APRIL 12, 2005

Working with the Tasks Collection

The First in a Series of Short Notes About Using Project VBA
The tasks collection is simply a collection of all the tasks in a project. It is the starting point for most Visual Basic programming exercises so it is important to know how to use it. The first thing is in how to set it. This is done using the `Set` keyword.
Typically one sets a collection to all the tasks in the project, but it is possible to set it to some other task collection.

Here is an example of setting it to the tasks in the active project:

```
Dim ts as Tasks
Set ts = ActiveProject.Tasks
```

Another useful trick is to filter the project first and then set the task collection to the set of filtered tasks:

```
SelectAll
Set ts = ActiveSelection.Tasks
```

Once we have the task collection we can go through it in a number of ways. If we want a specific task we can ask for it by index. For example if we want the first task the code would be:

```
Dim t as task
Set t = ts(1)
```

Quite often we want to do something to all tasks in the project. In that case we would set the task collection as above and then loop through it using a for..next structure:

```
For Each t in ts
t.Text5 = "Foo"
Next t
```

This approach works until you hit a blank line in the project. In the case of the blank line the task is what Project refers to as "Nothing". You can do nothing with Nothing, so setting the Text5 value for Nothing will give you an error. Luckily you can check to see if a task is Nothing and therefore skip doing anything that would cause an error and stop your code. To do this we add a simple If statement:

```
For Each t in ts
If not t is Nothing then
t.Text5 = "Foo"
End If
Next t
```

We can do a similar thing to ignore summary tasks. You might want to do this when altering a value like duration which is not something that you can edit directly for a summary task. I use something like this:

```
If not t.Summary Then
'do stuff
End If
```

Putting it all together we have this generic structure to loop through all tasks in a project:

```
Dim ts as Tasks
Dim t as Task
Set ts = ActiveProject.Tasks
For Each t in ts
If Not t is Nothing Then
If Not t.Summary Then
'do something
End If
End If
Next t
```

By putting your code in the middle of this structure (where it says "do something" you can be sure it will be applied to all the regular tasks in the project and won't generate an error when it hits a blank line.

Posted on April 12, 2005 12:38 PM | Comments (5)

APRIL 13, 2005

Working with the Project Object

The Second in a Series of Short Notes About Using Project VBA

Using a `Project` object of some kind is essential to programming Project. Like the Task object, it is also a member of a collection, in this case it is part of the `Projects` collection. Although the Projects collection is under the Application it is what Microsoft calls a "top-level object" meaning that you can use it without needing to specify the Application. This means both of the following are equivalent within Project (though if you are controlling project from another application you will want to specify the application just to be clear):

```
Application.Projects
```
is the same as:
```
Projects
```

The Project object I use most often is the `ActiveProject`. ActiveProject is simply the project you are currently working on in project. If you have multiple projects open then it is the one which is in front and which has the cursor active in it. Most of the time you want your code to operate on the ActiveProject and not some other project so code typically looks like this:

```
Set ts as ActiveProject.Tasks
```

There are cases where you DO want to work on all the projects that are open. In this case you would forgo using ActiveProject and refer to them individually. You can use `For..Next` to go through all of the open projects:

```
For Each Project In Application.Projects
'run subprocedure
Next Project
```

The Project object can refer to any project and you can define as many as you like. This can be useful when you want to compare a project which is open with another.

```
Dim proj1 as Project
Dim proj2 As Project
Set proj1 = ActiveProject
Set proj2 = FileOpen("c:\myfilename.mpp")
If proj2.Tasks(5).Finish = proj1.Tasks(5).Finish Then
msgbox "Task 5 is unchanged."
End if
End Sub
```

You can use an index to refer to a specific project, though the index of the project is dependent on the order in which the files were opened, so there is room for some surprises here:

```
Set proj1 = Application.Projects(1)
Set proj2 = Application.Projects(2)
```

There is another interesting type of Project and that is the `SubProject`. Subprojects are any projects inserted in a "Master" project. Sometimes it is necessary to go through them as well. An example is setting a particular view or modifying some information which can not be done in the "Master" view.

```
Dim subproj As Subproject
Dim myproj As Project
'go through all the subprojects in the file
For Each subproj In ActiveProject.Subprojects
'open them all in turn
FileOpen (subproj.Path)
Set myproj = ActiveProject
'when open do something to the file
FileClose
Next subproj
```

The Projects collection has a small number of properties including count, parent and item. It also has a method to add a project. Project and SubProject have too many properties to describe here, but eventually I'll get around to covering some of the more interesting ones.

