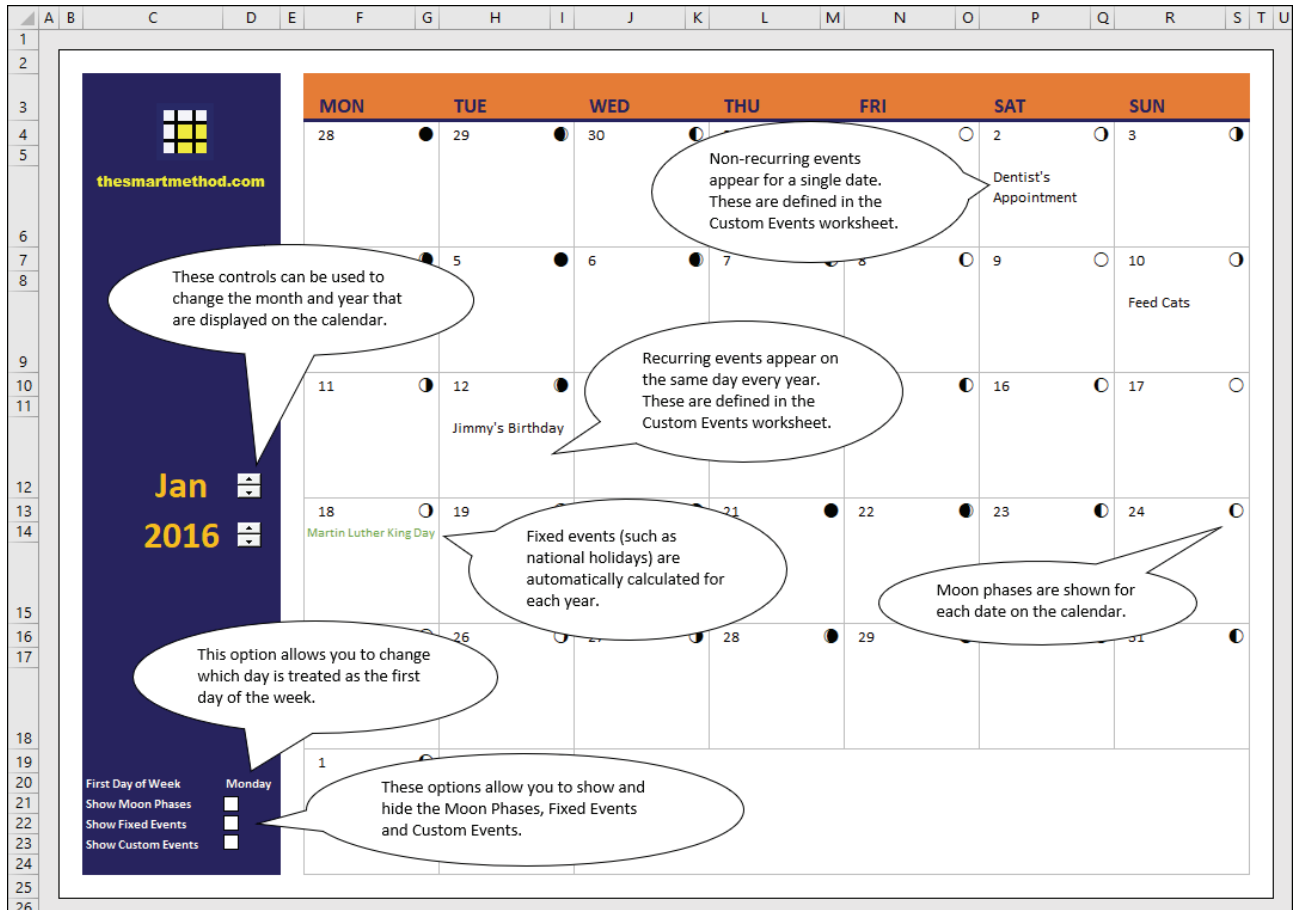


Excel Construction Kit #1

Year Planner Application

In this book you will learn how to use and apply advanced Excel skills to construct this robust Excel business application:



Users can define both recurring and non-recurring events:

	A	B	C	E	F
1	Custom Events				
2					
3	Non-Recurring			Recurring	
4					
5	Date	Name		Date	Name
6	6-Jan-18	Dentist's Appointment		18-Jan-18	Jimmy's Birthday
7	07-Jan-18	School sports day		02-Jan-18	Sarah's Birthday
8	03-Feb-18	Film Night		10-Jan-18	Wedding Anniversary
9	03-Feb-18	Weekend in Paris			
10	04-Feb-18	Weekend in Paris			
11	02-Feb-18	Depart 13:30 Gatwick			
12					
13					
14					
15					
16					
17					
18					

Enter dates and names for non-recurring events here. Non-recurring events will only be displayed for the date that you enter.

