

Visual Basic in AIS: Not Just a Programmed Approach

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The divide between financial statement auditing and information technology (IT) auditing and between accountant and systems designer is quickly disappearing. At a presentation at the 2007 AAA-IS mid-year meeting, Steve Hasty, a Risk Management Partner at KPMG, made clear the importance of financial statement auditors having knowledge of IT and of IT auditors having financial accounting understanding. As a result, accounting programs should be incorporating more IT skills. This presentation describes a hands-on exercise for introducing programming skills to AIS students. While accounting students will likely never program in their lives, hands on exposure to technical aspects of systems development can help increase students' understanding of systems development and program change controls. Additionally, Fordham explains the value of programming in helping students develop critical thinking skills that are transferable to other areas of their careers (Fordham 2005). The exercises presented teach basic programming concepts and the means through which programs interact with databases. The presentation focuses on how these programming exercises can be effectively integrated with other topics taught in the AIS course.

Visual Basic.NET AIS Training Materials

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The following web site can be accessed at
<http://info.cba.ksu.edu/bkovar/publications>

<p>Introducing Programming in the AIS Course: Creating and Coding an Expert System Using Visual Basic.NET</p> <p>Published in the Winter 2005 edition of <u>The Review of Business Information Systems</u> and presented at the AIS Educator Conference (2004: paper presentation: Best Paper Award) (2005 & 2006: hands-on training sessions)</p>	<p>Interacting with a Database Using Visual Basic.NET: An Alternative Approach to Illustrating Database Concepts</p> <p>Published in the 2006 <u>Compendium of Classroom Cases and Tools for AIS Applications</u>, sponsored by the Information Systems Section of the American Accounting Association (August 2006. Volume 3, Issue 1) and presented at the AIS Educator Conference (2005: paper presentation) (2005 2006 & 2007: hands-on training sessions)</p>
<p>Visual Basic.NET Version 2005 Tutorial http://info.cba.ksu.edu/bkovar/publications/2005version/2005versionVBExtutorial.pdf Student Files http://info.cba.ksu.edu/bkovar/publications/2005version/2005ZippedVBfiles.zip</p>	<p>Visual Basic.NET Version 2005 Tutorial http://info.cba.ksu.edu/bkovar/publications/2005version/2005versionVBDBtutorial.pdf Student Files http://info.cba.ksu.edu/bkovar/publications/2005version/2005ZippedVBDBfiles.zip</p>
<p>Visual Basic.NET Version 2003 Tutorial http://info.cba.ksu.edu/bkovar/publications/2003version/2003versionVBExtutorial.pdf Student Files http://info.cba.ksu.edu/bkovar/publications/2003version/2003ZippedVBExpertfiles.zip</p>	<p>Visual Basic.NET Version 2003 Tutorial http://info.cba.ksu.edu/bkovar/publications/2003version/2003versionVBDBtutorial.pdf Student Files http://info.cba.ksu.edu/bkovar/publications/2003version/2003ZippedVBDBfiles.zip</p>
<p>Original conceptual paper published in the Winter 2005 edition of <u>The Review of Business Information Systems</u>. (Volume 9, Number 1). http://info.cba.ksu.edu/bkovar/publications/RBISConceptualPaper.pdf</p>	<p>Original conceptual paper published in the 2006 <u>Compendium of Classroom Cases and Tools for AIS Applications</u>, sponsored by the Information Systems Section of the American Accounting Association. (August 2006. Volume 3, Issue 1). http://info.cba.ksu.edu/bkovar/publications/C3ConceptualPaper.pdf</p>

Why Cover Programming In AIS?

