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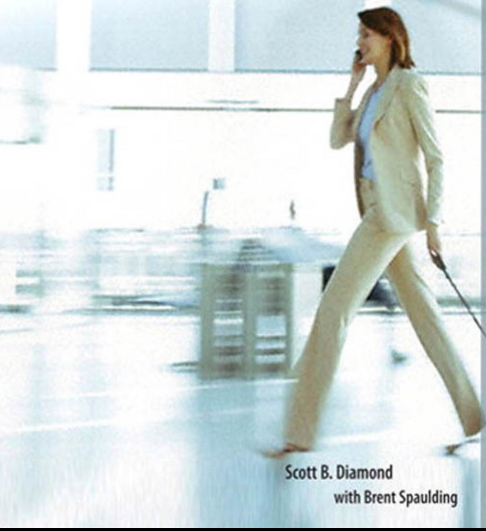

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Contents at a Glance

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ISBN-13: 978-0-7897-3731-1
ISBN-10: 0-7897-3731-0

Library of Congress Cataloging-in-Publication Data

Diamond, Scott B.

Microsoft Office Access 2007 VBA / Scott B. Diamond with Brent Spaulding.

p. cm.

ISBN 0-7897-3731-0

1. Microsoft Access. 2. Microsoft Visual Basic for applications. 3. Database management. I. Spaulding, Brent. II. Title.

QA76.9.D3D493 2008

005.75'65—dc22

2007044041

Printed in the United States of America

First Printing: November 2007 Corrections June 2010
This product is printed digitally on demand.

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Scott B. Diamond has been an information technology geek for more than 20 years. He has spent much of that time designing databases on various platforms. He started using Microsoft Access with Office 97 and has mastered all the subsequent versions. Besides developing database applications for the company where he's employed as an applications administrator, Scott also does freelance work, developing Access applications and consulting. He has always maintained that he's lucky his vocation is also his avocation, so he spends some of his free time helping people on web-based Q&A boards such as utteraccess.com (the premier support site for Access). He recently received Microsoft's MVP award for Access in acknowledgment of his contribution to the Access community. Scott, an avid bicyclist, lives on Long Island, New York, with his wife and daughter. You can reach Scott at AccessVBA@diamondassoc.com or visit his website, www.diamondassoc.com.

Brent Spaulding started writing applications about 20 years ago, generally focusing on data and data analysis. He has designed systems that have a wide range of focus: gymnastics class management, product assembly analysis, equipment fault logging, and manufacturing management systems. He has used Microsoft Access since version 2.0 and looks forward to using Access well into the future. In July 2007 Brent, who is employed in the automotive industry, received the Microsoft MVP award for Access, which recognizes his talent and contribution to the Access community. He spends much of his personal time learning and helping others on websites such as utteraccess.com, where he is known as datAdrenaline. Brent lives in southern Indiana with his wife and children.

Dedication

To my wife and daughter, who have helped me realize one of my dreams.

—Scott B. Diamond

To my wife and our seven children who have loved me, encouraged me, and prayed with me throughout the entirety of this adventure.

—Brent Spaulding

Acknowledgments

A number of people contribute to a book like this, and this section is where I can reward their efforts by acknowledging them. First, thank you to Loretta Yates, who believed in me and gave me the opportunity to fulfill a longtime dream of mine. I also want to acknowledge the contributions of the editorial team: Todd Brakke and Geneil Breeze and technical editor, Truitt L. Bradly. Todd and Geneil made a major contribution to making sure my prose made sense to the reader. Truitt's contributions helped make this book possible as an editor and a friend. A special thanks also goes to Crystal Long for her encouragement and input.

Another thank you goes to my collaborator on this book, Brent Spaulding, who filled in some of the gaps in my knowledge and experience.

And finally, many thanks to my wife and daughter, who gave me support and, more importantly, put up with my hours of sitting in front of the computer to produce this book.

Personal note from Scott: I hope you enjoy using this book as much as I have enjoyed writing it. I truly believe that by following these lessons you will become an accomplished Access developer.

Personal note from Brent: Working with talented people like Scott and Truitt while I wrote Part III has been an incredible experience. The practical tips, advice, and code samples will provide a strong foundation as your knowledge and ability expand. With that said, grab a soda and a snack and start programming!

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Introduction

So, you've been using Access for a little while. Now that you have used Access to build databases for yourself, and maybe some friends and/or colleagues, you are ready for the next step: developing automated database applications. If you want quicker, easier, and more accurate data entry; faster searching; better reporting; the ability to manipulate data behind the scenes; and much more, this book is for you.

With *Microsoft Office Access 2007 VBA* we show you how to unleash the power of Access using Visual Basic for Applications (VBA). VBA is a superset of the Visual Basic programming language that combines Visual Basic command syntax and a rich assortment of functions with the capability to control objects in your application (hence the "A" in "VBA").

This book shows you VBA in action with real-world examples. We introduce you to programming and its use within Access and hold your hand every step of the way. With the information provided in this book you will explore commands, functions, properties, and methods and how to use them to make your applications dance to your tune and jump through hoops.

What's in the Book

This book isn't meant to be read from cover to cover, although you may find that you can't put it down! Instead, most of the chapters are set up as self-contained units that you can dip into and extract whatever nuggets of information you need at will. If you're a relatively new Access user, I suggest starting with the first one or two chapters in each of the book's four main parts to ensure you have a solid foundation in the fundamentals of working with data in Access tables by using queries, forms, and reports.

INTRODUCTION

IN THIS INTRODUCTION

The book is divided into four main parts. To give you the big picture before diving in, here's a summary of what you find in each part:

- **Part I, "The Building Blocks"**—The nine chapters in Part I introduce you to the building blocks you use to build VBA modules. We start by explaining the advantages of using VBA. From there we introduce you to the Visual Basic Editor (VBE). This is where you enter, edit, and test all your code. In Chapter 3, "Using Variables, Constants, and Data Types," we talk about the various ways you assign and identify data. And Chapter 4, "Using Built-in Functions," moves on to a discussion of the many functions that Access and VBA provide. In Chapter 5, "Building Procedures," the topic is procedures in their various forms and modules, the containers for your code. Chapter 6, "Conditional and Looping Statements," gets into the meat of coding as we go over important syntax for branching using conditions and repeating code with looping. We follow that with a chapter on using arrays. And then Chapter 8, "Object and Event-Driven Coding," explains how to launch your programs using object and event-driven coding. Part I closes with a chapter on scope, which covers lifetime and visibility of variables and procedures.
- **Part II, "Working Within the User Interface"**—This part shows you how to use VBA to create a great user interface. You learn to work with form and report design and understand their components such as controls and sections. We introduce you to the wide variety of different controls available and show you how to use them. You learn what events are and how they are triggered and discover how to create different menus and use VBA to navigate through your application. Part II ends with a discussion of collections and how to reference Access objects.
- **Part III, "Working with Data"**—This part of the book deals with working directly with data. You will learn the two main ways to get at data: Data Access Objects (DAO) and ActiveX Data Objects (ADO). DAO and ADO are presented in a comparative fashion. We cover these object models as they apply to the Access Connectivity Engine (ACE), the database engine under the hood of Access. ACE is the successor to the Joint Engine Technology (JET) database engine, so you will see JET and ACE terminology where appropriate. You will learn not only how to find, add, edit, and remove data, but also how to create and modify the structure of how data is organized (the shema). With DAO, ActiveX Data Objects eXtentsion (ADOX), and Data Definition Language (a subset of SQL), you can modify and create databases, tables, fields, indexes, relationships, and queries. This section also touches on some of the more advanced topics of database analysis, such as retrieving a list of all the relationships in your database or discovering all the computers that are connected to your database.
- **Part IV, "Advanced VBA"**—In this final section, you encounter working with other types of data files such as Excel spreadsheets, Word documents, and flat files. You also learn the basics of automation with other Office applications. Finally, we show you how to call on the Windows Application Programming Interface (API).
- **Appendix**—This includes a great reference on Structured Query Language (SQL) in its many different flavors and shows how to integrate SQL into your applications.

