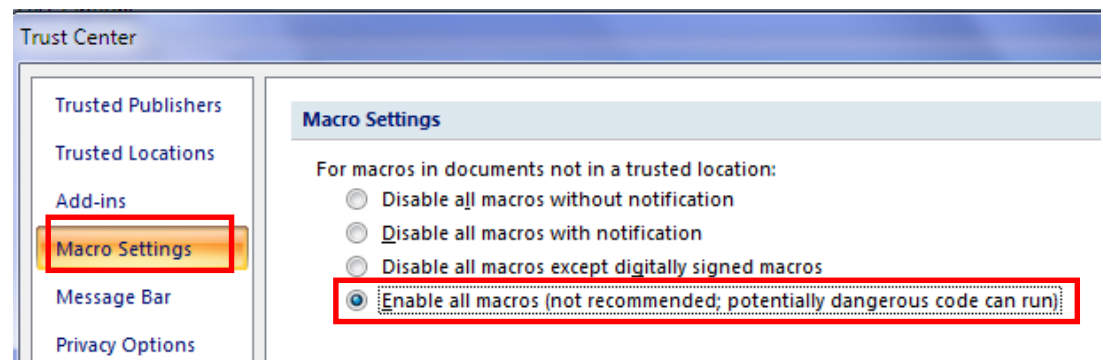
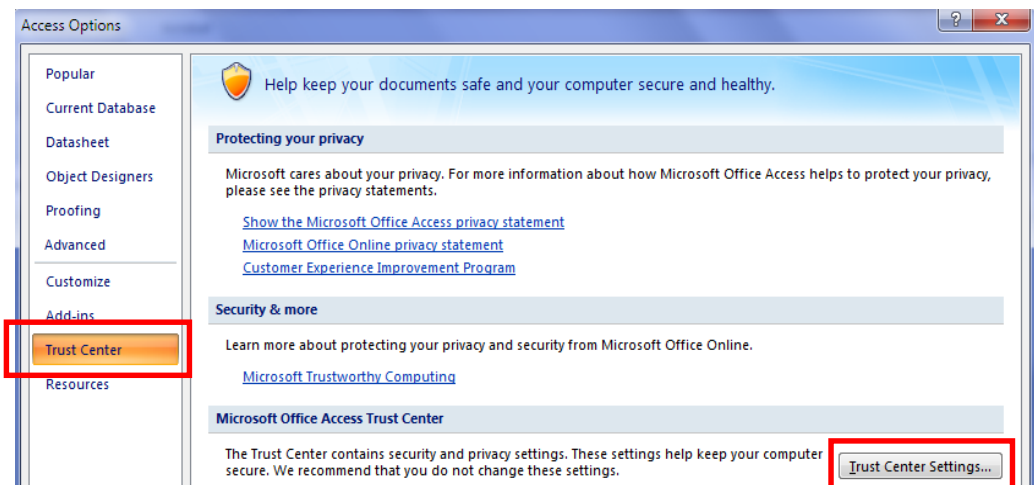
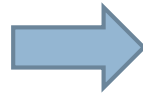
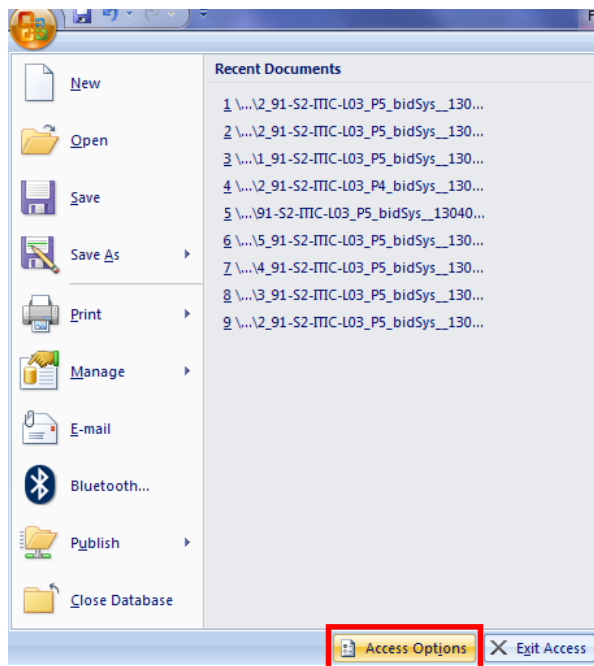


# Security warning



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- Select: > Access Options> Trust Center> Trust Center Settings> Macro Settings> Enable all macros



- When you did the new setting, on your next file opening security warning will not appear!