- ◆ Programming helps develop and improve problem solving and critical thinking skills, increasing the ability to handle more complex accounting issues and problems (Beard and Smith 2002)
- ◆ AICPA core competency: ability to leverage technology (2004)
- ◆ The lack of programming skills may handicap accountants in working effectively as IS auditors (Calderon, Cheh, Chatham 2002)
- ◆ The Information Systems Audit and Control Association (ISACA) model curriculum stresses the need for computer programming skills (2004)



Learning Objectives

- ◆ Understand how databases and programs interact in real systems
- ◆ Understand the concept of data program independence
- ◆ Obtain basic exposure to what programming is like
- ◆ Develop an appreciation of the challenges posed by the complexity of real systems, enhancing understanding during systems development and/or audit



The Context

- ◆ Introduction to General Ledger Systems
- ◆ Systems Analysis and Design
- ◆ Database Fundamentals
- ◆ Microsoft Access
- ◆ *Programming and Visual Basic*
- ◆ ERP Concepts

Step-by-Step Tutorials

◆ Creating and Coding an Expert System Using Visual Basic.NET

- Create an Expert System for Assessing Loan Candidates

Kovar, Brian R. 2005. Introducing Programming in the AIS Course: Creating and Coding an Expert System Using Visual Basic.NET. *The Review of Business Information Systems*. 9 (1): 31-54.


◆ Interacting with a Database Using Visual Basic.NET

- Create programs to interact with an Access database and perform simple data retrieval, display and SQL queries

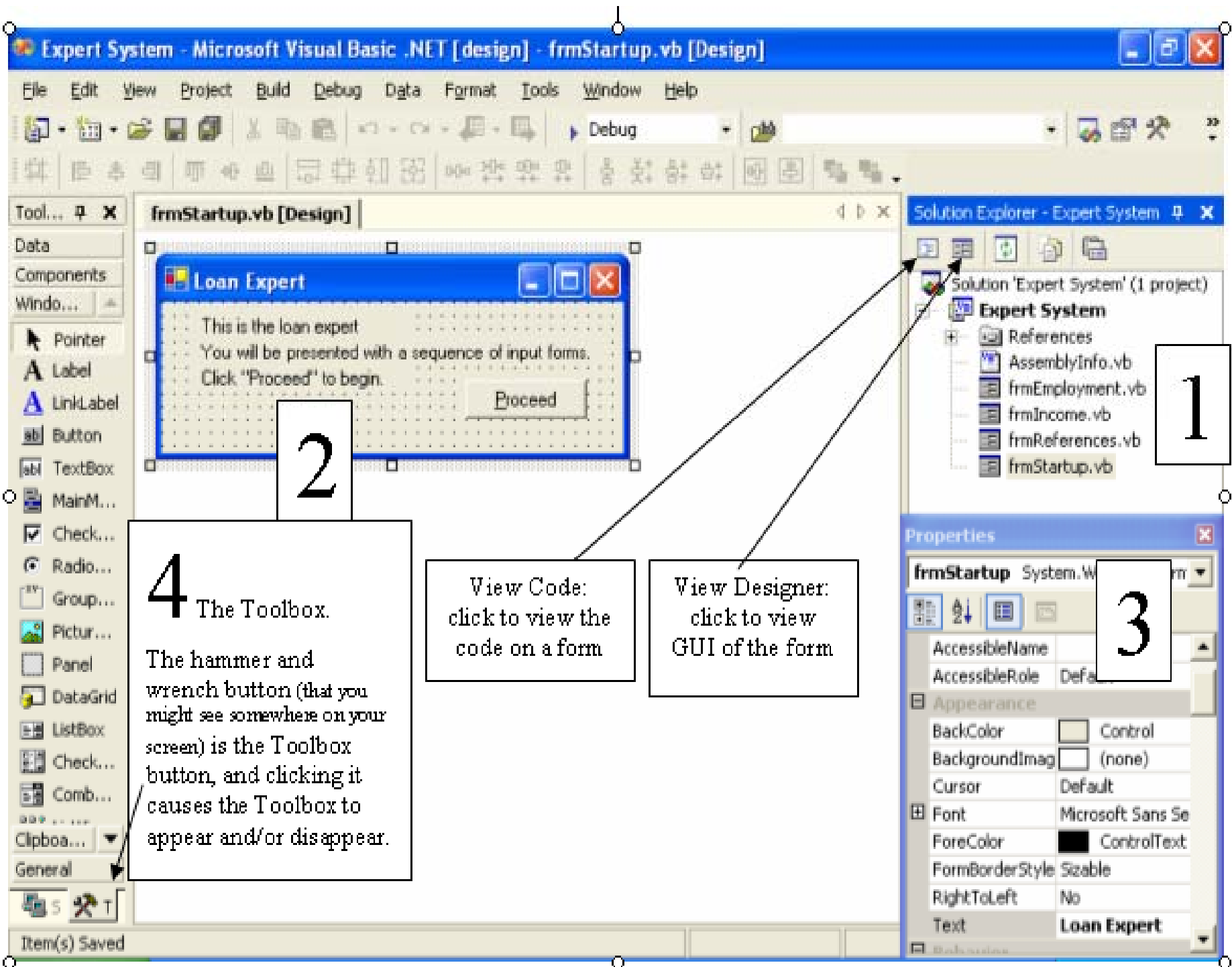
Kovar, Brian R. 2006. Interacting with a Database Using Visual Basic.NET: An Alternative Approach to Illustrate Database Concepts. *Compendium of Classroom Cases and Tools for AIS Applications*. AAA Information Systems Section. Volume 3.

