

Microsoft Visual Basic 2017 for Windows®, Web, and Database Applications



Microsoft
VISUAL BASIC® 2017

for Windows®, Web, and Database
Applications

COMPREHENSIVE

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Chapter 9 Accessing Database

Objectives (1 of 2)

- Understand database files
- Connect to a database using ADO.NET
- Connect Form objects to the data source
- Bind database fields to the Windows Form object
- Access database information on a Windows Form object

Objectives (2 of 2)

- Add a record
- Delete a record
- Select records from a list
- Program beyond the Database Wizard
- Create the OleDbDataAdapter object

Chapter Project

Game Art Commission - Game Art & Design Competition

1 of 16

Game Design Finalists

Art ID:

Artist Name:

Art Title: Location:

Collection: Retail Price:

Total Retail Value

The screenshot shows the Microsoft Access 2010 interface. On the left, the 'Access Objects' task pane is open, showing a list of objects including 'tblProducts'. The main window displays the 'tblProducts' table with the following data:

Product ID	Product Name	Unit Price	Quantity	Location	Retail Price
121	Game File	Using Commander Key	1	Using Studio Graphics	\$1,200.00
127	April Road	Provision Europe	1	Router Center	\$610.00
178	Andrew Pond	Faraway Puff	1	V/C	\$1,200.00
189	Mike Young	Hot and Catch Ice	1	Recenter Institute	\$5,800.00
193	Sharon Williams	Heaving the Silence	1	Royal Cruise	\$1,700.00
195	Thay Thall	Happy Place	1	Parsons School of Design	\$799.00
199	Jong Li	Isolation	1	173 Elm St	\$1,000.00
192	Lee Lopez	Living Well	1	18 Vincent Rd	\$1,100.00
1114	Ramona Conway	Druid's Quail	1	3401 S & 10th Ave	\$1,500.00
1019	Rob Hermanson	Microsoft World	1	La Mesa Community	\$4,500.00
1119	Barbar Dier	Pennsylvia Night	1	Yakima Arts	\$800.00
1984	Jerry Hager	Ping Pong Seminar	1	Grand Denim Center	\$1,000.00
1012	Don Demond	More Well	1	Spencer Art Center	\$1,700.00
1118	Marion Jumar	Salvage of Death	1	Musac Center	\$800.00
1123	Joan Longwell	Shy and Light	1	Hill Street Museum	\$750.00
1118	William Stuart	Big Hunting Bird	1	Waggon Patch Center	\$297.00

Database Files (1 of 2)

- A **database** is a collection of related information stored in a structured format
- A database organizes data in **tables**
- Each row is referred to as a **record**
- Each column in a table is referred to as a **field**
- A unique field is an identifier that represents the **primary key** for the table

Database Files (2 of 2)

Artist Name field

Location field

one row represents one record

Art ID	Artist Name	Art Title	Location	Collection	Retail Price	Click to Add
E27	Liam Fox	Wing Commander Sky	Gaming Studio Graphics	Public	\$1,200.00	
F27	April Reed	Freedom Escape	Ryder Center	Public	\$670.00	
F78	Andrew Pond	Rantary Prefati	USC	Public	\$1,300.00	
H67	Mila Young	Melt and Catch Fire	Rochester Institute	Public	\$3,800.00	
H87	Shauna Williams	Hearing the Science	Royal Venue	Public	\$2,100.00	
H93	Tracy Tirrell	Happy Place	Parsons School of Design	Private	\$799.99	
IB9	Song Li	Isolation	175 Rico St	Private	\$7,000.00	
LB2	Lisa Lopez	Living Wall	10 Vincent Rd	Private	\$170.00	
M14	Ramona Coveney	Druid's Duel	84th St & 5th Ave	Public	\$1,300.00	
M57	Felix Hernandez	Minecraft World	La Finca Community	Public	\$3,500.00	
P77	Scarlet Dale	Periwinkle Night	Valentine Arts	Public	\$800.00	
P84	Avery Harper	Ping Pong Summer	Drexel Gaming Center	Private	\$1,000.00	
S52	Deon Diamond	Sierra Hill	Strickler Art Center	Public	\$1,100.00	
T19	Monte Jemel	Trilogy of Death	Mosaic Center	Public	\$300.00	
T28	José Schaefer	Truth and Light	Hull Street Museum	Public	\$150.00	
T28	William Stuart	The Hunting Kind	Georgia Tech Center	Private	\$287.00	
					\$0.00	