This Book's Special Features

Microsoft Office Access 2007 VBA is organized to give you a firm foundation for using VBA in a logical manner that builds your knowledge step by step. We have also made the book a functional reference for VBA techniques.

- **Steps**—Throughout the book, each Access task is summarized in step-by-step procedures.
- **Code lines**—Lines of VBA code, commands, and statements appear in a `monospace` typeface.
- **Required Text**—Any text you need to enter will be **boldfaced**.
- **Italics**—Technical terms being defined appear in italic, such as *RecordSet Property*.
- **Syntax**—Within code statements certain arguments will be *italicized* to denote where you will need to substitute values relevant to your task. Brackets ([]) are used to indicate optional arguments.

This book also uses the following elements to draw your attention to important (or merely interesting) information.

NOTE

Notes are used to provide sidebar information about the topic being discussed. They provide extra insights that help you understand the concepts being covered.

TIP

Tips tell you about Access methods that we have found to make coding with Access easier, faster, or more efficient.

CAUTION

Caution elements warn you about potential pitfalls waiting to trap your code, such as common errors that might occur, and how to avoid or fix them.

➔ Cross-reference elements point you to related material elsewhere in the book.

CASE STUDY

You'll find case studies throughout the book based on an Inventory Tracking application. They are designed to show you how to apply what you've learned.

The Examples Used in the Book

All the tables, objects, and code samples referred to in this book can be found at http://www.quepublishing.com. There will be a folder for each chapter. The files build on the examples from the previous chapters. The Introduction file will be pretty bare bones and just have the objects that don't pertain to specific lessons we cover. You can build on the Introduction files or use the files that already have the examples coded for you.

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Using Built-In Functions

4

IN THIS CHAPTER

What Are Functions?

Built-in functions are commands provided by Access and VBA that return a value. The value returned is dependent on the purpose of the function and the arguments, if any, passed to it. VBA is rich in functions that perform a variety of tasks and calculations for you. There are functions to convert data types, perform calculations on dates, perform simple to complex mathematics, make financial calculations, manage text strings, format values, and retrieve data from tables, among others.

Functions return a value, and most accept arguments to act on. A lot of your code will use functions to make calculations and manipulate data. You should familiarize yourself with the functions that VBA makes available to you, but don't expect to memorize their syntax. Between Intellisense and the VBA Help screens you can't go far off course, especially because Intellisense prompts you for each argument. If you need help understanding an argument, press F1 or look up the function in VBA Help.

Although this book was not meant to be a reference for VBA functions, this chapter explains many of the most used ones to give you an idea of VBA's power.

A point to remember when coding your functions: Be consistent in using data types. If you provide arguments of the wrong data type or assign a function to a different data type, you will cause an error.

> **TIP** I don't know of any developer who knows every available function off the top of his or her head, so don't expect or think you need to. The more you code, the more you will remember, so feel free to use the references Microsoft provides. Use the Help option from the VBE menu to open the Developer Reference. In the search box type **`functions list`**, and one of the options is Functions (Alphabetical List). This gets you to a listing of all functions. Most of the function names are meaningful, so it shouldn't be difficult to find a function for the task you have.

> **NOTE** In this chapter we frequently use the term *expression*. In my use an expression can be as simple as a value or text string or as complex as a formula using multiple operators and functions. Just remember that an expression expresses a value.

Converting Data Types

At times you might find the need to import or link to data from external sources, or you might have to use data differently than the planned purpose. In such cases, the need may arise for you to convert from one data type to another. VBA includes several functions for this purpose. When you use a conversion function, the function returns the converted value but doesn't change the stored value.

➔ For more on data types see, "VBA DataTypes" **p. 28**.

This chapter goes over some of the more commonly used conversion functions. You can find a full list by opening the Developers Reference using the VBE Help menu and searching on *type conversion functions*.

- **`CBool`**—Converts a value to a `Boolean` data type.
- **`CDate`**—Converts a value to a `Date` data type.
- **`CInt`**—Converts a value to an `Integer` data type.
- **`CStr`**—Converts a value to a `String` data type.
- **`CVar`**—Converts a value to a `Variant` data type.

> **TIP** The most current conversion functions are prefixed with the letter *C*. It's better to use these functions in your conversions; however, you will also find included in VBA an older set of functions such as `Str` or `Val` for backward compatibility. The more current functions take your system's settings into account, whereas the older ones don't.

> **TIP** The `Val()` function has a use in addition to being a simple conversion function. It will return all numeric characters until it reaches a nonnumeric one. `CStr()` will return an error if you attempt to convert a string that contains nonnumeric data. For example, `Val("123abc")` will return the number 123 and `Cint("123abc")` will return a datatype mismatch error.

These functions have a simple syntax in common:

```
functionname(argument)
```

where *`functionname`* is the name of the function and *`argument`* is a value, variable, constant, or expression. The value of the argument is converted to a different data type depending on the function used, so it can be used elsewhere in your application. The value(s) used in the argument remain unchanged. It should be noted that not every data type can be converted to any other data type. The following sections explain the limitations.

Converting to a `Boolean` Data Type

A `Boolean` value is either `True` or `False`. The `False` value is either the number or character zero (0). Any other value is considered `True`. If the argument passed to the `CBool` function evaluates to a zero, `CBool` returns a `False`. If it evaluates to any other value, `CBool` returns a `True`. For example; all the following return a `True` because the arguments all evaluate to a nonzero value:

```
CBool("1")

CBool(1+0)

CBool(5)

CBool(-50)
```

Conversely, the following expressions return a `False` because each argument evaluates to zero:

```
CBool(0)

CBool("0")

CBool(15-15)
```

The argument passed to the `CBool` function must contain all numeric characters or operators. If you use alphabetic characters you get a type mismatch error. One place where using `CBool` becomes useful is in conditional statements. For example, you might need to determine whether two values match. In our Inventory application you might need to determine whether you are out of stock on an item. You could use the following expression, which would return a `False` if the incomings matched the outgoings:

```
CBool(Sum(Incoming)-Sum(Outgoing))
```

Converting to a `Date` Data Type

The `CDate` function converts any valid date/time value to a `Date/Time` data type. A valid date/time value can be either a number or a string that is formatted as a date or time. `CDate` determines valid date/time formats according to the regional settings you have chosen in Windows. You can use the following points to understand how dates are converted by `CDate`:

- If the argument is a numerical value, `CDate` converts the integer portion of the number according to the number of days since December 30, 1899. If the argument contains a decimal value, it's converted to a time by multiplying the decimal by 24 (for example, .25 would be 6:00 a.m.).
- If the argument is a string value, `CDate` converts the string if it represents a valid date. For example; `"1/16/51"`, `"March 16, 1952"`, and `"6 Jun 84"` would all be converted to a date. However, `"19740304"` would result in a type mismatch error.
- Access recognizes dates from January 1, 100, to December 31, 9999. Dates outside that range result in an error.
- I recommend that you use four-digit years for clarity. However, Access will work with two-digit years. If you enter a year less than 30, Access assumes you want a date in the twenty-first century. If you use a year of 30 or higher, it is assumed to be a twentieth century date.
- Remember that the / is also the division operator and the – is used for subtraction. So, if you enter dates such as 12/3/04 you will get unexpected results. Entering `CDATE(12/3/04)` returns December 31, 1899, because 12 divided by 3 divided by 4 = 1. So you need to put such dates within quotes.