Posted on April 13, 2005 7:35 AM | Comments (1)

APRIL 18, 2005

Working with Other Applications

The Third in a Series of Short Notes About Using Project VBA

Project is designed primarily for calculating schedules using the Critical Path Method (CPM). However, there are often times you need to do more advanced calculations than are available natively in Project. The easiest solution is to turn to another application to do the calculations or to work with the resulting data.

An example of this is the use of Excel. It is actually quite simple to do this. The first thing to do is to set a reference to Excel. You do this by:

Opening Project.
Hit ALT+F11 to open the Visual Basic Editor.
From the Tools menu select "References".
Scroll down until you see the Microsoft Excel Object Library (or something similar).
Make sure the box next to it is checked.

Once that is complete you simply create a new instance of Excel and add a worksheet if necessary.

```
If xlApp Is Nothing Then
'Start new instance
Set xlApp = CreateObject("Excel.Application")
If xlApp Is Nothing Then
MsgBox "Can't Find Excel, please try again.", vbCritical
End 'Stop, can't proceed without Excel
End If

Else
Set xlR = Nothing
Set xlApp = Nothing
Set xlBook = Nothing
Set xlApp = CreateObject("Excel.Application")
If xlApp Is Nothing Then
MsgBox "Can't Find Excel, please try again.", vbCritical
End 'Stop, can't proceed without Excel
End If

End If
xlapp.Visible = False
Set xlBook = xlapp.Workbooks.Add
Set xlSheet = xlBook.Worksheets.Add
xlSheet.Name = ActiveProject.Name
```

I use `CreateObject` here rather than GetObject based on Microsoft's recommendation in this article. If you use GetObject you may get this error:

```
Run-time error '429':
ActiveX component can't create object
```

Once that is done you can use any of the Excel VBA you need to manipulate data, format it or anything else. The following code is from a Monte Carlo simulation macro I wrote. You can find the complete thing here. What this code does is set the value of xlRow (actually a specific cell in Excel) to the value of the task finish. Then it shifts to the next cell down using the offset function.

```
For Each t In exportedTasks
xlRow = t.Finish
Set xlRow = xlRow.Offset(0, 1)
Next t
```

Once you have Excel running you can do just about anything you want with it. With a bit more code, the macro this was taken from could summarize the data and graph it. By using the two tools together you can do many things which would be difficult to do alone. I have a few other simple examples here. Be forewarned that they do not use the GetObject method. Sooner or later I'll revise them to reflect what I now know more about.

Posted on April 18, 2005 12:07 PM | Comments (0)

APRIL 21, 2005

Working with Custom Field Formulas

The Fourth in a Series of Short Notes about Using Project VBA

Technically the formulas in customized fields are not VBA, but they are quite similar. With Project 2000 Microsoft added the capability to have a field display the results of a user-defined calculation. Until then, fields would only contain the value that the user put there. Needless to say, having the ability to have formulas was a big step forward. In fact, in some cases formulas are more useful than VBA macros are. The main reason is that they calculate automatically whereas a VBA macro needs to be executed either by calling the macro or tying it to some event (and events in Project are not what I'd consider robust). Because of this the field can display real-time information about a task.

Formulas in fields can with a little work control the formatting of your schedule as well. With a formula setting the value of a flag field, and a bar style which applies to tasks with that flag field set to "Yes" you can change what the gantt chart displays. There are also indicators which can be shown in the specific cells if the formula returns a particular value.

Of course there are some limitations to these formulas. They can only work with information from the particular task they are associated with and a handful of Project-level fields (Things like Project Start). In cases where you need information from other tasks a formula is not going to be sufficient. I've put together some guidelines about choosing one over the other. You can find them here.

Working with Formulas is pretty simple, but they are hidden rather deep in the interface. To get to them, right-click on a column header, choose customize fields, then choose the field you want the formula to apply to and click on the "formula" button. This brings up a dialog box where you can enter and edit the formula. Note that the = sign which is required for formulas in Excel is NOT REQUIRED and if you enter one you will get an error. After you have written the formula choose OK and you get back to the customize fields screen. At this point you have one more decision to make, you can decide whether the Summary tasks use the formula or not. The default is to not use the formula so be careful here if you want them to use the same calculation.