Enter dates and names for recurring events here. Recurring events will be displayed on the same date every year.

Learning by doing.

An alternative approach to learning and applying Excel skills

For over 900 years craftsmen have traditionally taught their skills to an apprentice. The apprentice would work (often unpaid) for a period of five to nine years to learn the craftsman's trade. In this model the apprentice learned his trade by observing how the master craftsman used his skills. The apprentice would then attempt to imitate the same techniques.

This construction kit will teach you advanced Excel skills in the same way. Even if you only have basic Excel skills, the construction kit is designed in such a way that you'll be able to construct a complex, polished professional Excel application that would be well beyond the powers of most advanced Excel users.

As you progress through the book you will use advanced Excel skills to construct a finished application. Along the way you'll learn Excel techniques that you will be able to apply in the future to a multitude of Excel business problems.

No VBA program code or Macros are used in this construction project.



The use of VBA programming code or recorded macros (recorded macros also contain VBA program code) is always a virus threat. For this reason, most corporate environments have a security policy that does not allow VBA program code within Excel workbooks.

When using Excel for its intended purpose it is actually very rare find a true need for custom VBA program code.

No VBA program code, recorded macros or add-ins are used in the sophisticated project you'll build using this book. You will complete your construction kit using only regular Excel features.

This book will teach you best-practice when applying your Excel skills to large real-world projects.

This book won't only teach you Excel skills. You'll also learn a best-practice design and development methodology that will stand you in good stead when working on future Excel projects.

In constructing this project you'll discover new and interesting ways to use many of Excel 2019's more powerful and complex features.

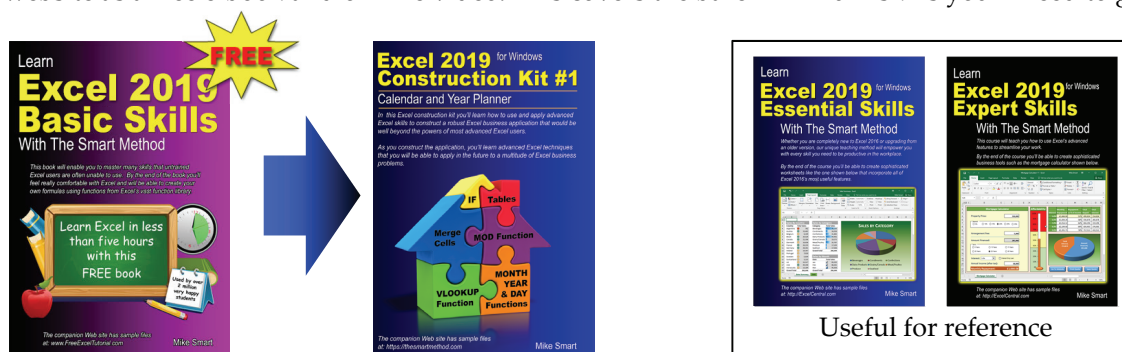
Use of this book as courseware

This book is particularly useful for training organizations, teachers, schools, colleges and universities who would like to engage, motivate and interest students by having them use Excel skills to produce an interesting, useful and impressive Excel application.

You can use this construction kit in two ways

As an Excel beginner

If you are an absolute beginner who has never used Excel before you'll need to acquire some basic skills before beginning this construction kit. We offer a free *Excel Basic Skills* tutorial on our thesmartmethod.com website as a free e-book and on-line video. This covers the bare minimum skills you'll need to get started.



If you follow this track, you'll still learn a lot of useful information (and hopefully have fun along the way), but you'll only have a surface-level understanding of some of the Expert-level skills you'll use. You'll also have a more limited knowledge of Excel as you'll only discover the features that you use in the construction kit.

It isn't necessary to have the *Essential Skills* and *Expert Skills* books (or e-books) on hand to complete this construction kit but it is highly recommended that you do.