Converting to an `Integer` Data Type

The `CInt` function takes a numeric or string value and converts it to an `Integer` data type. The *argument* is required and needs to represent a value within the range of –32,678 to 32,767. If the argument contains a decimal, Access rounds to the next whole number. A value of .5 or higher is rounded up; anything lower is rounded down. Some examples of `CInt` functions follow:

```
CInt(10.5)  = 11
CInt(25.333) = 25
CInt(10/3) = 3
CInt("1,000") = 1000
```

> **TIP** That last example illustrates one of the advantages of `CInt` over the older `Val` function. `CInt` uses the system's regional settings and, therefore, recognizes the thousands separator, whereas `Val` would convert "1,000" to 1.

The argument must evaluate to a numeric value; otherwise, it returns an error. If the argument evaluates to a value outside the range of the `Integer` data type, you get an overflow error.

Converting to a `String` Data Type

The `CStr` function converts just about every numeric value into a `String` data type. The required argument can be any variable, constant, expression, or literal value that evaluates to a string.

> **CAUTION**
>
> If you use a variable as the argument, make sure it's been initialized to a value. If you use `CStr` on an uninitialized variable, it returns a numeric value of 0.

Converting to a `Variant` Data Type

As I mentioned in the discussion of VBA data types in Chapter 3, "Using Variables, Constants, and Data Types," the `Variant` data type is the most flexible because it can accept almost any value. With `CVar`, you can convert just about any numeric or text string to the `Variant` data type. With numeric values there is a constraint to the same range for the `Double` data type.

> **CAUTION**
>
> `CVar` should be used only when there is a doubt of the data type you are converting or when the data type isn't important.

Converting Null Values

If you try to use a Null value in many expressions, you will probably encounter an error. For example, the following expression results in a runtime error if either of the values contains a Null:

```
varTotal = ValueA * ValueB
```

To avoid such errors you can utilize the `Nz` function to convert the value to a non-Null. The `Nz` function uses the following syntax:

```
Nz(value, [valueifnull])
```

The `Nz` function works similarly to an Immediate If (`IIF`) function. The following expressions are functionally equivalent:

```
varTotal = IIF(IsNull(ValueA),0,ValueA) * IIF(IsNull(ValueB),0,ValueB)
varTotal = Nz(ValueA,0) * Nz(ValueB,0)
```

The *`valueifnull`* is an optional argument; it defaults to 0 or a zero-length string based on the value's data type.

Working with Date Functions

VBA has many functions that help you deal with dates. As long as you understand how Access stores Date/Time values, you should have no problem in working with date functions and values.

➔ For a description of the Date/Time datatype see "VBA DataTypes," **p. 28**.

In this section we go over most of the functions you use when dealing with dates.

Returning the Current Date

To return the current date (as stored on your system) use the following function, which gives you a number counting the days from 12/30/1899:

```
Date()
```

How this value is displayed depends on your regional settings. You can use the `Date$()` function to return a 10-character string representing the date. This string uses the format *mm-dd-yyyy*. The `Date()` function returns only the system date; if you need to include the time use the `Now()` function. As noted earlier, a date/time value is a number where the integer portion represents the date and the decimal portion represents the time. So the `Now()` function will return an integer and decimal that represents the current date and time. The `Now()` function defaults to displaying its value according to the regional settings on your PC. On my PC it displays 7/25/2007 5:06:34 PM.

Performing Date Arithmetic

Because dates are stored as numbers, you can do date arithmetic simply by adding or subtracting date values. However, VBA gives you a better way, the `DateAdd` function. Using this function, you can add 14 days, 14 weeks, 14 months, or 14 years to any date. Or you can find a time 60 hours earlier than the specified date and time.

The following is the syntax for `DateAdd`, where *`interval`* is a string that indicates the type of time period that you want to calculate:

```
DateAdd(interval, value, date)
```

Table 4.1 shows the various strings that can be entered as intervals. The *`number`* argument is a value or expression that specifies the number of intervals you want to calculate. The number used is an integer. If a decimal value is included, it's rounded to the nearest whole number, before performing the calculation. The *`date`* argument is a Date/Time value that is the base value to use in the calculation.

Table 4.1 Interval Settings

String Setting	Description
`yyyy`	Years
`q`	Quarters
`m`	Months
`y`	Day of year
`d`	Days
`w`	Weekdays
`ww`	Weeks
`h`	Hours
`n`	Minutes
`s`	Seconds

The `y`, `d`, and `w` intervals work interchangeably in the `DateAdd` function but have more meaning in other Date/Time functions. If the interval evaluates to a negative number, it returns an earlier date/time; a positive number returns a future date/time.

Determining the Difference Between Two Dates

The `DateDiff` function is used to determine the number of intervals between two date/time values. The following is the syntax for the `DateDiff` function, where *`interval`* is a string that indicates the type of time period used to calculate the difference between the first and second dates represented by *`date1`* and *`date2`* (refer to Table 4.1):

```
DateDiff(interval, date1, date2[,firstdayofweek[, firstweekofyear]])
```

Also included in the `DateDiff` function are two optional arguments: *`firstdayofweek`* and *`firstdayofyear`*. These are numerical constants that can be used to adjust the first day of a week or year when using the `DateDiff` function. Tables 4.2 and 4.3 show a list of the values for each constant. The default values are Sunday and January 1, respectively.

Table 4.2 First Day of Week Constants

Constant	Description	Integer Value
`vbSunday`	Sunday (the default)	1
`vbMonday`	Monday	2
`vbTuesday`	Tuesday	3
`vbWednesday`	Wednesday	4
`vbThursday`	Thursday	5
`vbFriday`	Friday	6
`vbSaturday`	Saturday	7

Table 4.3 First Week of Year Constants

Constant	Description	Integer Value
`vbFirstJan1`	Use the week in which January 1 occurs (the default).	1
`vbFirstFourDays`	Use the first week that has at least four days in the new year.	2
`vbFirstFullWeek`	Use the first full week of the new year.	3

The results from this function might not always be as expected:

- If *`date2`* falls before *`date1`*, the function yields a negative value.
- The `DateDiff` function calculates a year has passed when a new year falls between the two dates, even if there are fewer than 365 days. So when using 12/31 and 1/1 as `date1` and `date2`, respectively, the function returns a 1.

Figure 4.1 shows how these guidelines affect the function in the Immediate window.