# Form control formatting

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Hands on software (MS Access):

- Text box
- Combo box
- Button
- Default form
- Security warning

# After class practice 2

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Bid form is a form for entering our bid information. Create a bid form which can be used for reviewing our past bids and can be used for creating new bids that we are going to participate.

Where ever is appropriate use combo-boxes, buttons and other controls.

*(Due: one day)*

# Sub-form

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- A sub-form is a form that is inserted in another form. The primary form is called the main form, and the form that is enclosed in form is called the sub-form.
- A form/sub-form combination is sometimes referred to as a hierarchical form, a master/detail form, or a parent/child form.
- Sub-form and main form are linked to each other through (a set of) shared fields.

- **Example:** In our bidding system we want a form which has the client information on the top and the list of (or history of) previous projects announced on the bottom. (the form is called project history).

The screenshot shows a software window titled "frmClient". It contains a form with the following fields:

- ClientId: 1
- ClientName: City of Tehran
- Private\_Public: Public
- OfficeLocation: Tehran
- ContactNum: +98 21 22222
- Email: mayor@tehran.ir
- Fax: +98 21 22222

Below the form is a sub-form titled "List of projects announced:" which contains a table:

PrjDescripti	Date Announced	PrjLocation	BidValue	WinnerValu	Winner name
Sard Highway	06/04/2012	Tehran	9999999	9999999	Our Company
Garm Highway	06/04/2013	Tehran			
*					

At the bottom of the window, there is a status bar with the text "Record: 1 of 2", "No Filter", and a "Search" button.

# Sub-form

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- **Example (cont'd):** In this example form *frmClient* has an embedded form *frmClientProject*. It is shown in the Design View of the form in below:

Form *frmClient* as the main form

Form *frmClientProject* as the sub-form

Detail	
ClientId:	ClientId
ClientName:	ClientName
Private_Public:	Private_Public
OfficeLocation:	OfficeLocation
ContactNum:	ContactNum
Email:	Email
Fax:	Fax

List of projects announced:

Detail	
PrjDescription:	PrjDescription

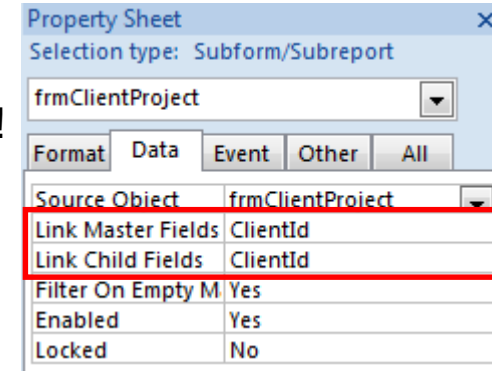
# Sub-form

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- **Example (cont'd):** The linked field between two forms is ClientId!

- **Creating a sub-form:**

Sub-form is among the form controls which can be selected and drawn on the form! By drawing a sub-form on the form the Sub-Form is started to help you setting up the sub-form. You can build your sub-form up on the currently developed forms, tables or queries! So before start drawing your sub-form control you need to have your desired database object prepared!