The variety of formulas is huge but here are some common situations people encounter in using formulas:

My formula refers to Baseline or Deadline fields.
When there is "NA" in the baseline or deadline it gives an error:

This problem is caused by the fact that the project gives a numerical value of 4294967296 (2 to the 32nd power - 1) if the field is "NA" (blank). Why it does this rather than giving a value of 0 I do not know, however once you know that it uses this number you can write a formula which accounts for it.

The solution is to use an iif statement. The syntax for an iif statement is as follows:

```
iif(expression, value if true, value if false)
```

So if you want to know if the difference between the baseline finish and the finish of a task you would use a formula like this (in a text field):

```
Iif([Baseline Finish] > 50000, "There is no baseline for this task",
[Baseline Finish]-[Finish])
```

Another alternative is to use ProjDateValue to evaluate the data stored in the baseline. Since an empty baseline shows "NA" for dates such as Baseline Finish, you can test for it directly.

```
iif([Baseline Finish]=projdatevalue("NA"), "Has Baseline", "No,
Baseline")
```

I am getting unexpected values when using work or duration in my formula.

The problem is usually caused by failing to convert the units correctly.
When you use duration or work in a formula Project uses the value of either in MINUTES. This can be confusing if you are subtracting a duration of 1 day from a duration of 2 days. You would expect that 2 - 1 = 1, but in Project it equals 480 minutes.

Now you may wonder why 480 minutes? There are 24 hours in a day x 60 minutes, however by default a Project day is 8 hours or 480 minutes. One easy way to handle this is to simply divide by 480 as in this example.

```
([Baseline Duration]-[Duration])/480 & " days"
```

You will then get the difference in days (note that using the & will concatenate the text within quotations to the result of the first part of the equation).
However there are times that a different project calendar is used and in that case a day may be defined as 24 hours or 7 hours. Because of this it is safer practice to use the constant [Minutes Per Day] or [Minutes Per Week] in the formula.

```
([Baseline Duration]-[Duration])/[Minutes Per Day] & " days"
```

I want to subtract one date from another in Project.

There are a number of ways to do date subtraction. The first is to simply subtract one from the other like this:

```
[Finish]-[Start]
```

On a one day task which starts and ends the same day this will return a value of .38 which is somewhat useful, but as in the section above it takes some conversion to make
sense of it. .38 days = 8 hours.
This approach also has some problems if you are subtracting across a non-working time such as a weekend or holiday. Or if the task ends on the next day. Then the value will be quite unexpected.

So there is another method that Project provides to do date math. It is to use the ProjDateDiff function. The syntax is as follows:

```
ProjDateDiff( date1, date2, calendar )
```

Using this will give you the difference between two dates according to a specific Project calendar. If you leave the calendar blank then it uses the Standard calendar. Otherwise you can specify the calendar (put the name of the calendar in quotations).

Here is an example of a calculation which finds the difference between the start and the finish of a task:

```
ProjDateDiff([Start],[Finish])
```

Note that the field order is different than the original equation. For a positive result you put the soonest date as the first parameter and the latest date as the second.

Posted on April 21, 2005 12:22 PM | Comments (8)

MAY 13, 2005

Recursion in Project VBA

The Fifth in a Series of Short Notes about Using Project VBA
Recursion is a programming techique which is similar to the process of taking a video of your television when the television is displaying the video output of your video camera. The result - an endless tunnel of pictures of your television.

So how can this be useful in programming, and more specifically in programming Microsoft Project? Well, recursion is also well suited for dealing with parent/child relationships or dependencies, both of which are essential parts of Project. Recursion allows you to easily get the subtasks of the subtasks of the subtask of a task and because it continues indefinitely (or until it hits a limit) it will get to the last task in the project without you having to keep track of how many levels deep it needs to go.

It can be difficult to grasp the concept without a concrete example so let's start with one right away and explain the details as we go along. Let's say that you have a number of tasks which may be viewed individually (perhaps in project server) and they will no longer show the heirarchy which is in the file. Some may even have the same name as each other, just like you can have two John's who are unrelated and different. The solution to this confusion is to use a text field to show the entire path to the task. That path is made up of all the names of the parent tasks of the individual task.