Using the VB.NET Tutorials in the Classroom

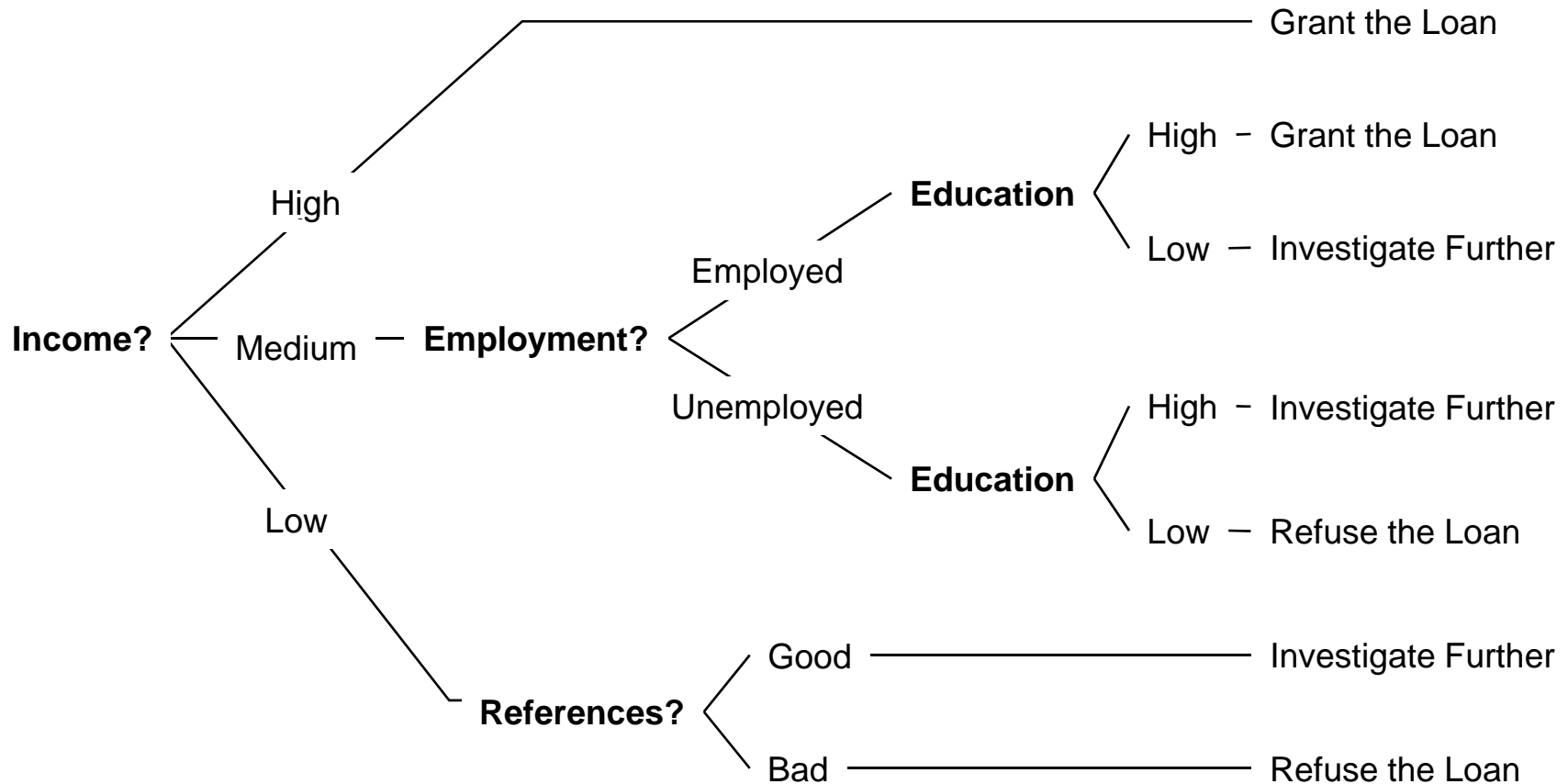
- ◆ Can be used in class or self-paced
- ◆ Have been used at both the undergraduate and graduate levels.
 - Students self-report an average completion time of 3.25 hours when working on the Expert System tutorial.
 - Students self-report an average completion time of 5-6 hours when working on the Interacting with a database tutorial.
- ◆ Must be completed in a computer lab or on a computer that already has Visual Studio/Visual Basic.NET installed.
 - Software can be obtained for a yearly fee from the Microsoft Software Developer Network Academic Alliance (your college or department may already be a member)