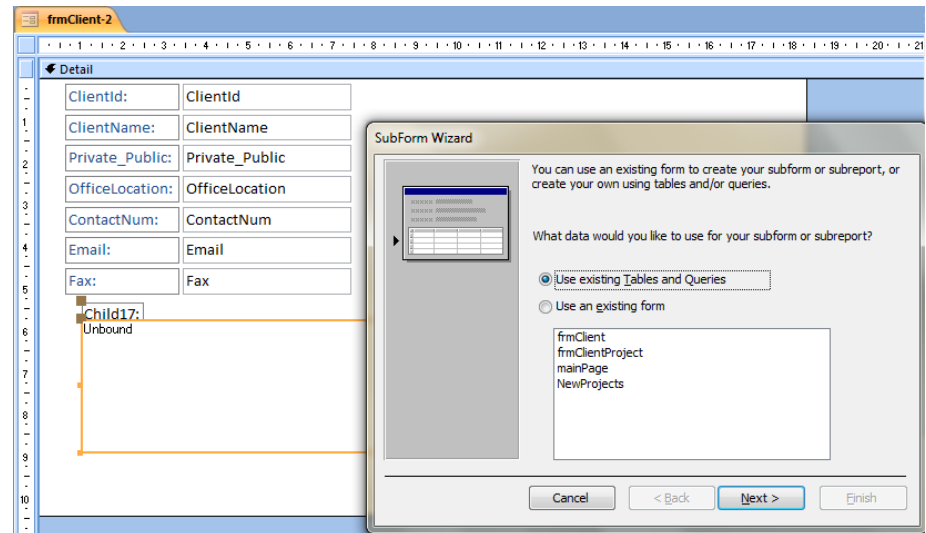
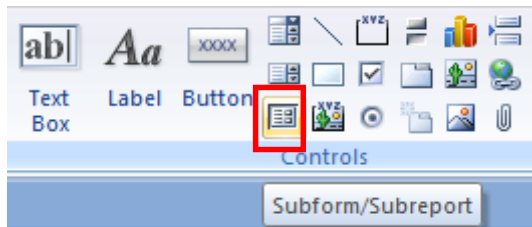


Property Sheet  
Selection type: Subform/Subreport

frmClientProject

Format Data Event Other All

Source Object	frmClientProject
Link Master Fields	ClientId
Link Child Fields	ClientId
Filter On Empty M	Yes
Enabled	Yes
Locked	No



frmClient-2

Detail

ClientId:	ClientId
ClientName:	ClientName
Private_Public:	Private_Public
OfficeLocation:	OfficeLocation
ContactNum:	ContactNum
Email:	Email
Fax:	Fax

Child17: Unbound

SubForm Wizard

You can use an existing form to create your subform or subreport, or create your own using tables and/or queries.

What data would you like to use for your subform or subreport?

☒ Use existing Tables and Queries

☐ Use an existing form

frmClient  
frmClientProject  
mainPage  
NewProjects

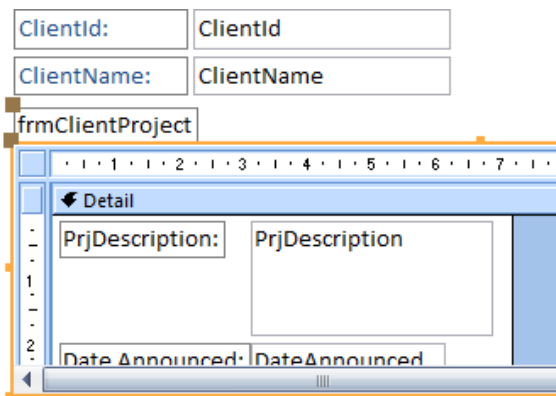
Cancel < Back Next > Finish

# Sub-form

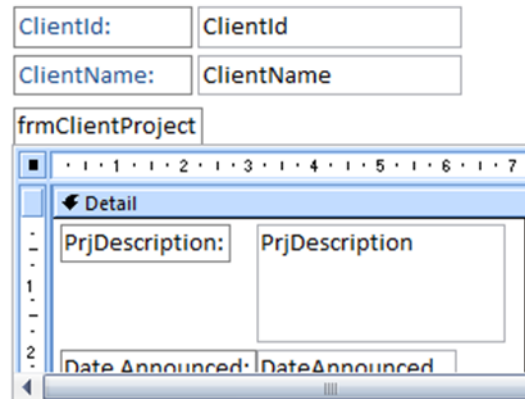
64

## □ Creating a sub-form (cont'd):

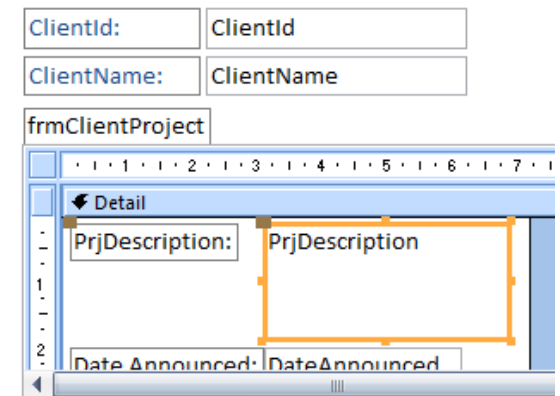
At the Design View of the sub-form you have 3 levels of control selection: 1) Sub-form frame selection 2) Sub-form Form selection 3) Sub-form Form controls selection. After selecting a control you can adjust its properties correspondingly!