One way to do this is brute force:

```
Dim mytask As Task
Dim myoutlinelevel As Integer
myoutlinelevel = 1
While myoutlinelevel < 10
For Each mytask In ActiveProject.Tasks
If Not (mytask Is Nothing) Then
If mytask.OutlineLevel = myoutlinelevel Then
mytask.Text2 = mytask.OutlineParent.Text2 & " | " & mytask.Name
End If
End If
Next mytask
myoutlinelevel = myoutlinelevel + 1
Wend
End Sub
```

The trouble with this approach is that it runs through the entire set of tasks one time for each level of heirarchy that you want to name. And, you have to define how many levels deep you want to go. Even if you have only one level of heirarchy this code will still read and check each task 10 times. And if you have more than 10 levels, the tasks beyond the 10th level will not get labeled correctly.

The solution is to use recursion. With recursion we ask the program to name all the children of a task and then name all the children of that task all the way down until there are no more children. We do this by having a procedure which calls itself. Here we are using a procedure called "kids" which calls the same procedure for all of the child tasks - when it runs using those child tasks it will get all their child tasks etc. etc. etc.

```
Sub kids(ByRef t As Task)
Dim kid As Task
t.Text2 = t.OutlineParent.Text2 & " | " & t.Name
For Each kid In t.OutlineChildren
kids kid
Next kid
End Sub
```

Pretty simple. Now the only question is how to get it started off. We can't put the code to start it inside the procedure or it will keep restarting itself. So we write a procedure which sets the starting task and then calls the kids procedure:

```
Sub recursionExample()
Dim t As Task
Set t = ActiveSelection.Tasks(1)
kids t
End Sub
```

```
Sub kids(ByRef t As Task)
Dim kid As Task
t.Text2 = t.OutlineParent.Text2 & "-" & t.Name
For Each kid In t.OutlineChildren
kids kid
Next kid
End Sub
```

That is all there is to it. I have an example of how recursive techniques can be used to trace dependencies on my website which adds some additional logic so it can trace forward or backward or only critical tasks, but the basic principle is the same.

One thing to be aware of before you use recursion is that whatever you are recursing through does require some limit or stopping point. In this case it stops when there are no further children. In the Trace macro it stops at the end of the chain of dependencies. However, if you are not careful you can construct something that will continue indefinitely. To avoid this, try setting a breakpoint so you can step through the code the first few times to make sure it doesn't break. And always back up your files before you start.

Posted on May 13, 2005 10:57 PM | Comments (3)

MAY 20, 2005

Critical Resources

I keep losing track of these things so I'm going to just put all the links here:

Project 2003 Object Model

Project 2003 XML Schema

Building a Project Server PDS Extension with dot net.

PDS Reference download

I used to have a link to the code for the "Export Timescaled Data to Excel" add-in, but I can't find it right now.

[Update: Here it is Download Timescaled Data Source Code]

Any of these links lead you to the MSDN documentation. I suggest you browse around the other topics while you are there.

Posted on May 20, 2005 3:24 PM | Comments (0)

MAY 31, 2005

VBA - Integer Division and Mod

Many Microsoft Project users are not professional programmers so they might not be aware of some of the basics of visual basic. One of them which surprised me when I first ran across it was the "integer division" operator. Now most people know the typical add + , subtract -, multiply *, and divide / operators and what results they bring. But there are really two more which are quite useful in certain situations.

The first is the integer division operator which is a backslash "\". Do not confuse this with the forward slash "/" which is used for regular division. The results of this operator are that division takes place as usual except any non-integer remainder is discarded. Here are a couple of examples to illustrate.

```
10/4 = 2.5
10\4 = 2

5.423/1 = 5.423
5.423\1 = 5
```

As you can probably guess, integer division is a handy way of dividing and rounding down in a single step.

Another related operator is the MOD operator. It is similar to integer division only it returns only the remainder. Here are a couple of examples.

```
6 MOD 4 = 2
12 MOD 4 = 0
```

By putting them together you can break numbers into their component parts. Doing date math is an easy way to see how this works. Let's let "Days" be a number of days. We want to know how many weeks and how many days it is. The following formula would return how many weeks and how many days there are in that amount of time.

```
Days\7 & " Weeks, " & Days MOD 7 & " Days"
```

If Days is 23 days, then the result would be:

```
3 Weeks, 2 Days
```

Posted on May 31, 2005 7:26 AM | Comments (3)

JUNE 16, 2005

Working with Modules and Macros

This morning someone asked how to access code stored in another file. In this case it was the global.mpt file. There are a number of answers to this, but first I want to explain a bit about how code is stored within Project files.