Establish a Database Connection (1 of 6)

- The first step in accessing database information is to establish a **connection** with the database source
- To connect a Visual Basic 2017 application to data in a database, you can use the **Data Source Configuration Wizard**
- The data is available in the **Data Sources window** for dragging onto a Windows form
- A **DataSet** object is a temporary cache storage for data retrieved from a data source

Establish a Database Connection (2 of 6)

- Create a Windows application named Gaming Art. Name the form frmArtPrize. Change the Text property to Gaming Art Commission – Game Art & Design Competition. Resize the form to a size of 670, 450. Change the BackColor property to White on the Web tab. An image representing one of the local artists, named Art.jpg, is available with your Data Files. Place a PictureBox object on the left side of the window. Name the PictureBox object picArt. Change the Size property to 293, 160. Using the Image property, import the Art.jpg image for the PictureBox object. Change the SizeMode to StretchImage. On the right side of the form, place a Label object named lblTitle. Change the Text property to Game Design Finalists on two lines. Make the Font property Script MT, Bold, size 40, and the ForeColor property Green on the Web tab. Center-align the text. Close the Toolbox, and then tap or click Project on the menu bar

Establish a Database Connection (3 of 6)

- Tap or click Add New Data Source on the Project menu
- In the Choose a Data Source Type dialog box, tap or click Database, and then tap or click Next. In the Choose a Database Model dialog box, tap or click Dataset, and then tap or click Next
- Tap or click the New Connection button. In the Add Connection dialog box, tap or click the Change button to select the data source
- In the Choose Data Source dialog box, select Microsoft Access Database File because the Art database is an Access database. Tap or click the Continue button

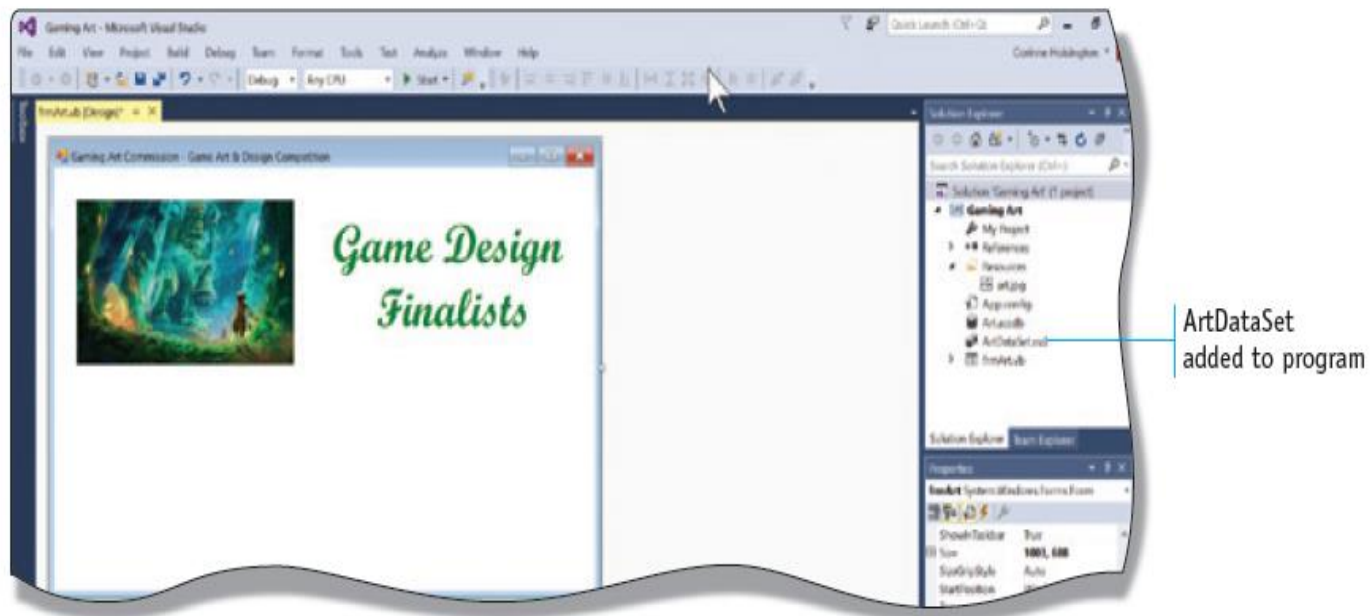
Establish a Database Connection (4 of 6)