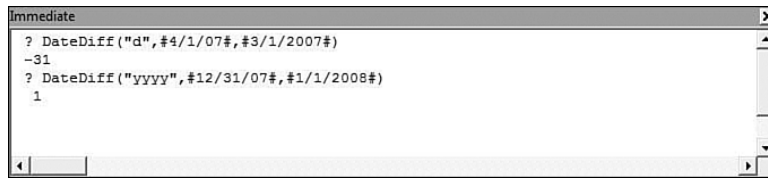


Figure 4.1
The `DateDiff` function in action.

NOTE

Notice that the dates in Figure 4.1 are enclosed by *octothorpes* (#—commonly known as a *pound sign*). This character is used to delimit date values, similarly to the way quotation marks are used with text strings. Access may recognize a date value and automatically insert the octothorpes, but it's a good practice to insert them yourself.

Extracting Parts of Dates

The `DatePart` function is used to extract a portion of a date from a date value. A Date/Time data type contains several components that correspond to the intervals listed in Table 4.1. For example, the following expressions return the values 4, 1, and 2007, respectively:

```
DatePart("m",#4/1/2007#)
DatePart("d",#4/1/2007#)
DatePart("yyyy",#4/1/2007#)
```

The `DatePart` function uses the following syntax, where *`interval`* is a String value that defines the part of the date you want to extract and *`date`* is a valid Date/Time value (refer to Table 4.1 for a list of interval values):

```
DatePart(interval, date[,firstdayofweek[, firstweekofyear]])
```

Also included in the DatePart function are two optional arguments: *firstdayofweek* and *firstdayofyear*. These are numerical constants that can be used to adjust the first day of a week or year when using the DatePart function. Tables 4.2 and 4.3 show a list of the values for each constant. The default values are Sunday and January 1, respectively.

> **TIP** Because you can extract any portion of a Date/Time value, it makes the most sense to store a date or time once as a valid Date/Time value. For example, even if you need to show only the month and year for a date, it would make sense to store a full date even if it's just the first or last day of the month.

Creating Dates from the Individual Parts

With DatePart you extract part of a date; conversely, with the DateSerial function you combine the parts of a date to return a date value. The DateSerial function uses the following syntax, where *Year*, *Month*, and *Day* can be any expression that evaluates to an integer value that represents the respective date part:

```
DateSerial(Year, Month, Day)
```

There are some rules for each of the arguments:

- *Year* is required and must be equal to an integer from 100 to 9999.
- *Month* is required, and integers from 1 to 12 (positive or negative) are considered.
- *Day* is required, and integers from 0 to 31 (positive or negative) are considered.

The DateSerial function can take integer values outside those ranges and calculate the difference to return a date value. This makes it very powerful if you use expressions for the arguments. For example, the following expression returns June 5, 2008 because the 18th month from the start of 2007 is June:

```
DateSerial(2007,18,5)
```

Similarly, the following returns May 15, 2007, by using the 30 days in April and adding the difference of 15 days to the next month:

```
DateSerial(2007,4,45)
```

Although this shouldn't be used as a substitute for DateAdd or DateDiff, it can make it easy to create dates from calculated values.

> **TIP** The expression DateSerial(2007,5,0)) returns 4/30/07. Using 0 for the *Day* value can then be used to get the last day of a month. If you use DateSerial(*Year*,*Month*+1,0) you get the last day of the *Year* and *Month* used as arguments passed to the function.

Creating Dates from String Values

The `DateValue` function can be used to return a date value from a string value; it uses the following syntax, where *`stringexpression`* must conform to the formats used by the system's Regional settings:

```
DateValue(stringexpression)
```

The following three expressions return the date June 1, 2007:

```
DateValue("6/1/2007")
DateValue("June 1, 2007")
DateValue("1 Jun 07")
```

> **TIP** The functions `TimeSerial` and `TimeValue` perform similarly to the `DateSerial` and `DateValue` functions with time values.

Extracting a Specific Date or Time Portion

Table 4.4 lists several functions that return a specific portion of a date or time value. The syntax for these functions is simple:

```
Functionname(date/time)
```


Table 4.4 Date Component Functions

Function	Result
`Day(date)`	Returns the day of the month as an integer between 1 and 31
`Hour(time)`	Returns the hour as an integer between 0 and 23
`Minute(time)`	Returns the minute as an integer between 0 and 59
`Second(time)`	Returns the second as an integer between 0 and 59
`Month(date)`	Returns the month as an integer between 1 and 12
`Year(date)`	Returns the year as an integer between 100 and 9999

A Conversion and Date Example

Sometimes you might need to round a time value to the nearest quarter hour or hour. This example uses some of the conversion and date/time functions previously discussed to accomplish that task.

1. Create a blank form and put two text boxes on it. Label the boxes `txtTime` and `txtResult`.
2. Add an option group to the form with the options Hour and Quarter Hour. Name the group `optType`.
3. Add a button to the form (turn off the wizard first). Name the button `cmdRound`.
4. Set the Record Selectors and Navigation buttons to No. Set Scroll Bars to neither.
5. In the `On Click` event of the button use the following code:

```
Private Sub cmdRound_Click()
Dim intHrs As Integer, intMin As Integer
Dim dteTime As Date
' convert entered time to Time value

dteTime = CDate(Me.txtTime)
'extract parts of time

intHrs = DatePart("h", dteTime)
intMin = DatePart("n", dteTime)

If Me.optType = 1 Then 'test for nearest type
    'Round to nearest hour
    If intMin >= 30 Then
        dteTime = DateAdd("h", 1, dteTime)
        dteTime = DateAdd("n", -intMin, dteTime)
    Else
        dteTime = DateAdd("n", -intMin, dteTime)
    End If
Else
    'Round to quarter hour
    Select Case intMin
        Case Is < 8
            intMin = 0
        Case 8 To 23
            intMin = 15
        Case 24 To 38
            intMin = 30
        Case 39 To 53
            intMin = 45
        Case Else
            intHrs = intHrs + 1
            intMin = 0
        End Select
    dteTime = TimeSerial(intHrs, intMin, 0)
End If

'Populate Result control
Me.txtResult = dteTime

End Sub
```

6. Save form as `frmRound` (see Figure 4.2).

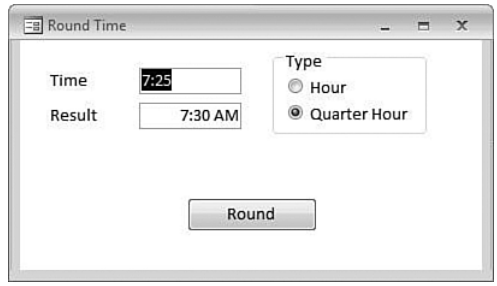


Figure 4.2
The completed `frmRound` showing an example of input and result.

Using Mathematical Functions

VBA provides a rich, broad set of functions to perform mathematical and financial calculations. There are too many to cover in this section, so we provide an overview of the most commonly used functions.

The `Abs` Function

The `Abs` function returns the absolute value of a number, removing the sign. The following is the syntax for the `Abs` function, where *`number`* is any expression that evaluates to a numerical value:

```
Abs(number)
```

For example; this expression returns a 7:

```
Abs(-7)
```

The `Int` Function

The `Int` function removes any decimal value from a number, returning the integer portion. The function uses the following syntax, where *`number`* is any expression that evaluates to a numerical value:

```
Int(number)
```

For example; this expression returns 15 because it truncates the value, removing the decimal portion:

```
Int(15.9)
```

However, if the numerical value is negative, `Int` returns the nearest negative integer, so the following returns –16:

```
Int(-15.9)
```

Although seemingly the same, `Int` and `Cint` can't be used interchangeably. The `Int` function doesn't convert the data type of the argument. Using `CInt` is often the better option, but it doesn't always return the same result. So be careful in determining which one to use.