Creating and Coding an Expert System Using Visual Basic.NET

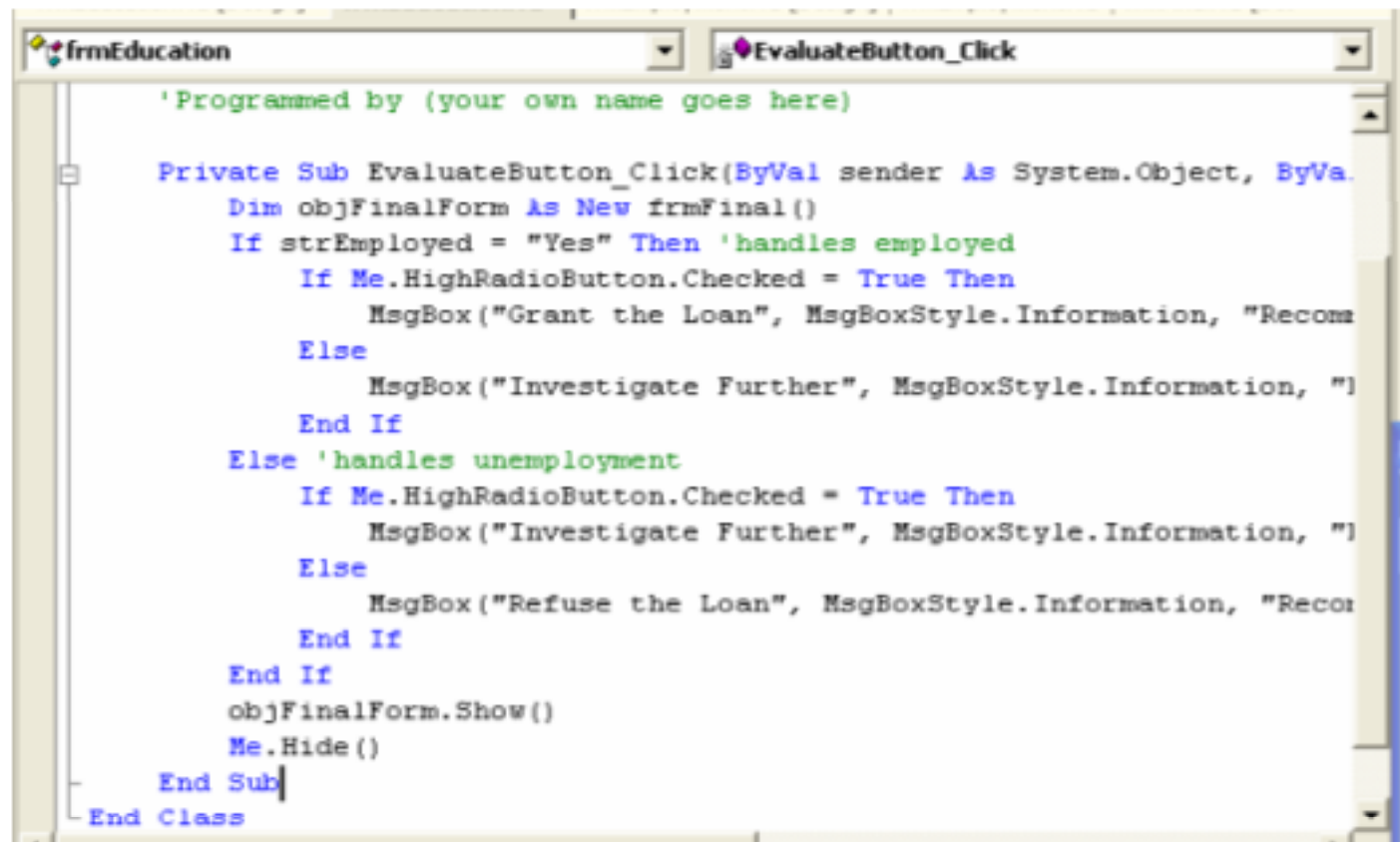


Expert System Decision Tree



As seen in the code on the right, the Education form uses a nested IF statement. A nested IF statement is simply one IF statement inside another IF statement. Our use of the indent feature makes it easier for us to see the beginning and ending of each IF statement.

We will first write the code for the form (as seen in the picture) and then a description of how the code works and what it does will be given. Please indent your own code exactly as is seen in the picture. Type the following:



```
frmEducation EvaluateButton_Click
'Programmed by (your own name goes here)

Private Sub EvaluateButton_Click(ByVal sender As System.Object, ByVal
    Dim objFinalForm As New frmFinal()
    If strEmployed = "Yes" Then 'handles employed
        If Me.HighRadioButton.Checked = True Then
            MsgBox("Grant the Loan", MsgBoxStyle.Information, "Recom
        Else
            MsgBox("Investigate Further", MsgBoxStyle.Information, ")
        End If
    Else 'handles unemployment
        If Me.HighRadioButton.Checked = True Then
            MsgBox("Investigate Further", MsgBoxStyle.Information, ")
        Else
            MsgBox("Refuse the Loan", MsgBoxStyle.Information, "Reco
        End If
    End If
    objFinalForm.Show()
    Me.Hide()
End Sub
End Class
```

```
Dim objFinalForm As New frmFinal()
```

```
If strEmployed = "Yes" Then 'handles employed (this marks the beginning of the outside IF statement)
```

```
    If Me.HighRadioButton.Checked = True Then (this marks the beginning of the first inside IF statement)
```

```
        MsgBox("Grant the Loan", MsgBoxStyle.Information, "Recommendation")
```

```
    Else
```

```
        MsgBox("Investigate Further", MsgBoxStyle.Information, Recommendation")
```