- Tap or click the Browse button to the right of the Database file name field. Select the USB device on the E drive and then select the file named Art
- Tap or click the Open button
- Tap or click the OK button in the Add Connection dialog box
- Tap or click the Next button

Establish a Database Connection (5 of 6)

- Tap or click the No button, and then tap or click the Next button. When the Choose Your Database Objects dialog box opens, select which database objects you want in the DataSet. Tap or click the expand icon next to the Tables option. Tap or click the Artist check box to select that table. A connection is made from the Visual Basic application to the Artist table within the Art.accdb database
- Tap or click the Finish button. Tap or click ArtDataSet.xsd to select the DataSet

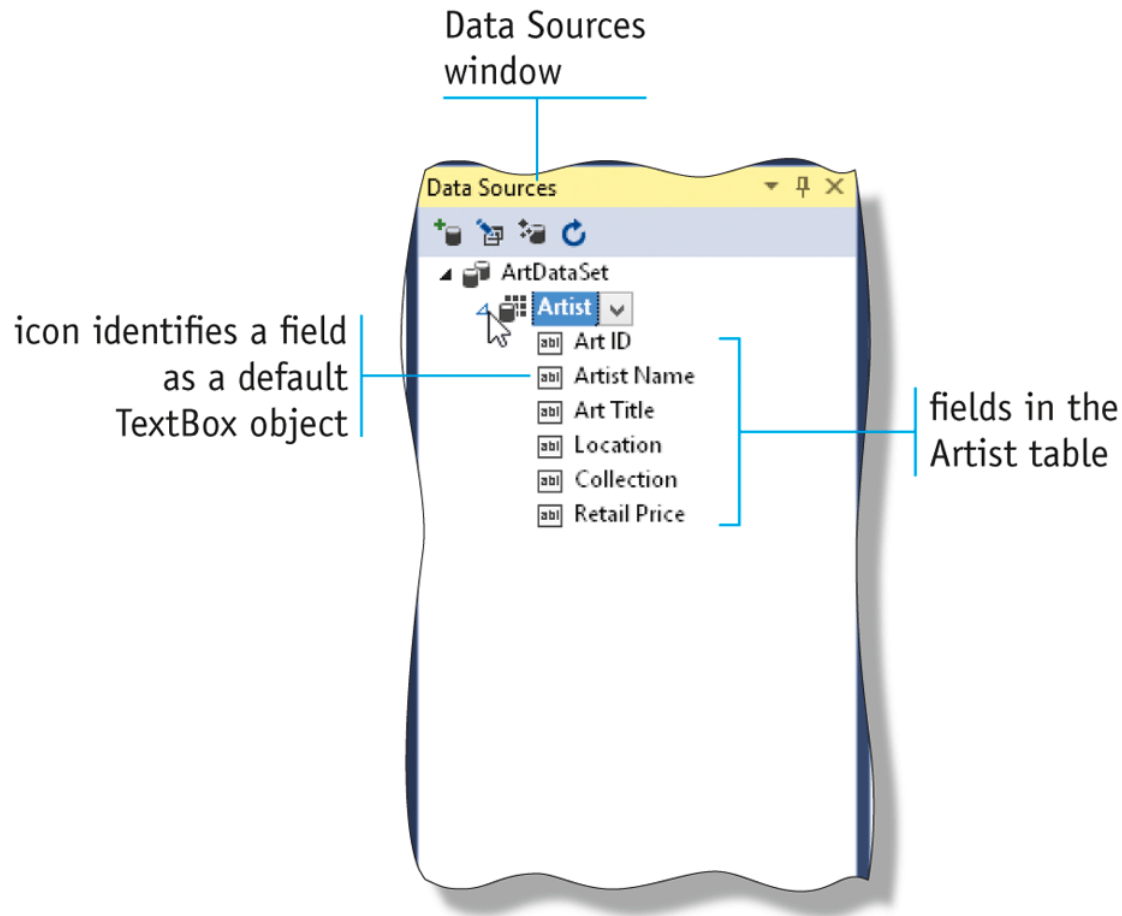
Establish a Database Connection (6 of 6)



View Data Available in the Source Database (1 of 2)