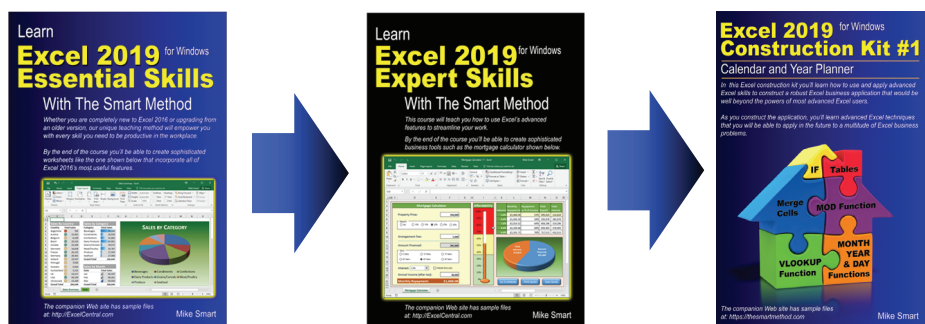
The *Essential Skills* and *Expert Skills* tutorials provide an in-depth understanding of all the advanced features used in this construction kit. If you have the books (or e-books) on hand, you'll be able to use them as a reference to expand your understanding of some of the advanced skills you will use in this construction kit.

As an Excel Expert

If you've already completed our *Essential Skills* and *Expert Skills* tutorials you already have advanced Excel skills that are rarely mastered by the average user.

This construction kit will show expert users how to plan and implement a high-quality Excel solution. You'll learn a solid design methodology that will enable you to use and apply your skills to satisfy even the most complex business requirements.

You will also discover some innovative techniques that combine Excel's advanced features to elegantly solve complex requirements.



Every step in your construction kit is presented on two facing pages

Pray this day, on one side of one sheet of paper, explain how the Royal Navy is prepared to meet the coming conflict.

Winston Churchill, Letter to the Admiralty, Sep 1, 1939

Winston Churchill was well aware of the power of brevity. The discipline of condensing thoughts into one side of a single sheet of A4 paper resulted in the efficient transfer of information.

A tenet of our teaching system is that every step in this construction kit is presented on *two* facing sheets of A4. We've had to double Churchill's rule as they didn't have to contend with screen grabs in 1939! If we can't teach an essential concept in two pages of A4 we know that the subject matter needs to be broken into two smaller lessons.

How this book avoids wasting your time.

Many presentational methods have been used in this book to help you to skip reading about things you already know how to do, or things that are of little interest to you.

Lessons are logically grouped into *Sessions* and numbered for easy reference. This example shows *Lesson 28* in *Session 3*.

Screen grabs are provided in-line with the text when they can explain what you need to do more clearly than words alone.

If you want to progress through the course as quickly as possible you don't have to read notes.

Notes usually expand a little on the information given in the lesson text.

If you already know how to do something simply read the bold text for each step and just do it. Step notes sometimes provide precise instructions about how to progress if the one-line description is inadequate. Notes also often include interesting information about the current task.

When there is a sample file (or files) to accompany a lesson, the file name will be shown in a folder icon. You can download the sample file set from: <https://thesmartmethod.com>.

Learn Excel 2016 Expert Skills with The Smart Method

note

VLOOKUP is still (usually) a better solution than IFS

In *Lesson 3-5: Use the IF logic function* (sidebar) I advised: "Excel 2016 allows you to nest IF functions up to 64 levels deep (which is 63 too many)". The new IFS and SWITCH functions (introduced in Feb 2016) are mainly intended to offer a simpler alternative to nested IF functions.

This doesn't mean using the IFS and SWITCH functions provides a better solution than VLOOKUP.

It is easy to introduce errors using IFS and SWITCH, as the order in which the logic pairs are listed is vital to the correct operation of the function.

In almost all business situations a VLOOKUP will provide a better and more elegant solution than the use of the IFS or SWITCH function.

Lesson 3-28: Use the IFS function

If you have Excel 2016 (rather than Excel 365) you will not be able to complete this lesson (see sidebar).

In *Lesson 3-25: Use a VLOOKUP function for an inexact lookup*, you used a VLOOKUP function to return a grade from different pass mark percentages.