This is a bit complicated because there are a number of different places where the actual code can be stored. Don't fall asleep while I walk through this. The actual code is a procedure which is a named sequence of statements executed as a unit. procedures are commonly refered to as macros. They can come in a few varieties such as Function, Property, and Sub. They can be recognized because they typically start like `Sub nameOfMyMacro()` and end with `End Sub` or the same but using the Function or Property keyword.

Procedures need to be stored somewhere. To make things manageable they are usually stored within something called a module. I tend to think of a module as an envelope which holds procedures. A module can contain one or more procedures. When you use the organizer you can only move code at the module level.

The other place where procedures can be stored is in the project object. In the VBA object browser you can find it by opening the Project VBE (ALT+F11) then looking in the project explorer and expanding the project objects folder and then double-clicking on "ThisProject". I have an article with more details about "ThisProject" on my website if you want to learn more. It also describes a bit about class modules which I'm not going to go into here.

OK, now back to the real topic:

There are 3 ways to refer to code in other project files. To make things clear lets assume that we want to run "macro1" which is in "module1" in "Project1" and that we are trying to do this from "Project2". If you want to use code from the global.MPT file simply substitute it for Project1.

Using References

Save both projects and ensure that both projects are open. In VBE editor open Project explorer which lists all the projects. By default all vba projects are named as "vbaproject". The global.MPT file is named "ProjectGlobal". If you want to reference ProjectGlobal you don't need to do anything else. If you want to reference another project you will need to change the name to make it unique. To do this select the vbaproject corresponding to project1.mpp, click on properties icon, change the vba project name to vbaproject1. Do the same to project2 but call it vbaproject2.

Next select vbaproject2 and go to the Tools menu, select References, you can see vbaproject1 and ProjectGlobal listed in the references dialog box. Set the reference to vbaproject1. Now you can call any macro in vbaproject1 from project2.mpp as follows :

This is Macro1 stored in Project1/Module1

```
Public Sub Macro1()
MsgBox "Hey!"
End Sub
```

This is Macro2 which is in some module in Project2

```
Sub Macro2()
VBAProject1.Module1.Macro1
End Sub
```

The advantages of this method are:

- References are automatically opened if available.
- You can call macros in any type of modules including standard modules
- The macro appears in auto list as a method
- You can pass arguments

The disadvantages of this method are:

- You can not use this method to call a project macro from some other application like vb6, Excel etc.
- You will get an error if Project1 is renamed, deleted or moved.

This is my method of choice when the module is in the global.MPT file.

Using Macro method of Application object

Make sure that Project1 is open and simply call the macro using the macro method:

```
Application.Macro "Project1.mpp!Module1.Macro1"
```

The advantages of this method are:

- It is simple
- You can call macros in any type of modules including standard modules
- You can use this method to call project macro from some other application like vb6, Excel etc.

The disadvantages of this method are:

- You can not pass arguments
- The macro does not appear in auto list of methods
- You need to ensure that source project is open

Using the Project object

In this case Macro1 must be in ThisProject module or any class module (to be clear ThisProject IS a special case of a class module. It is not a standard module).

```
Projects("Project1.mpp").macro1
```

An alternative is to create a project object for Project1.mpp and use:

```
Set prj = projects("project1.mpp")
prj.macro1 "hello", "hi"
```

The advantages of this method are:

- You can use this method to call a ms project macro from other applications like vb6, Excel
- You can pass arguments

The disadvantages of this method are:

- You can not call macros in standard modules
- The macro does not appear in auto list of methods
- You need to ensure that source project is open

To summarize. I prefer the first method, but the other two are valid alternatives, though the third is a bit fussy.

Thanks to Venkata Krishna for pointing these three methods out to me many years ago.

Posted on June 16, 2005 7:41 AM | Comments (1)

JULY 25, 2005

Perl and Project?

Yeah, it seems a bit odd as PERL is more typical on the UNIX side of the house, but if you are a die-hard here is a page which shows the basics of getting it to work. As expected, managers and project users get the obligatory slam:

Microsoft Project is a tool that many managers use behind closed doors to prepare massive, wall-sized works of fiction for the entertainment of corporate executives. Closely read, these fictional plans prove convincingly that neither gravity nor even the speed of light are obstacles for the corporation's mighty horde of otherwise unruly developers.