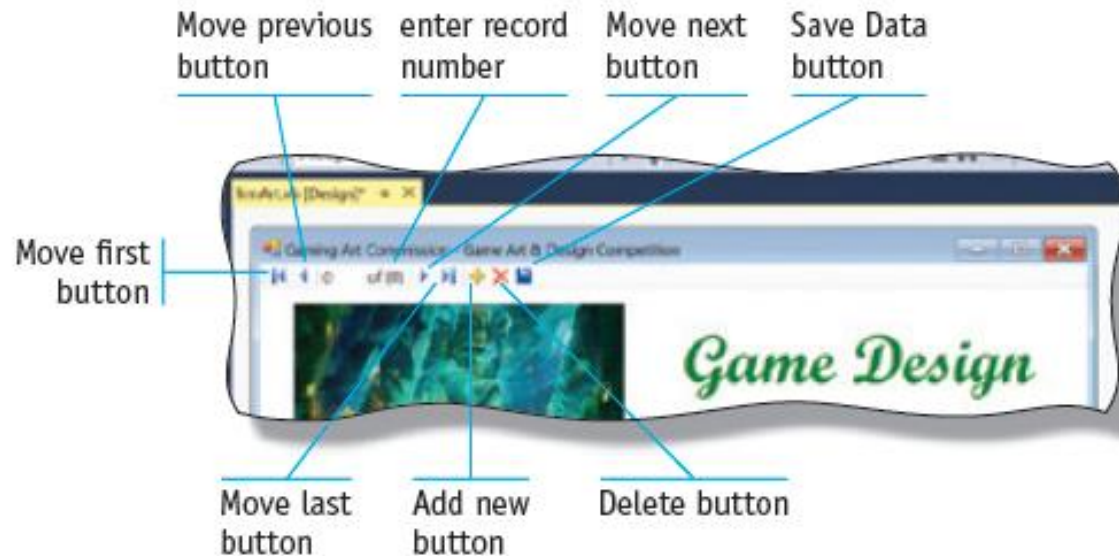
- DataSet string is called **data binding**
- Data binding allows you to display each field as an object on the form
- In the Art project window, point to the Data Sources tab on the left side. If the Data Sources tab is not visible, tap or click View on the menu bar, tap or click Other Windows, and then tap or click Data Sources
- Tap or click Data Sources to view the database sources
- Tap or click the expand icon for the Artist table to expand the list of field names within the table. Each bindable field item in the Data Sources window can be placed on the Windows Form object

View Data Available in the Source Database (2 of 2)



Bind Database Fields to the Windows Form (1 of 4)

- Visual Studio automatically creates a **databinding** to populate the form by binding the form object to the DataSet information
- After the first field item is placed on the Windows form, a navigation toolbar control called the **BindingNavigator** appears on the form



Bind Database Fields to the Windows Form (2 of 4)

- Select the Art ID field in the Data Sources window. Drag the Art ID field to the Windows Form object below the PictureBox object
- Drag the rest of the field objects from the Data Sources window to the Windows form. Select all the field labels and field TextBox objects and change their font size to 10 points and bold. Use the formatting tools on the Format menu to equally distribute the bound objects. You can select the Labels and the TextBox objects separately to move them independently of each other.

Bind Database Fields to the Windows Form (3 of 4)

- Run the application by tapping or clicking the StartDebugging button on the Standard toolbar to fill the Windows Form object with the data from the Artist table. Use the Move next button on the navigation toolbar to move through the records. Tap or click the Move last button to display the last record

Bind Database Fields to the Windows Form (4 of 4)

last record displayed



The screenshot shows a Windows Form with a rounded rectangle and a shadow. At the top left is a small rectangular image of a landscape painting. Below it are six data fields arranged in two columns. The left column contains 'Art ID:', 'Art Title:', and 'Collection:'. The right column contains 'Artist Name:', 'Location:', and 'Retail Price:'. Each label is followed by a text box. The 'Art ID' text box contains the value '128' and is highlighted with a blue border. A blue line originates from the text 'last record displayed' above the form and points to the 'Art ID' text box. The other text boxes contain the following values: 'The Hunting Kind', 'Private', 'William Stuart', 'Georgia Tech Center', and '287'.