In early 2016 Microsoft added a new IFS function to Excel 365. In this lesson you will solve exactly the same problem posed in *Lesson 3-25: Use a VLOOKUP function for an inexact lookup*, with a logic based (rather than lookup based) solution.

1 Open *IFS Grades-1* from your sample files folder.

Name	Percentage	Grade	Percentage	Grade
Johnny Caine	70%	0% Fail		
George Marley	68%	60% C		
Betty Anan	86%	70% B		
Paris Winfrey	80%	80% A		
Ozzy Dickens	95%	90% A*		
Johnny Roberts	84%			

This is an exact duplicate of the *Grades-1* sample file that you used at the beginning of: *Lesson 3-25: Use a VLOOKUP function for an inexact lookup*.

2 Use the IFS function to calculate the grade for each student by defining grade data within the function.

Sometimes it may be better to "hard code" data (such as the percentage grade thresholds) within the function itself. This prevents users from accidentally deleting or changing the grade percentage thresholds within the worksheet.

The argument against this approach is that the worksheet is more difficult to maintain if grade thresholds change in the future.

- Click in cell C4.
- Click: Formulas→Function Library→Logical→IFS.

The *Function Arguments* dialog for the IFS function appears. The IFS function accepts up to 127 *Logical Test/Value* pairs.

3. Enter the following pair of arguments:

Logical_test1	Value_if_true1
B4 < 60%	"Fail"

The *Logical Test* is an expression that returns TRUE or FALSE. In this case the test asks if Johnny Caine's percentage is less than 60%.

IFS Grades-1

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Learning by participation

Tell me, and I will forget. Show me, and I may remember. Involve me, and I will understand.

Confucius, Chinese teacher, editor, politician and philosopher (551-479 BC)

Confucius would probably have agreed that the best way to teach IT skills is hands-on (actively) and not hands-off (passively). This is another of the principal tenets of The Smart Method® teaching method.

Research has backed up the assertion that you will learn more material, learn more quickly, and understand more of what you learn if you learn using active, rather than passive methods.

For this reason, pure theory pages are kept to an absolute minimum with most theory woven into the hands-on lessons, either within the text or in sidebars.

This echoes the teaching method used in Smart Method classroom courses where snippets of pertinent theory are woven into the lessons themselves so that interest and attention is maintained by hands-on involvement, but all necessary theory is still covered.

Session Three: Advanced Functions

As Johnny scored 70% the result is FALSE (as 70% is not less than 60%). If Johnny had a percentage score of less than 60%, the function would have returned the text "Fail".

Note that textual values must be placed in double quotation marks. If you omit to do this Excel will add them for you.

4. Add *Logical Test/Value* pairs for the other grades (see sidebar).

5. Click the OK button.

Johnny Caine's B grade is shown in cell C4.

6. AutoFill cell C4 to the end of the range.

All grades are now correctly shown.

	A	B	C	D	E	F
3	Name	Percentage	Grade		Percentage	Grade
4	Johnny Caine	70%	B		0%	Fail
5	George Marley	68%	C		60%	C
6	Betty Anan	86%	A		70%	B
7	Paris Winfrey	80%	A		80%	A
8	Ozzy Dickens	95%	A*		90%	A*

3 USE the IFS function to calculate the grade for each student using the grade data defined in cells E3:F8.

1. Delete the functions in column C.
2. Add a new IFS function to cell C4.
3. Enter the following pair of *Logical Test/Value* arguments:

Logical_test1	B4 >= E\$5
Value_if_true1	"Fail"

Notice the use of an absolute reference for cell E5. This is needed to make sure that the formula AutoFills correctly.

If you do not understand absolute references see: *Lesson 1-10: Add percentage and running totals using Quick Analysis* (sidebar).

4. Add appropriate *Logical Test/Value* pairs for the other grades.
5. Click the OK button.
6. Autofill cell C4 down to the end of the range.

Exactly the same grade values are now shown. The difference from the first approach is that the grades will change if the Percentage/Grade thresholds shown in cells E3:F8 change in the future.

4 Save your work as *IFS Grades-2*.

important

Excel recognizes text as having a value in logical expressions

If you try entering text into the *Percentage* column you might be surprised to find this result:

A	B	C
3 Name	Percentage	Grade
4 Johnny Caine	teacup	A*
5 George Marley	68%	C

Excel has evaluated this logic expression:

= "teacup" > 90%

... and has surprisingly returned TRUE.