The **End If** should already appear. It marks the end of the first inside IF statement and you should not have to type it since it should already appear, so then move your cursor down to the next line, press your Backspace key, and then type:

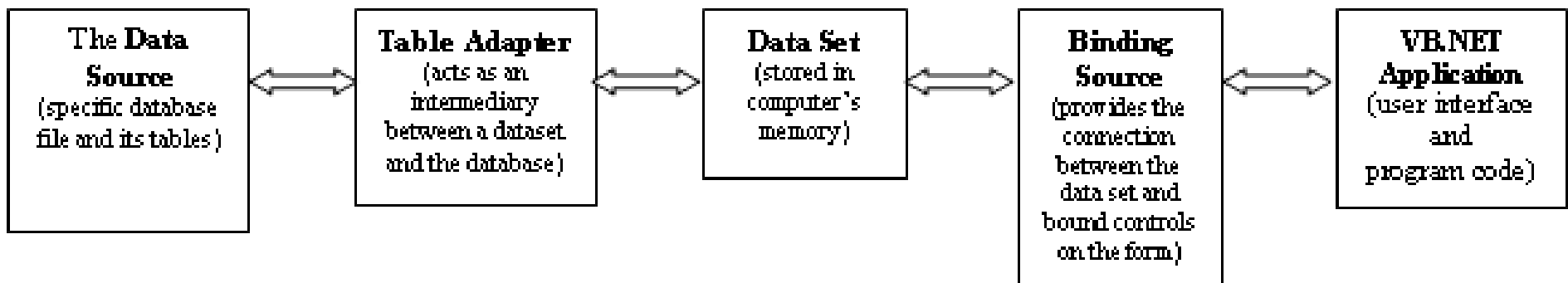
```
Else 'handles unemployment
```



Interacting with a Database Using Visual Basic.NET

How do Databases and Programs Interact in a Real System?

1. Create a connection to a data source
2. Create a Table Adapter to facilitate information transfer between database and application
3. Create a Data Set to hold the data as the application is working with it.
4. Configure a Binding Source object so that data in the data set can be displayed in labels, textboxes, etc.
5. Create the user interface and programming code



MemberNumber	LastName	FirstName	Gender	Address	City	State
111-03-2003	Mickelson	Phil	Male	101 Gambler's Peak	Phoenix	AZ
112-98-1356	McConnell	Britton	Female	84 McClary Boulevard	Calistoga	CA
237-75-3008	Mouse	Mickey	Male	1234 Denison Avenue	Manhattan	KS
325-81-1998	Duck	Donald	Male	765 Manhattan Avenue	Manhattan	KS
434-56-1345	McWilliams	Keith	Male	1 Chapman Lane	Burlingame	CA
441-31-8800	Moser	Tammy	Female	Box 46	Burbank	OR
442-54-3882	Leno	Jason	Male	350 Alameda Drive	Burbank	CA
445-66-4321	Clifford	Karen	Female	85 Lane #2	Portland	OR
543-12-3344	Andrews	Kathy	Female	333 Cross	Calistoga	CA
551-98-1456	Woods	Tiger	Male	375 Yard Drive	Orlando	FL
551-99-2000	Eubanks	Kevin	Male	200 Rodeo Drive	Burbank	CA
654-33-8867	Pearl	Barney	Male	Yuma Street	Sacramento	CA
661-99-2000	Duval	David	Male	TPC Drive	Sawgrass	FL
662-21-3398	Chang	Thomas	Male	543 Alack	Burbank	OR
679-23-1987	Keller	Robert	Male	12 Ivy Street	Burbank	OR
783-44-2266	Peck	Ozzy	Male	83 Yerming Way	Sacramento	CA
881-45-7543	Matson	Lisa	Female	345 Church	Burbank	CA
888-76-1982	Peterson	Amy	Female	101 Kingsmill	Burbank	CA
888-76-2345	Pringle	Michelle	Female	90 Ocean Street #64	Burbank	CA
983-12-3568	Neumiller	Irving	Male	16 Meadow Avenue	Stockton	CA
990-23-3489	Young	Steve	Male	9203 Niner	Sacramento	CA
999-00-1111	Jackson	Alan	Male	318 Oakdale #7	Stillwater	OK