The Rnd Function

The Rnd function is used to generate a random number. It can be used with an optional argument represented as any valid numerical expression. The following is the syntax for the function:

```
Rnd(seed)
```

seed can be used to control the generated number as indicated in the following:

- If *seed* is a negative value, Rnd generates the same number.
- If *seed* is a positive number (other than 0) Rnd generates the next number in an internally determined sequence of numbers.
- If *seed* equals 0, Rnd generates the most recently generated number.
- If seed is omitted, Rnd generates the next number in an internally determined sequence of numbers.

The Rnd function generates a number in the range of 0 to 1, so if you need a whole number, you will have to multiply the generated value by a power of 10 and use the Int function to get your whole number.

> **TIP** Use the Randomize statement to reset the internal sequence so that Rnd generates apparently unique values that are repeated.

A Mathematical Functions Example

To illustrate mathematical functions, let's create a function to generate a number between 1 and 99.

1. Create a blank form and put two text boxes on it. Label the boxes txtSeed and txtPicks.
2. Add a button to the form (turn off the wizard first). Name the button cmdGenerate.
3. Set Record Selectors and Navigation buttons to No. Set Scroll Bars to neither.
4. In the On Click event of the button use the following code:

```
Private Sub cmdGenerate_Click()
'Generate number between 1 and 99
    Me.txtPicks = Int(Rnd(Me.txtSeed) * 100)
End Sub
```

5. Save form as frmGenerate (see Figure 4.3).

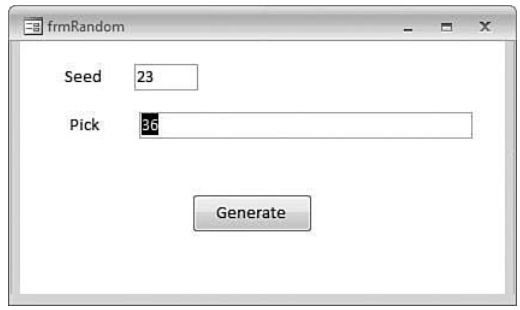


Figure 4.3
The completed `frmGenerate` showing an example of a generated number.

Using Financial Functions

Financial functions are used to perform many standard financial calculations such as interest rates, annuity or loan payments, and depreciation. Following are some financial functions you might find useful.

The `Ddb` Function

The `Dbd` function calculates the depreciation of an asset for a specified time using the predefined double-declining balance method. The following is the syntax for this function, where *`cost`* is an expression representing the asset's opening cost and *`salvage`* is an expression that specifies the value of the asset at the end of *`life`*, an expression representing the term of the asset's lifespan.

```
Ddb(cost, salvage, life, period[, factor])
```

The *`period`* argument represents the time span for which the depreciation is being calculated. All these arguments use `Double` data types. There is an optional *`factor`* argument that specifies the rate of decline of the asset. If omitted, the double-declining method is used.

The `FV` Function

The `FV` function is used to calculate the future value of an annuity. The `FV` function returns a double data type and uses the syntax

```
FV(rate, nper,pmt[,pv [, type]])
```

where *`rate`* is an expression resulting in a `Double` data type that represents the interest rate per period, *`nper`* is an expression resulting in an `Integer` data type that represents the number of payment periods in the annuity, and *`pmt`* is an expression resulting in a `Double` value that specifies the payment being made for each period. There are two optional arguments, *`pv`* and *`type`*, which are `Variant` data types that specify the present value of the annuity and whether payments are made at the start or end of each period.

The `Pmt` Function

The `Pmt` function is used to calculate the payment for an annuity or loan. This function uses the syntax

```
Pmt(rate, nper, pv[, fv[, type]])
```

where *`rate`* is an expression resulting in a `Double` data type that represents the interest rate per period, *`nper`* is an integer expression that defines the number of payments to be made, and *`pv`* identifies the present value and is also a `Double` data type. There are two optional arguments, *`fv`* and *`type`*, which are `Variant` data types that represent the future value of the payments and whether payments are made at the start or end of each period.

The `Rate` Function

The `Rate` function is used to calculate the periodic interest rate for an annuity or loan. The syntax for this function is

```
Rate(nper, pmt, pv[, fv[, type[, guess]]])
```

Where *`nper`* is an expression resulting in a `Double` data type that represents the number of period, *`pmt`* is an expression resulting in a `Double` data type that represents the payment per period, and *`pv`* is an expression resulting in a `Double` data type that defines the present value. There are also three optional arguments: *`fv`*, *`type`*, and *`guess`*, which identify the future value, determine whether payments are made at the start or end of each period, and allow you to give an estimate of the rate, respectively.

A Financial Functions Example

In keeping with the Inventory application theme of the sample file, this example looks at a scenario where you want to expand to cover a new product line. Because this new product line is from a new vendor, the vendor requires you to make a significant purchase the first time around. You don't have the $10,000 to make the initial purchase, so you need to figure out different loan scenarios to see whether you can afford a loan.

1. Open the basUDFs module or one of your own.
2. Enter the following procedure:

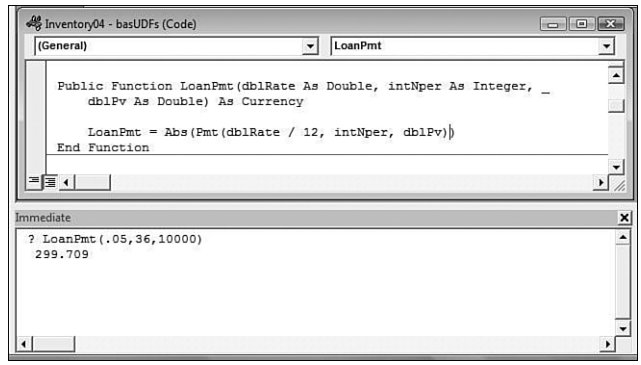
```
Public function LoanPmt(dblRate As Double, intNper As Integer, _
dblPv As Double) As Currency
    LoanPmt = Abs(Pmt(dblRate/12, intNper, dblPv))
End Function
```

3. In the Immediate window enter the following statement and press Enter:

```
? LoanPmt(.05,36,10000)
```

Figure 4.4 shows the code and the result. This loan would cost you $300 per month for 36 months. You can now try out different scenarios with combinations of rate and term to see what your payments might be.

Figure 4.4
The `LoanPmt` function and its results.



Manipulating Text Strings

You use string functions to manipulate groups of text data. The following are some examples of where you might use string functions:

- Checking to see whether a string contained another string
- Parsing out a portion of a string
- Replacing parts of a string with another value

The following string functions help you do all these tasks and more.

The `Asc` Function

Every individual character can be represented by a number value. These values are listed in the American Standard Code for Information Interchange (ASCII). To return the ASCII value of a character use the following syntax, where *`string`* is an expression that results in a `Text` data type. It returns an integer value between 0 and 255.

```
ASC(string)
```

> **CAUTION**
>
> The `Asc` function reads only the first character of the string if there are multiple characters.