I guess I missed the part where it says `"Microsoft Project is teh Sux0rZ"`. In case you are wondering, here is how to open a project plan from PERL:

```
use Win32::OLE;
use Win32::OLE::Variant;
use strict;

my $app = Win32::OLE->GetObject("SomeProject.mpp")
or die "Couldn't open project";

my $project = $app->{Projects}->Item(1);
```

Posted on July 25, 2005 7:09 PM | Comments (1) | TrackBacks (1)

JULY 29, 2005

Securing Your MS Project Files and Macro Code

Securing your project file or keeping things secret inside it seems to be a perpetual topic. There are some parts of the file that you can secure fairly easily, but if you encrypt or remove any of the data that is needed for project to calculate you will have problems. That said, here is some simple code for encrypting the date entered in the Text1 field:

```
Sub encodeTextField1()
Dim t As Task
Dim ts As Tasks
Dim tempString As String
Dim key As Long
Set ts = ActiveProject.Tasks
key = InputBox("Enter Key between 1 and 256")
For Each t In ts
If Not t Is Nothing Then
tempString = t.Text1
eNcode tempString, key
t.Text1 = tempString
End If
Next t
MsgBox "Done"
End Sub
```

```
Private Sub eNcode(ByRef eText As String, ByRef eKey As Long)
Dim bData() As Byte
Dim lCount As Long
bData = eText
For lCount = LBound(bData) To UBound(bData)
bData(lCount) = bData(lCount) Xor eKey
Next lCount
eText = bData
End Sub
```

What this macro does is prompt the user for a key which is used with the XOR operator to encrypt the data. You can read more about how this works here. If you like, you can expand on this and use a more sophisticated algorithm, but this should stop most casual readers from decrypting your data unless they have read this article.

The problem with this approach is that the algorithm used for encryption is exposed whenever anyone hits ALT+F11 and views the macro code. You can avoid this by keeping the code in your global.mpt file. However, that would prevent any others from being able to encrypt the data. So we need to take a second step and protect the macro code itself.

1. From the VBA editor, right-click on the module where the code is located.
2. From the shortcut menu, select VBAProject Properties (If it is in your global.mpt file it will be ProjectGlobal Properties)
3. On the Protection tab, check the Lock Project For Viewing check box.
4. Enter a password and verify it in the boxes at the bottom of the tab.
5. Click OK.

Now your code is protected. I should warn you that even this is not secure. It is possible to break the password that you have used to protect the macro and with knowledge of the algorithm you used it may be possible for someone to break the password which you have used to encrypt the data, so if something is really secret don't even bother to do this, just keep the file locked somewhere secure and don't share it. But for casual users this should be sufficient to keep them from snooping around.

Posted on July 29, 2005 12:16 PM | Comments (0)

AUGUST 2, 2005

Working with Task and Assignment Fields VBA

One common problem people face with project is that there are three classes of custom fields; task fields, assignment fields and resource fields. If you are in a resource view and you are looking at the Text1 field it won't have the same information as if you are looking at the Text1 field in a task view. This is true with reports as well. The solution is to copy over the items from the one field to the other. This is painful unless you automate it. So, to reduce the pain here is VBA code which does it for you:

```
Sub CopyTaskFieldToAssignment()
'This macro copies information in the task text5 field
'into the assignment text5 field so that is can
'be displayed in a usage view or in a report.
'Modify the line noted below to fit your needs
Dim t As Task
Dim ts As Tasks
Dim a As Assignment
Set ts = ActiveProject.Tasks
For Each t In ts
If Not t Is Nothing Then
For Each a In t.Assignments
'change the following line to use
'for a different custom field
a.Text5 = t.Text5
Next a
End If
Next t
End Sub
```

Pretty easy. This one should have no problems because each assignment only has a single task that it references. However, going the other way could be a problem as each task can have several assignments. To sidestep the issue we can simply concatenate all of the text from all of the assignments. The code would then look like this:

```
Sub CopyAssignmentFieldToTask()
Dim t As Task
Dim ts As Tasks
Dim a As Assignment
Set ts = ActiveProject.Tasks
For Each t In ts
If Not t Is Nothing Then
t.Text5 = ""
For Each a In t.Assignments
'change the following line to use
'for a different custom field
t.Text5 = t.Text5 & ", " & a.Text5
Next a
End If
Next t
End Sub
```

The line `t.Text5 = t.Text5 & ", " & a.Text5` appends whatever is in the assignment field to whatever is already existing in the task field.