The image shows a Microsoft Access design view of a sub-form named 'frmClientProject'. The sub-form is embedded within a larger form. The sub-form's frame is highlighted with a thick orange border, indicating that the entire sub-form object is selected. The sub-form contains a 'Detail' section with two text boxes: 'PrjDescription:' and 'PrjDescription', and a 'Date Announced:' label with a 'DateAnnounced' text box below it.

Sub-form frame selection

The image shows the same sub-form 'frmClientProject' in design view. The sub-form's frame is still highlighted with a thick orange border. Additionally, the sub-form's internal controls are highlighted with a thinner orange border, indicating that the sub-form as a whole is selected, including its contents.

Sub-form form selection

The image shows the same sub-form 'frmClientProject' in design view. The sub-form's frame is highlighted with a thick orange border. The sub-form's internal controls are also highlighted with a thinner orange border. A specific control, the 'PrjDescription' text box, is highlighted with a thick orange border, indicating that a specific control within the sub-form is selected.

Sub-form form controls selection

**Note :** Sub-form properties also can be directly be adjusted by directly opening the sub-form in its Design view. However it should be noted that at the time the form can be opened in one way (i.e., either opened in the main/ child form or as a separate and stand alone form)



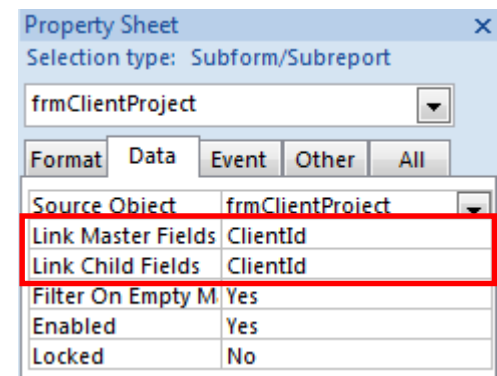
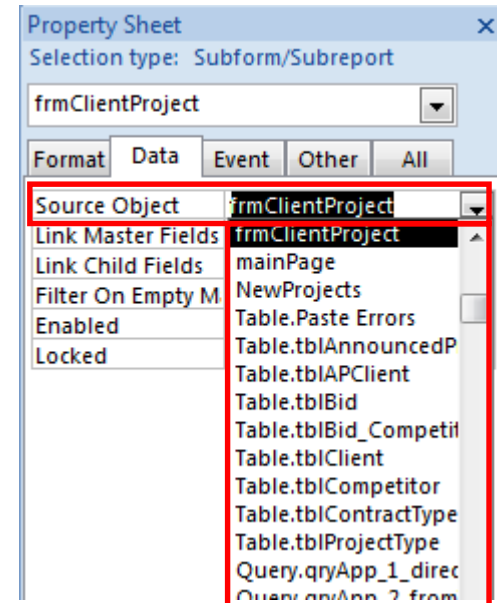
# Sub-form

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## □ Creating a sub-form (cont'd):

**Source Object:** If you need to change the *sub-form object* (e.g., from a form to another form), you can change the reference to the sub-form object by selecting the *sub-form frame* at: Properties> Data> Source Object

**Link Master/ Child Fields:** It is possible to change the link fields by changing *Link Master/ Child Fields* at: Properties> Data> *Link Master Fields* and Properties> Data> *Link Child Fields* . In cases that master form and sub (or child) form are linked through several fields use “;” for separating field names from each other.



# Sub-form creation

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Hands on software (MS Access):

- Sub-form creation

# Sub-form and filtering

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- Sub-forms are used for interactive data filtering in MS Access!

Select different dates and related records are interactively shown in the sub-form after OK button is pushed!

**Announced Projects Filtering**

Project Announced date from: 29/11/2012 To:

**Projects Announced List:**

PrjDescription	PrjLocation	Date Announced	DueDate	PrelimMa
High level bridge in shomal high	Mazandaran	06/04/2013	29/04/2013	500000
Qom Freeway Payment	Tehran	09/04/2013	18/05/2013	200000
Garm Highway	Tehran	06/04/2013	29/04/2013	600000

Record: 1 of 3 No Filter Search

# Sub-form and filtering

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- It is done by using sub-form and a small portion of programming! The design view of the form is shown in below. The significant change from form view to design view is two additional unbound text boxes which have “Visible: No” properties and are used as supports to the visible invisible at the text boxes. Another considerable issue is that the *main form and all its controls are unbound* since they are just used for filtering purpose and their values are selected by user.