With any text string you must use apostrophes or quotation marks to define and delineate the text string; otherwise, `Asc` returns an error. However, if the string is a numeric, the delimiters can be eliminated. For example, the following two functions both return the value 51:

```
Asc("3")
Asc(3)
```

The `Chr` Function

The `Chr` function is the reverse of the `Asc` function. Whereas `Asc` returns the numerical value from character, `Chr` returns the character from a number. The following is the syntax for this function. where *`charactercode`* is an integer value between 0 and 255:

```
Chr(charactercode)
```

As you saw previously, the character 3 is represented by the number 51. So the following functions returns a 3:

```
Chr(51)
```

> **NOTE** The numbers 0–255 represent the values of characters according to the ASCII table. An example of that table can be found at http://www.asciitable.com.

> **TIP** Many of the string functions return a value as a variant of the `String` subtype. An alternative set of string functions add a `$` to the function name (for example, `Chr$`). These alternative functions return a literal string value. This provides a better performance because VBA doesn't have to evaluate the data type during processing.

The Case Functions

There is actually no case function. There are two functions, `LCase` and `UCase`, that can be used to change the case of a text string. They use the following syntax, where *`string`* is an expression that returns a string value. Both functions return the *`string`* in either lowercase or uppercase, respectively.

```
LCase(string)
```

```
UCase(string)
```

> **TIP** You can use the `UCase` function to convert entered data so that the data entry person doesn't have to concern himself with entering the proper case.

The `Len` Function

The `Len` function is used to determine the number of characters in a text string. This function uses the following syntax, where *`string`* is an expression that results in a `Text` data type. The function returns a long integer except where the string is Null, in which case it returns a Null value.

```
Len(string)
```

The `Left`, `Right`, and `Mid` Functions

Among the most used functions, these three return a portion of a string depending on the function and the arguments provided. All three result in a `Variant Long` subtype but support a `$` version, which forces a `String` data type.

The `Left` and `Right` functions use a similar syntax:

```
Left(string, length)
```

```
Right(string, length)
```

Here, *`string`* is an expression that results in a `Text` data type to be parsed and *`length`* is an expression that results in an `Integer` data type that specifies the number of characters from either the left or right end of the string to return.

The `Mid` function can parse a text string from any part of the string. It uses the following syntax, where *`string`* is a required argument that represents an expression resulting in a `Text` data type and *`start`* is a required argument that specifies where to start parsing the string:

```
Mid(string, start[, length])
```

An optional argument, *`length`*, specifies how many characters from the *`start`* point to parse. If *`length`* is omitted or is greater than the number of characters to the end of the string, all characters from *`start`* are returned. Figure 4.5 shows the three functions parsing various parts of the same string.

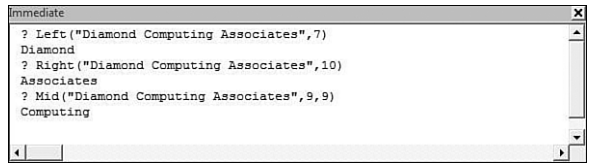


Figure 4.5 The `Left`, `Right`, and `Mid` functions parsing the same text.

The `Replace` Function

The `Replace` function is used to replace one or more characters within a string with a different character or characters. This function takes the following syntax, where *`string`* is an expression representing the text string to be searched, *`stringtoreplace`* is an expression representing the string to be searched for, and *`replacementstring`* represents the string you want in place of *`stringtoreplace`*

```
Replace(string, stringtoreplace, replacementstring[, start[, count[, compare]]])
```

In addition, there are three optional arguments: *`start`*, which specifies where to start searching within the string; *`count`*, which specifies the number of replacements to process; and *`compare`*, which is a constant indicating the method used to compare *`stringtoreplace`* with *`string`*. Table 4.5 lists the constants that can be used.

Table 4.5 Comparison Constants

Constant	Value	Description
`vbUseCompareOption`	–1	Performs a comparison using the setting of the `Option Compare` statement.
`vbBinaryCompare`	0	Performs a binary comparison.
`vbTextCompare`	1	Performs a textual comparison.
`vbDatabaseCompare`	2	Microsoft Access only. Performs a comparison based on information in your database.

The `Split` Function

The `Split` function takes a delimited string and populates an array with the parts. The following is the syntax for the `Split` function, where *`string`* is a delimited string of values:

```
Split(string[, delimiter[, count[, compare]]])
```

This is the only required argument. The first optional argument is *`delimiter`*, which specifies the delimiting character separating the values. If you omit *`delimiter`* a space is assumed to be the *`delimiter`*. The second optional argument is *`count`*, which limits the number of values parsed. For example, there might be five values separated by commas in the string, but a *`count`* argument of 3 parses only the first three values. The final optional argument is *`compare`*. See Table 4.5 for the comparison constants.

The `Trim` Functions

Three functions can be used to trim leading or trailing spaces from a string. All three use the same syntax, where *`string`* is an expression that results in a `Text` data type:

```
Trim(string)
LTrim(string)
RTrim(string)
```

The `Trim` function removes both leading and trailing spaces, `LTrim` removes the leading spaces, and `Rtrim` removes the trailing spaces. All three functions return a `Variant String` subtype and support the `$` format to force a `Text` data type.

Formatting Values

Often data is stored is differently from the way it's displayed on forms and in reports. The `Format` function is your tool to change how data is displayed. Access provides many predefined formats for you to use and allows you to customize your own formats. For example, a phone number might be stored as 10 digits but you can display it like (111) 222-3333 by applying a format. Another example are Date/Time values. As previously noted, they are stored as a `Double` number. However, the `Format` function can display the number in a variety of date or time formats.

CAUTION

Keep in mind that the `Format` function returns a `Variant String` subtype, which will probably be different from the original value's data type, and that the original data remains unchanged. This means that you should use `Format` only for display purposes; you don't want to use it in calculations.

The `Format` function uses the following syntax, where *`expression`* can be either a `String` or `Numeric` data type that results in the value you want to format:

```
Format(expression[, format[,firstdayofweek[, firstweekofyear]])
```

There are three optional arguments, the first of which determines how the data is formatted. The other two optional arguments, *`firstdayofweek`* and *`firstdayofyear`*, are numerical constants that can be used to adjust the first day of a week or year when using the `DatePart` function. Tables 4.2 and 4.3 show a list of the values for each constant. The default values are Sunday and January 1, respectively.

Tables 4.6 and 4.7 show some of the predefined formats you can use.

Table 4.6 Numeric Named Formats

Format	Example	Result
General Number	`Format(12345.6789,"General Number")`	12345.6789
Currency	`Format(12345.6789, "Currency")`	$12,345.68
Fixed	`Format(0.1, "Fixed")`	0.10
Standard	`Format(12345.6789, "Standard")`	12,345.68
Percent	`Format(6789, "Percent")`	67.89%
Scientific	`Format(12345.6789, "Scientific")`	1.23E+03
Yes/No	`Format(0, "Yes/No")` `Format(3, "Yes/No")`	No Yes
True/False	`Format(0, "Yes/No")` `Format(3, "Yes/No")`	False True
On/Off	`Format(0, "Yes/No")` `Format(3, "Yes/No")`	Off On

The result for `Currency` is based on the United States regional settings; if you use a different regional setting, the `Currency` format uses those settings. For the `Boolean` types a zero results in a No, False, or Off result. Any other value gives the opposite result.