Some simple modifications can make it work to copy from the resource fields.

Posted on August 2, 2005 4:39 PM | Comments (3)

AUGUST 29, 2005

Writing Project VBA macros using the Macro Recorder

One of the easiest ways to learn how to use Microsoft Project VBA is to use the macro recorder. It does not always produce reusable output, but it does output the correct syntax and it identifies the objects, properties and methods which are involved in what you want to do. Let's work through a simple example like zooming the timescale to show only the selected tasks.

Start with turning on the macro recorder by going to the tools menu / select "macros" / select "record new macro". Give it a title and note where it is going to be saved.

Now select some tasks in your project. Then go to the "view" menu / select "zoom" / select "selected tasks" and click OK. Now we turn off the macro recorder either by going back to the tools menu and choosing "stop recorder".

Now you can look at the code. It should look something like this:

```
Sub Macro1()
' Macro Macro1
' Macro Recorded 8/29/05 by yourusername.
SelectRow Row:=-6, Height:=2
ZoomTimescale Selection:=True
End Sub
```

This code is OK, but it is not reusable because each time you run it, it will select two rows which are 6 rows above where ever your cursor is. Chances are you don't want that. So we edit it and remove that row.

```
Sub Macro1()
ZoomTimescale Selection:=True
End Sub
```

This code works fine, IF you have a valid selection. Try running it on a blank row and you get an error. So we need to make one more modification to it.

```
Sub Macro1()
If Not ActiveSelection = 0 Then
ZoomTimescale Selection:=True
End If
End Sub
```

Now if we have a task or tasks selected this code will zoom the view to show the entire duration of the longest task. An obvious next step is to assign this to a toolbar button so you can zoom the selection with a single click.

A more complicated example is exporting a file to excel. I can never remember the exact syntax off the top of my head, but turning on the macro recorder and exporting makes it easy. Here is the code I get while creating a map and saving a file. Note: for formatting reasons I've added several line continuation characters "_" so that the long lines will fit on the screen correctly.

```
Sub Macro2()
MapEdit Name:="Map 1", Create:=True, _
```

```
OverwriteExisting:=True, _
DataCategory:=0, _
CategoryEnabled:=True, _
TableName:="Task_Table1", _
FieldName:="Name", ExternalFieldName:="Name", _
ExportFilter:="Critical", _
ImportMethod:=0, _
HeaderRow:=True, _
AssignmentData:=False, _
TextDelimiter:=Chr$(9), _
TextFileOrigin:=0, _
UseHtmlTemplate:=False, _
TemplateFile:="C:\...\Centered Mist Dark.html", _
IncludeImage:=False
MapEdit Name:="Map 1", _
DataCategory:=0, FieldName:="Finish", _
ExternalFieldName:="Finish_Date"
MapEdit Name:="Map 1", DataCategory:=0, _
FieldName:="% Complete", _
ExternalFieldName:="Percent_Complete"
MapEdit Name:="Map 1", DataCategory:=0, _
FieldName:="Resource Names", ExternalFieldName:="Resource_Names"
FileSaveAs Name:="C:\foo.xls", FormatID:="MSProject.XLS5", _
map:="Map 1"
End Sub
```

You can see that the macro recorder makes this a lot easier than typing this in from scratch.

Posted on August 29, 2005 12:34 PM | Comments (0)

SEPTEMBER 1, 2005

Microsoft Project VBA Reference Material

If you are interested in Project VBA you can now find a chapter I wrote on Project VBA for Que Publishing online here.

It goes through the basics of working with the visual basic editor, debugging, and gives several code examples. I'm a bit surprised to find it free on the internet from the publisher so go get it while it is still there.

Even though the chapter is about Project 2002, the information should apply to Project 2000 and Project 2003. There have not been many changes except to events. Just looking at this:

"When you have code with a large number of steps and you know only the initial state and the outcome, it is difficult to figure out where the root of your problem lies. The VBE provides the ability to view your code as it executes and to check the values of your variables. The main tools to do this are breakpoints, watches, and the Immediate window.

reminds me that I should put together a few posts on debugging...