The screenshot displays the design view of a Microsoft Access form titled 'frmAnnouncedProject-Main'. The form is currently in 'Detail' view. At the top, there is a 'Project Announced date from:' label followed by an 'Unbound' text box, a 'To:' label followed by an 'Unbound' text box, and an 'OK' button. Below these is a 'Projects Announced List:' label. The list is a sub-form with a 'Form Header' and a 'Detail' section. The 'Detail' section contains four rows of controls: 'Date Announced' (text box), 'DateAnnounced' (text box), 'DueDate' (text box), 'DueDate' (text box), 'ProjectTypeId' (text box), 'ProjectTypeId' (text box with a dropdown arrow), and 'ContractTypeId' (text box), 'ContractTypeId' (text box). The design view shows the layout of these controls and their properties.

# Sub-form and filtering

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- The main basis of filtering is that we set a query for the sub-form object whose values are linked to the main-form filtering objects (i.e., From and To dates).

The screenshot shows the Microsoft Access Query Builder interface. The title bar indicates two windows: 'frmAnnouncedProject-Main' and 'frmAnnouncedProjectFilter : Query Builder'. The 'tblAnnouncedProject' table is selected, showing fields: APIId (primary key), DateAnnounced, DueDate, ProjectTypeId, ContractTypeId, and PrjDescription. The 'Criteria' row in the query grid is populated with the following expression: `>=[Forms]![frmAnnouncedProject-Main]![txtFrom] And <=[Forms]![frmAnnouncedProject-Main]![txtTo]`. The 'Show' checkbox for this criterion is checked.

Field:	tblAnnouncedProj	DateAnnounced
Table:	tblAnnouncedProject	tblAnnouncedProject
Sort:		
Show:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:	>=[Forms]![frmAnnouncedProject-Main]![txtFrom] And <=[Forms]![frmAnnouncedProject-Main]![txtTo]	

**Query set for the sub-form object!**

*Date Criteria is linked to the main form text controls (txtFrom and txtTo)*

# Sub-form and filtering

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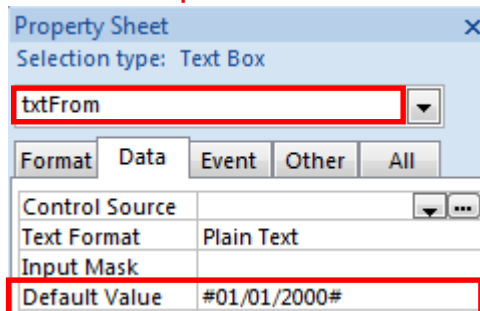
- We need to set the filtering *Criteria* correctly:
  - On the query side we need to set the criteria to show the dates greater than *From* and the dates less than *To*.
  - On the form control side, if user selects both ranges properly, the criteria logic works fine.
  - The issue comes up when user has not selected a value(s) for one or both filtering text boxes. The logic says if there is no value it means there is no constraint, i.e., no value on *From* means all lower limit dates should be shown and no value on *To* means all upper limit values should be shown. However, no value will send a *Null* to our sub-form *query* and will result in showing no result!!!
  - We used our auxiliary and invisible text boxes to solve the issue. As a matter of fact these text boxes are linked to the sub-form query and we will adjust their values using Event properties and supporting VBA coding based on updates on the visible filtering text boxes.

# Sub-form and filtering

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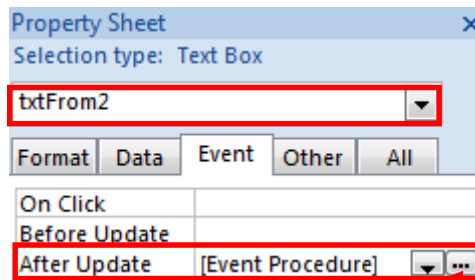
- In our logic we wanted to show there is no constraint if there is no value shown, it is translated in coding to set a far-past date for *From* filter and set a far-future date for the *To* if there is no date value selected by user. For example it is done for the from filter as:

Set default value of **Invisible** From filter (txtFrom) as a far-past date



The screenshot shows the 'Property Sheet' for a 'Text Box' control named 'txtFrom'. The 'Default Value' property is set to '#01/01/2000#'. The 'Control Source' is empty, and the 'Text Format' is 'Plain Text'.