Table 4.7 Date/Time Named Formats

Format	Example	Result
General Date	`Format("04/01/07", "General Date")`	4/1/2007
Long Date	`Format("04/01/07", "Long Date")`	Sunday April 1, 2007
Medium Date	`Format("04/01/07", "Medium Date")`	01-Apr-07
Short Date	`Format("04/01/07", "Short Date")`	4/1/2007
Long Time	`Format('13:13:13', "Long Time")`	1:13:13 PM
Medium Time	`Format('13:13:13', "Medium Time")`	1:13 PM
Short Time	`Format('13:13:13', "Short Time")`	13:13

Applying User-Defined Formats

Although the predefined formats listed in Tables 4.6 and 4.7 cover many situations, at times you'll need to create your own formats. You can use a number of special characters and placeholders to define your own formats. Tables 4.8, 4.9, and 4.10 list these formats.

Table 4.8 Numeric User-Defined Formats

Format	Explanation	Example	Result
`0`	Display actual digit or 0 for each 0 used. Rounds if more digits than shown.	`Format(12.3456, "000.00000")` `Format(12.3456, "000.00")`	012.34560 012.35
`#`	Display actual digit or nothing. Rounds if more digits than shown.	`Format(12.3456, "###.#####")` `Format(12.3456, "###.##")`	12.3456 12.35
`%`	Multiples by 100 and adds percent sign	`Format(.3456, "##%")`	35%
`E- E+ e- e+`	Display scientific notation.	`Format(1.234567, "###E-###)`	123E-2
`- + $ ()`	Display a literal character.	`Format(123.45, "$####.##")`	$123.45
`\`	Display following character as a literal.	`Format(.3456, "##.##\%"`	.35%

Table 4.9 Date User-Defined Formats

Format	Explanation	Example	Result
`d`	Display day of month without leading zero	`Format("04/04/07", "d")`	1
`dd`	Display day of month with leading zero where needed	`Format("04/04/07", "dd")`	01
`ddd`	Display abbreviated day of week	`Format("04/01/07", "ddd")`	Sun
`dddd`	Display full day of week	`Format("04/01/07", "dddd")`	Sunday
`ddddd`	Display short date	`Format("04/01/07", "ddddd")`	4/1/2007
`dddddd`	Display long date	`Format("04/01/07", "dddddd")`	Sunday, April 1, 2007
`m`	Display month without leading zero	`Format("04/01/07", "m")`	4
`mm`	Display month with leading zero	`Format("04/01/07", "mm")`	04
`mmm`	Display abbreviated month name	`Format("04/01/07", "mmm"`	Apr
`mmmm`	Display full month name	`Format("04/01/07", "mmmm")`	April
`q`	Display quarter of year	`Format("04/01/07", "q")`	2
`h`	Display hours without leading zero	`Format("13:13:13", "h")`	1
`hh`	Display hours with leading zero	`Format("13:13:13","hh")`	01
`n`	Display minutes without leading zero	`Format("13:07:13", "n")`	7
`nn`	Display minutes with leading zero	`Format("13:07:13", "nn")`	07
`s`	Display seconds without leading zero	`Format("13:13:07", "s")`	7
`ss`	Display seconds with leading zero	`Format("13:13:07", "ss")`	07
`ttttt`	Display 12-hour clock	`Format("13:13:13", "ttttt")`	1:13:13 PM
`AM/PM`	With other time formats displays either upper- or lowercase AM/PM	`Format("13:13:13", "hh:nn AM/PM")`	1:13 PM
`am/pm`		`Format("13:13:13", "hh:nn am/pm")`	1:13 pm
`A/P`	With other time formats displays either upper- or lowercase A/P	`Format("13:13:13", "hh:nn A/P")`	1:13 P
`a/p`		`Format("13:13:13", "hh:nn a/p")`	1:13 p
`ww`	Display the number of the week (1–54)	`Format("04/01/07", "ww")`	14

Format	Explanation	Example	Result
w	Display the number of the day of the week	`Format("04/01/07", "w")`	1
y	Display the day of the year (1–366)	`Format("04/01/07", "y")`	91
yy	Display 2-digit year (00–99)	`Format("04/01/07", "yy")`	07
yyyy	Display 4-digit year (0100–9999)	`Format("04/01/07", "yyyy")`	2007

These formats can also be combined to display different date or time formats. The following are some examples:

```
Format("04/01/07", "yyyymmdd") = 20070401
```

> **TIP** This format is useful when exporting data to other formats and still maintaining chronological sort.

```
Format("4/01/07", "mmm dd") = Apr 01
Format("04/01/07", "mmm yyyy") = Apr 2007)
```

Table 4.10 String User-Defined Formats

Format	Explanation	Example	Result
@	Display actual character or space	`Format("VBA", "@@@@@")`	VBA
&	Display actual character or nothing	`Format("VBA", "&&&&&")`	VBA
<	Display character as lowercase	`Format("VBA", "<<<<")`	vba
>	Display character in uppercase	`Format("VBA", ">>>>")`	VBA

Domain Aggregate Functions

Domain Aggregate functions are specific to Microsoft Access because they are used to retrieve data from tables. Because you can't assign the results of a query directly to a variable, you must use Domain Aggregate functions to retrieve that data. There are other ways besides Domain Aggregate functions that will be covered later in this book. The advantages of the Domain Aggregate functions are that they can accept a set of criteria to retrieve just the data needed. All the Domain Aggregate functions use a similar syntax, where *`expression`* is the name of the field in a table or query, *`domain`* is the name of the table or query, and *`criteria`* is a comparison to define which record to extract the value from:

```
Function("[expression]", "domain", criteria)
```

Notice that the *expression* is usually surrounded by quotes and brackets and that the *domain* is also surrounded by quotes. I'll list some of the more commonly used Domain Aggregate functions.

The DLookup Function

The DLookup function is used to retrieve a value from a single field in a table or query. The following example returns the last name of the contact for Supplier G from tblSuppliers in the Inventory application:

```
DLookup("[LastName]", "tblSuppliers","[Company] = '" & "Supplier G" & "'")
```

The DLookup function retrieves that value from the first record matching the criteria. Because *Company* is a Text data type, you must concatenate the single quotes around the company name. If you are comparing a Numeric data type, no quotes are needed, and a Date/Time data type requires octothorpes (#) to delimit the value to be searched for.

The DCount Function

The DCount function is used to count the number of records in a table or query that match your criteria. An example of the DCount function follows:

```
DCount("*","tblEmployees","[Jobtitle] = 3")
```

This returns a result of 6 because there are six employees whose job title is Sales Representative.

The DMax/DMin Functions

The DMax and DMin functions return the highest or lowest values in the domain according to the criteria listed. An example of the DMin function follows:

```
DMin("[CreatedDate]","tblTransactions")
```

This returns 3/22/2006 4:02:28 PM, which is the earliest transaction in the Transactions table.