Art ID:	128	Artist Name:	William Stuart
Art Title:	The Hunting Kind	Location:	Georgia Tech Center
Collection:	Private	Retail Price:	287

Add Records (1 of 2)

- Tap or click the Start button on the Standard toolbar to run the Gaming Art application
- Tap or click the Add new button to add a new record to the database table
- Add a new record by typing Y77 in the Art ID field. After the record is complete, tap or click the Save Data button on the BindingNavigator control to save the new record to the original database

Add Records (2 of 2)

Save Data button

data entered for new record

Gaming Art Commission - Game Art & Design Competition

Game Design Finalists

Art ID: Y77

Artist Name: Eric Matthews

Art Title: Young Hearts

Location: Morris Arts

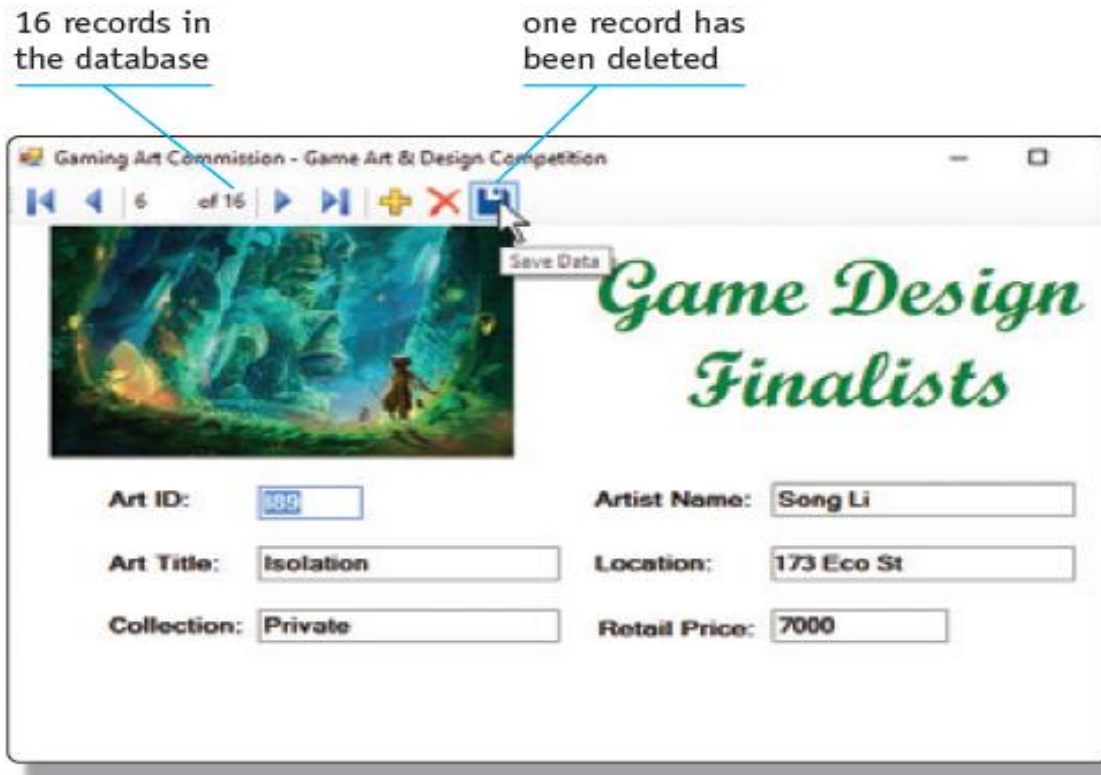
Collection: Private

Retail Price: 780.00

Delete Records (1 of 2)

- If necessary, tap or click the Start button on the Standard toolbar to execute the Gaming Art application
- Use the navigation buttons to move to Tracy Tirrell's record. Her artist record should be deleted because she has decided not to enter artwork in this year's competition. Tap or click the Delete button on the BindingNavigator control to delete her record from the database table. Tap or click the Save Data button to remove the record from the original database

Delete Records (2 of 2)



Select Records from a List (1 of 3)

- Select the Artist Name Label and TextBox objects on the Windows form. Press the DELETE key to delete the Artist Name objects from the Windows form. Select the Artist Name table field in the Data Sources window and then tap or click its list arrow
- Tap or click the ComboBox object from the Toolbox object listing for the Artist Name field. Drag the Artist Name field ComboBox object to the original location of the Artist Name TextBox object on the Windows Form object. Change the font size to 10 and bold. Align the ComboBox with the other objects on the Windows form
- To fill the ComboBox object with the names of the artists, the ComboBox object must be bound to the Artist Name field. To bind the items to the ComboBox object, select the Artist Name object on the Windows form and tap or click the Action tag on the Artist Name ComboBox object