Select "After Update" event of the **Visible** From Filter (txtFrom2)



The screenshot shows the 'Property Sheet' for a 'Text Box' control named 'txtFrom2'. The 'After Update' event is selected, and the 'Event Procedure' button (three dots) is highlighted with a red arrow.

Push "... " button to go to the programming environment!

Set the condition in a way that if user's *From* value in the **Visible** filter *txtFrom2* is not within the range (including Null values) automatically a far-past value is set for the **Invisible** filter *txtFrom* which is linked to the sub-form query.

```
Private Sub txtFrom2_AfterUpdate()  
    If txtFrom2.Value > #1/1/2000# Then  
        txtFrom.Value = txtFrom2.Value  
    Else  
        txtFrom.Value = #1/1/2000#  
    End If  
End Sub
```

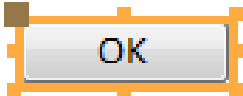
- Similar approach will be followed for *To* filters!

# Sub-form and filtering

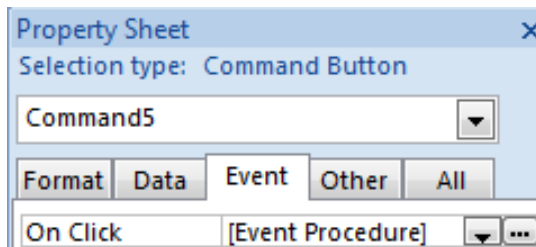
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- Your filter is *almost* done, but is not working until you do you last setting.
- The issue is, although every part of program is logically right, we need to refresh the link between our filters and the sub-form query.
- This last step *can* be done (there are also other ways) by using a command button:

Draw a  
command  
button. Cancel  
the wizard  
steps and writ  
OK as its  
caption!



Go to the On Click event of  
the button!



Ask the program to Requery the  
sub-form's frame name by each  
click

```
Private Sub Command5_Click()  
    frmAnnouncedProjectFilter.Requery  
End Sub
```

- The filter is now up and running!



# Sub-form filterin

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Hands on software (MS Access):

- Sub-form filtering

# After class practice 3

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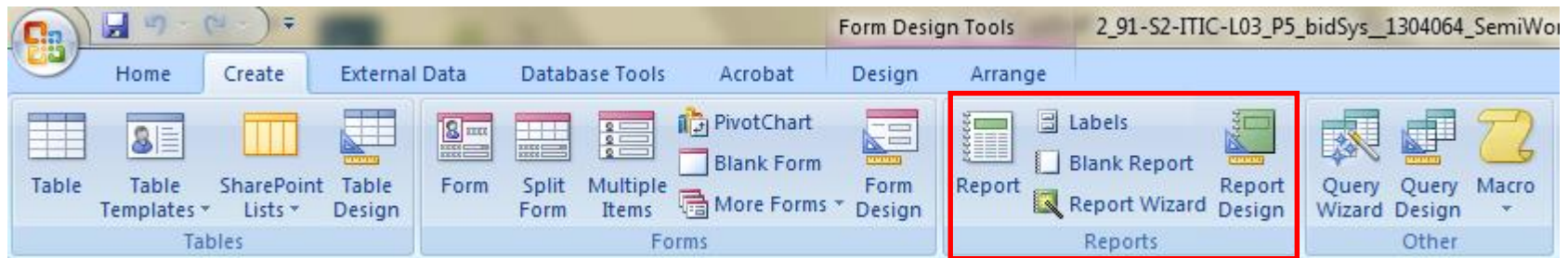
Create a filter form which shows different new project's information with a project prelim cost between a range!

*(Due: one day)*

# Report

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- Reports are other object types in MS Access (in parallel to table, query and form).
- It can be said that reports are special type of forms with specialized set of controls adapted for printing and presenting data (no data input is possible in the reports).
- Both data source and sub-form concepts are valid in report development steps!
- For creating new report you need to follow: Create> Report> Report Design



- Since development of the reports is similar to form development (compared to form development report development is a simplified process because no input is received from the user), we skip discussing form capabilities).



**Thank you!**