TIP

The DMax function is often used to produce a sequential numbering system that can be dependent on some other value. For example, say you wanted to number each transaction for each employee and start the numbering each time a new employee is added. In such a case you could use the following code snippet in the After Update event of the control where the employee is selected on your form:

```
Me.txtIncrement =
Nz(DMax("[Increment]","tblTransactions","[EmployeeID] = " &_
Me.cboEmployee),0)+1
```

This sets the control named txtIncrement to the highest value of the field Increment plus 1 for the selected employee. If no record for the employee is found, the NZ function causes the expression to return a 0, which is then incremented to 1.

Using the `Is` Functions

VBA provides a series of functions to help you trap errors that might arise from data type mismatches. These functions test a value to see whether it's a specified type.

- **`IsArray`**—Checks whether the value is an array
- **`IsDate`**—Checks whether the value is a Date/Time data type
- **`IsEmpty`**—Checks whether the value hasn't been initialized with a value
- **`IsError`**—Checks whether an expression results in an error
- **`IsMissing`**—Checks whether an optional argument has been passed to a procedure
- **`IsNull`**—Checks whether the value contains a Null
- **`IsNumeric`**—Checks whether the value is a number
- **`IsObject`**—Checks whether a variable contains a reference to an object

➔ We cover arrays in more detail in Chapter 7,"Working with Arrays."

All these functions use the same syntax, where *`value`* is a value or expression being tested:

```
IsFunction(value)
```

The functions all return a `Boolean` data type, either `True` if the value meets the condition being checked or `False` if it doesn't.

Interaction

At times you need to provide information to the application's user or get information from them. This is interacting with the users. Two functions that can perform such an action are the `MsgBox` and `InputBox` functions.

The `MsgBox` Function

You use the `MsgBox` function to present information to users with an opportunity to respond to the information. You have control over how the message box appears and what response the user can make. The `MsgBox` function uses the following syntax, where *`prompt`* is the only required argument and represents a text string that constitutes the message presented by the message box:

```
MsgBox(prompt[, buttons][, title][, helpfile, context])
```

The users can respond through a choice of one or more buttons. Table 4.11 lists various button options you can use. You can supply a string value for *`title`* that displays in the title bar of the message box. The other two optional arguments—*`helpfile`* and *`context`*—are seldom used and go together. The *`helpfile`* argument is a string that points to a help file to be used if the user clicks the message box's Help button. The *`context`* argument is a numeric value that specifies a number to be used within the help file. (Note: Creating help files is outside the scope of this book.)

Table 4.11 `MsgBox` Button Constants

Constant	Description	Integer Value
`vbOkOnly`	OK button	0
`vbOKCancel`	OK and Cancel buttons	1
`vbAbortRetryIgnore`	Abort, Retry, and Ignore buttons	2
`vbYesNoCancel`	Yes, No, and Cancel buttons	3
`vbYesNo`	Yes and No buttons	4
`vbRetryCancel`	Retry and Cancel buttons	5

Table 4.12 lists constants for the icons that can be displayed in the message box. You can display both icons and buttons using the following syntax:

```
buttonconstant + iconconstant
```

As an example, the following function displays the message box shown in Figure 4.6. There are two buttons—OK and Cancel—and a question mark icon.

```
MsgBox("Do you want to save this record?", vbOKCancel + vbQuestion,"Warning")
```


Figure 4.6
A message box asking whether the user wants to save a record.

CAUTION

Besides the `MsgBox` function there is also a `MsgBox` action. The action displays the `Msgbox` without returning a value as a response.

Table 4.12 Icon Constants

Constant	Description	Integer Value
`vbCritical`	Critical message	16
`vbQuestion`	Warning message	32
`vbExclamation`	Warning message	48
`vbInformation`	Information message	64

When the user clicks one of the buttons, the function returns its value. Table 4.13 shows the values returned for each button.

Table 4.13 Button Values

Button	Returned Value	Integer Value
OK	`vbOK`	1
Cancel	`vbCancel`	2
Abort	`vbAbort`	3
Retry	`vbRetry`	4
Ignore	`vbIgnore`	5
Yes	`vbYes`	6
No	`vbNo`	7

The following code snippet is built around the message box function previously shown:

```
Private Function cmdSave_OnClick()
Dim strMsg As String
strMsg = "Do you want to save this record?"
If MsgBox("strMsg, vbOKCancel + vbQuestion,"Warning") = vbOK Then
     DoCmd.RunCommand acCmdSaveRecord
Else
    Me.Undo
End If
```

The `InputBox` Function

The `Inputbox` function displays a dialog box with a prompt that allows the user to enter a value that can then be assigned to a variable (see Figure 4.7). The following is the syntax for this function, where *`prompt`* is a `String` that displays a message for the user and is the only required argument:

```
InputBox(prompt[, title][, default][, xpos][, ypos][, helpfile, context])
```

The message is used to let the user know what data should be input. The *`title`* is a `String` that is displayed in the title bar of the window. The *`default`* is used to set a default value when the box opens. The *`xpos`* and *`ypos`* arguments allow you to precisely position the box in terms of the top and left of the screen. The *`helpfile`* and *`context`* arguments are the same as for the `MsgBox`.

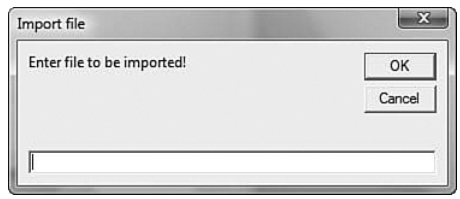


Figure 4.7
An input box asking the user to enter a filename.

You usually use `InputBox` to retrieve a value from the user during processing of code. An example follows:

```
Dim strFilename As String
strFilename = InputBox("Enter file to be imported!", "Import file")
DoCmd.TransferText acExportDelim, , "Import", strFilename
```

> **TIP** I rarely use the `InputBox` function, preferring to use a form to allow the user to supply input. Using a form gives you much greater control over the input. With a form you can use interactive controls such as combo boxes or option groups to ensure that the correct data is entered. We'll deal with this more in later chapters.

CASE STUDY

Case Study: Add Work Days

Sometimes you might need to figure a delivery or follow-up date for a shipment. You want to calculate such dates based on business days, not calendar days. The following function allows you to enter a start date and the number of business days and returns the date equal to that number of business days:

1. Open the UDFs module or a new one.
2. Enter the following code into the module:

```
Public Function AddWorkdays(dteStart As Date, intnNumDays As Integer) As Date

Dim dteCurrDate As Date
Dim i As Integer

dteCurrDate = dteStart
AddWorkdays = dteStart
i = 1

Do While i < intNumDays
     If Weekday(dteCurrDate, vbMonday) <= 5 AND _
         IsNull(DLookup("[Holiday]","tblHolidays", "[HolDate] = #" & _
         dteCurrDate & "#")) Then
          i = i + 1
     End If

     dteCurrDate = dteCurrDate + 1

Loop
AddWorkdays = dteCurrDate

Exit_AddWorkDays:
End Function
```

3. Test the code by entering the following into the Immediate window. Figure 4.8 shows the results.

```
? AddWorkDays(#5/16/07#,15)
```

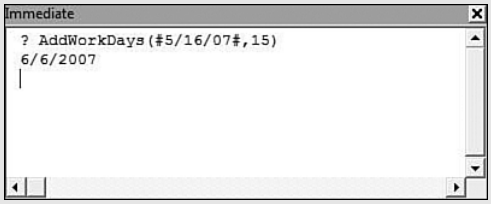


Figure 4.8
The results from using the `AddWorkDays` function.

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