Select Records from a List (2 of 3)

- Tap or click the Use Data Bound Items check box on the ComboBox Tasks menu. The Data Binding Mode list is displayed. Tap or click the Data Source list arrow under Data Binding Mode, and then select ArtistBindingSource to connect the table to the ComboBox object. Next, tap or click the Display Member list arrow and then select Artist Name. Tap or click the Value Member list arrow and then tap or click Artist Name in the list. Do not change the Selected Value entry
- Tap or click the Start Debugging button on the Standard toolbar to run the application. After the Windows form opens, tap or click the list arrow on the Artist Name ComboBox object
- Tap or click Song Li to move directly to the record containing the information for Song Li's artwork

Select Records from a List (3 of 3)

Gaming Art Commission - Game Art & Design Competition

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Game Design Finalists

Art ID:	<input type="text" value="189"/>	Artist Name:	<input type="text" value="Song Li"/>
Art Title:	<input type="text" value="Isolation"/>	Location:	<input type="text" value="173 Eco St"/>
Collection:	<input type="text" value="Private"/>	Retail Price:	<input type="text" value="7000"/>

record for Song Li

Program Beyond the Database Wizard

General Format: OleDbDataAdapter

```
Dim odaName As New OleDb.OleDbDataAdapter(SQL Select command, Path statement)
```

Code:

`strSql is a SQL statement that selects all the fields from the Artists table

```
Dim strSql As String = "SELECT * FROM Artist"
```

` strPath provides the database type and path of the Art database

```
Dim strPath As String = "Provider=Microsoft.ACE.OLEDB.12.0 ;" - & "Data  
Source=e:\Art.accdb"
```

```
Dim odaArtist As New OleDb.OleDbDataAdapter(strSql, strPath)
```

The SQL statement assigned to strSql("SELECT * FROM Artist") is a query statement that requests that the entire table named Artist is opened for use by the application. The * symbol represents the wildcard symbol, which means all fields within the table are available.

The Path statement assigned to strPath("Provider=Microsoft.ACE.OLEDB.12.0 ;" & "Data Source=e:\Art.accdb") has two portions. The first portion represents the database source. Microsoft.ACE.OLEDB12.0 assigns the drivers needed to create a connection to an Access database. The second portion represents the path of where the database resides.

An instance of the OleDbDataAdapter is assigned to the variable odaArtist. The prefix oda is used for an OleDbDataAdapter.

Fill a DataTable Object (1 of 2)

- A **DataTable** is needed to hold the data retrieved from that connection
- After the DataTable is initialized, it must be filled using the **Fill** command with the data from the selected table
- To disconnect from the database, use the **Dispose** command

Fill a DataTable Object (2 of 2)

```
20
21 Private Sub btnValue_Click(sender As Object, e As EventArgs) Handles btnValue.Click
22     ' strSql is a SQL statement that selects all the fields from the
23     ' Artist table
24
25     Dim strSql As String = "SELECT * FROM Artist"
26
27     ' strPath provides the database type and path of the Art database
28     Dim strPath As String = "Provider=Microsoft.ACE.OLEDB.12.0 ;" & "Data Source=D:\Art.accdb"
29     Dim odaArtist As New OleDb.OleDbDataAdapter(strSql, strPath)
30     Dim datValue As New DataTable
31     Dim intCount As Integer
32     Dim decTotalValue As Decimal = 0D
33
34     ' The DataTable named datValue is filled with the table data
35     odaArtist.Fill(datValue)
36     ' The connection to the database is disconnected
37     odaArtist.Dispose()
38     For intCount = 0 To datValue.Rows.Count - 1
39         decTotalValue += Convert.ToDecimal(datValue.Rows(intCount)("Retail Price"))
40     Next
41     lblTotalRetailValue.Visible = True
42     lblTotalRetailValue.Text = "The Total Retail Value is " & decTotalValue.ToString("C")
43 End Sub
```

Program Beyond the Database Wizard (1 of 4)