This seems puzzling at first until it is realized that (behind the scenes) Excel does assign values to text in order to implement alphabetical sorting. These nominal values are always higher than any number so that (in an A-Z sort) numbers will always come before text.

To work around this peculiarity you could add a new first *Logical Test/Value* pair to ensure that the value in column B was numeric like this:

Logical_test1	ISNUMBER(B4)=FALSE
Value_if_true1	"Error"

Whenever something can easily go wrong, or when the subject text is particularly important, you will see the *important* sidebar. You should always read important sidebars.

Each lesson models a real-world business problem. You'll immediately appreciate the value and relevance of each skill you learn.

A goal of this book is not to waste your time by explaining any skill twice. Sometimes you may forget something that has already been covered earlier in the course.

Cross-references are extensively used pointing you back to the lesson in which the relevant skills was learned. The cross-references also help when you use this course as a reference book but have forgotten the more basic skills needed to complete each step.

What you will learn

In the process of completing this construction kit, you'll learn how to apply many Excel skills in the context of a real-world project.

Here are some of the skills you will use (in the order that they first appear in the book).

- Understand the Waterfall Method.
- Understand update channels and enable automatic updates.
- Apply background colors.
- Specify a custom color using RGB values.
- Create a Custom Color Set.
- Enable and disable gridlines.
- Apply Borders and Lines.
- Select non-contiguous cells, rows and columns.
- Resize rows and columns.
- Use AutoFill.
- Set vertical and horizontal cell alignment.
- Set cell indents.
- Set font sizes and colors.
- Wrap text.
- Merge cells.
- Use custom formats.
- Create line breaks within custom formats.
- Insert Symbols into cells.
- Insert pictures into a worksheet.
- Use a Spin Button Form Control.
- Use a Checkbox Form Control.
- Insert and name worksheets.
- Create a Tables.
- Name a Table.
- Apply Cell Styles.
- Work with shapes.
- Define named ranges and named cells.
- Use the Name Manager to view, delete and edit range names.
- Create a drop-down list using a list validation.
- Understand and use control settings.
- Understand and use helper cells.

- AutoSize columns.
- Use the IF logical function.
- Understand Date Serial Numbers.
- Use the DATE function.
- Understand international date formats (MDY and DMY).
- Use the WEEKDAY function.
- Understand precedence rules.
- Format date serial numbers using a custom format.
- Use the TEXT function.
- Use the UPPER function.
- Use a cell link to connect a Spin Button control to a control setting.
- Understand magic numbers.
- Create a formula driven conditional format.
- Use the MONTH function.
- Use the Conditional Format Rules Manager.
- Use the OR logical function.
- Understand the AND, NOT and XOR logical functions.
- Use absolute, relative and mixed cell references.
- Calculate the correct date for New Year's Day (in any year) using the DATE function.
- Link a table of fixed events to the calendar so that fixed events are appropriately displayed.
- Use the VLOOKUP function.
- Use the IFERROR function.
- AutoFill formulas.
- Copy and Paste.
- Understand calculated table columns.
- Calculate the correct dates for New Year's Day, Independence Day, Christmas Day and Veterans' Day (for any year) using the DATE function.
- Calculate the correct date for Martin Luther King Day, President's Day, Labor Day, Columbus Day and Thanksgiving Day (in any year) using simple Excel formulas and helper cells.
- Understand the CHOOSE function.
- Calculate the correct date for Memorial Day (in any year) using simple Excel formulas and helper cells.
- Understand symbolic constants and how they can be used to give meaning to magic numbers.
- Calculate the correct date for Easter Sunday (in any year).
- Add a unique constraint to a table using a formula-driven data validation.
- Understand the COUNTIF and COUNTIFS functions.
- Use structured table references.

- Use the CHAR function.
- Understand the CODE function.
- Concatenate text.
- Create a text length data validation.
- Calculate the age of the moon using Synodic Months and the MOD function.
- Calculate the correct phase of the moon (for any date) based upon the moon's age.
- Use the ROW function.
- Use Excel's zoom feature.
- Use Paste Formulas to copy formulas without disturbing conditional formatting.
- Create user-friendly validation error messages.
- Hide error warning markers.
- Use Smart Tags.
- Unlock cells.
- Hide columns and entire worksheets.
- Protect a worksheet to prevent users from making unwanted changes.