SQL (Structured Query Language)

- ◆ A set of commands used to access and manipulate the data stored in a DBMS. Can be used to store, retrieve, update, delete & sort data.
- ◆ SELECT specifies the fields that should be displayed.
- ◆ FROM specifies the table or tables the selected fields are taken from.
- ◆ WHERE is used to limit the records to only those meeting specified criteria.

Query Builder

tblMembership

- * (All Columns)
- MemberNumber
- LastName
- FirstName
- Gender



Column	Alias	Table	C
MemberNumber		tblMember...	
LastName		tblMember...	<input checked="" type="checkbox"/>



```
SELECT MemberNumber, LastName, FirstName, Gender, Address, City, State
FROM tblMembership
WHERE (State = ?)
```

Query Records by State

Member Number

Last Name

First Name

Gender

Address

City

State

Previous Next

Enter State: Find

Return to the Original Display Exit

```

Private Sub OptionChanged()
    Dim CourseName As String
    If Me.radAdultFitness.Checked = True Then
        CourseName = Me.radAdultFitness.Text
    ElseIf Me.radAdvancedLifesaving.Checked = True Then
        CourseName = Me.radAdvancedLifesaving.Text
    ElseIf Me.radAerobics.Checked = True Then
        CourseName = Me.radAerobics.Text
    ElseIf Me.radBiking.Checked = True Then
        CourseName = Me.radBiking.Text
    ElseIf Me.radGolf.Checked = True Then
        CourseName = Me.radGolf.Text
    ElseIf Me.radHandball.Checked = True Then
        CourseName = Me.radHandball.Text
    ElseIf Me.radSwimming.Checked = True Then
        CourseName = Me.radSwimming.Text
    ElseIf Me.radWeightLifting.Checked = True Then
        CourseName = Me.radWeightLifting.Text
    Else
        MsgBox("Please select a course")
    Exit Sub
End If

```

Enrollment Information

Please select a course, and the students enrolled in the course will appear, along with the name of the instructor teaching the course.

Aerobics Biking
 Advanced Lifesaving Handball
 Adult Fitness Swimming
 Beginning Golf Weight Lifting

Instructor:

Mickelson,Phil
Clifford,Karen
Woods,Tiger
Duval,David
Young,Steve
Jackson,Alan



Programming Concepts Covered

- ◆ Basic SQL
- ◆ How to bind controls/objects to a data set
- ◆ How to create message boxes
- ◆ IF....Then....Else Selection Statements
- ◆ The For....Next Repetition Structure
- ◆ Variable Declaration (procedure-level, module-level, and global)
- ◆ Object-Oriented Programming
- ◆ Graphical User Interface Design

Selected Student Comments

I found that this exercise gave me a basic understanding of how the Visual Basic programming language works. It also helped me to better understand how an expert system goes about its “thought process” and comes to the conclusion that it does.

Overall, I found the assignment to be very well thought out and explained. It was a very good tutorial for anyone that is unfamiliar with programming and a good introduction to Visual Basic for those that know basic coding concepts.

By completing this tutorial, I developed a better understanding not only for expert systems but for the work involved in making them. It is a lot more complicated than it looks.

This exercise gives students a chance to get involved in the actual development of a program or system, not just its use. I think this gives people more respect and understanding towards computers and software.

I would recommend that you continue to offer this as an exercise because I felt that this exercise really teaches well how conclusions are based on logic. I think that this is something that everyone taking this class would benefit from when dealing with expert systems.

I think that it is a great way for a person who knows nothing about computer programming, like me, to get a taste of what programming is like, without overwhelming them. It is a great introductory experience for those who are just starting their journey into computer programming.