- Download the original Access database file Art.accdb again to overwrite any data you added or deleted from the database. Open the Gaming Art Windows application. Add a Button object named btnValue to the Windows Form object and change the Text property to Total Retail Value. Change the font size to 12 and the ForeColor property to Green on the Web tab. Set the Size property for the button to 178, 28 and center the Button object horizontally across the form. Below the Button object, add a Label object named lblTotalValue with the Text property of 23 “Xs,” and then center the text. Change the font size to 12 points. Set the Visible property to False for the lblTotalValue Label object because the Xs should not be displayed when the program begins

Program Beyond the Database Wizard (2 of 4)

- Double-tap or double-click the Total Retail Value button to create the btnValue_Click event handler. The first variable, strSql, is assigned the SQL statement that queries all the fields in the Artist table. The second variable, strPath, is assigned the database driver for Access and the path to the Art.accdb file. The third variable, odaArtist, is an instance of the OleDbDataAdapter
- After the first three variables are initialized, initialize the rest of the variables needed for the Button object event handler. An instance named datValue is initialized to represent the DataTable object. The intCount variable is used to count through a For loop. The last variable, decTotalValue, will contain the total value of the Game art & Design collection

Program Beyond the Database Wizard (3 of 4)

- Continuing inside the btnValue_Click event handler, enter the code to fill the DataTable with the contents of the Artist table. In the next line of code, use the Dispose method to close the connection
- Enter the code to create a For loop to increment through each record in the Artist table. Because the rows are numbered 0 to 15, the upper range is one less than the number of rows in the table, making 16 records. The value in each Retail Price field is added to the value in the decTotalValue variable
- Enter the code to display the total value of the Game Art & design collection

Program Beyond the Database Wizard (4 of 4)

```
41     lblTotalRetailValue.Visible = True
42     lblTotalRetailValue.Text = "The Total Retail Value is " & decTotalValue.ToString("C")
43 End Sub
44 End Class
```


Program Design (1 of 2)

REQUIREMENTS DOCUMENT

Date: February 22, 2019

Date Submitted:

Application Title: Gaming Art

Purpose: This Windows application opens a Windows form that displays an Access database with data for local artwork. The data can be viewed, updated, and deleted. The application also computes the total value of the Game Art & Design collection.

Program Procedures: In a Windows application, the Art Access database file is opened and the user can view, add, and delete records as needed. The user can calculate the total value of the Game Art & Design collection.

Algorithms, Processing, and Conditions:

1. The user first views a Windows application that loads an Access database table, which includes fields for the Art ID, Artist Name, Art Title, Location, Collection (public or private), and Retail Price. A navigation toolbar appears at the top of the Windows form, allowing the user to move from record to record. The Windows form also includes a title and artistic image.
2. The user can click the Add new button on the navigation toolbar to add a new artist. The record is saved when the user clicks the Save Data button on the navigation toolbar.
3. The user can click the Delete button on the navigation toolbar to delete an artist's record. The record is permanently deleted when the user clicks the Save Data button on the navigation toolbar.
4. The user can click the Total Retail Value button to compute the total value of the Game Art & Design collection.

Notes and Restrictions: The Access database named Art.accdb is located on the USB drive (the D drive).

Comments:

1. The Art.accdb file is available on CengageBrain.com.
2. Obtain an image for this program from CengageBrain.com. The name of the picture on the Windows form is art.jpg.

Program Design (2 of 2)

USE CASE DEFINITION

1. The user views the Access database information about local artwork.
2. The user clicks the Add new button to add an artist and clicks the Save Data button to permanently save the new artist to the database.
3. The user clicks the Delete button to delete an artist and clicks the Save Data button to permanently delete the record from the database.
4. The user clicks the Total Retail Value button to display the total value of the Game Art & Design collection.

Event Planning Document

EVENT PLANNING DOCUMENT			
Program Name: Gaming Art Windows Application	Developer: Corinne Hoisington	Object: frmArt	Date: February 22, 2019
OBJECT	EVENT TRIGGER	EVENT PROCESSING	
frmArt	Load	Fill the DataSet object using the Data Source Configuration Wizard	
btnValue	Click	Initialize the OleDbDataAdapter with the type of database and path statement Fill the data table Disconnect the database For each record in the database: Add each record's value to the total value of the collection Display the Total Retail Value of the collection	

Summary

- Create a Windows application that uses database files and ADO.NET