Posted on September 1, 2005 7:19 AM | Comments (2)

OCTOBER 6, 2005

MS Project VBA - Earliest Predecessor

Sometimes we want Project to calculate a schedule a little differently than it does naturally. At least a few times I've had people ask if it is possible to set the start of a specific task based on the date the first it's predecessors completes. With a little code it is easily possible. This code takes the predecessors of a selected tasks and figures out which is the one which will finish first. Then it applies negative lag to the dependencies between itself and the other predecessors. The comments in the code (lines starting with an apostrophe ') describe what is being done

```
Sub FollowEarliestPredecessor()
Dim t, p, earliest As Task
Dim ps As Tasks
Dim l As Long
Dim tdeps As TaskDependencies
Dim tdep As TaskDependency

Set t = ActiveSelection.Tasks(1)
```

```
'Set lag to 0 to remove any previous lags
Set tdeps = t.TaskDependencies
For Each tdep In tdeps
If tdep.To = t.ID Then
tdep.lag = 0
End If
Next tdep
CalculateProject

'Find earliest predecessor
Set ps = t.PredecessorTasks
Set earliest = ps(1)
For Each p In ps
If p.Finish <= earliest.Finish Then
Set earliest = p
End If
Next p

'Set lag so it covers the greatest task variance
l = -Application.DateDifference(earliest.Finish, t.Start)

'Apply that lag to all predecessors except for the earliest
For Each tdep In tdeps
If tdep.To = t.ID And tdep.From <> earliest.ID Then
tdep.lag = l
End If
Next tdep
CalculateProject

End Sub
```

Pretty simple.

Posted on October 6, 2005 7:27 PM | Comments (0)

OCTOBER 24, 2005

Telling Time - ProjDateDiff, VB DateDiff and Application.DateDifference

Date subtraction in VB, Project VBA and Project custom field formulas is one of the more common activities. Unfortunately there are a number of slightly different functions available. This article briefly describes the main three.

It all starts with the VB DateDiff function.
The syntax is as follows:

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

`interval` is required and is the time unit you want the result returned in:

- yyyy = Year
- q = Quarter
- m = Month
- y Day of year
- d = Day
- w = Weekday
- ww = Week
- h = Hour
- n = Minute
- s = Second

`date1` and `date2` are required and are the two dates you are working with.

`firstdayofweek` and `firstdayofyear` are optional and will change the defaults from Sunday and the week which contains January 1 to whatever else you might choose.

Now this is a pretty powerful and useful function, but when you are calculating schedule dates it becomes a problem. The issue is easily illustrated with the example of a weekend. Suppose you want the working hours for a task between now and two working days from now. DateDiff would work fine if both days are in the same workweek, but once the interval spans a weekend then the calculation is wrong. To resolve this, Project VBA has the `DateDifference` function. DateDifference is considerably simpler. Here is the syntax:

`Application.DateDifference(StartDate, FinishDate, Calendar)`

`StartDate` and `FinishDate` are required. They are the start and finish dates used.

`Calendar` is optional. It can be a resource or task base calendar object. The default value is the calendar of the active project.

The result of this function is the duration in minutes. You can convert the minutes into days by dividing by 480 (for an 8 hour day or more accurately dividing by 60 * `HoursPerDay`. `HoursPerDay` is a Project property which reflects the current definition of workdays in Project. You can also divide by the `HoursPerWeek` and `DaysPerMonth` functions if you want to use longer timescales.
Application.DateDifference is what you would use in VBA code.

In Project custom field formulas the situation is almost exactly the same. However instead of being called `DateDifference`, they named the function `ProjDateDiff`. The arguments are the same:

```
ProjDateDiff( date1, date2, calendar )
```

and the result is also returned in minutes. Converting this into usable time periods IS different though. Custom formulas offer the `[Minutes Per Day]` and <[Minutes Per Week] constants to do conversion to days and weeks. There is no month conversion available.

Here are a couple of examples:
Project VBA DateDifference example:

```
Sub projectduration()
MsgBox CStr(Application.DateDifference(ActiveProject.Start,
ActiveProject.Finish, standard))
End Sub
```

Custom Field Formula Example:

```
ProjDateDiff([Project Start],[Project Finish],"standard")
```

Note that the custom field formula requires quotation marks around the calendar name and the VBA example does not.

Posted on October 24, 2005 11:32 AM | Comments (2)

NOVEMBER 8, 2005

Working With Microsoft Project Events - On Open

Working With Events

Often one wants Project to do something when something changes in the project file. An example of this is having some sort of macro run when the project is opened or when it is saved. Project offers a number of Project events which allow this. They include:

- `Project_Open (which acts like the On_Open event you may be familiar with),`
- `Activate,`
- `BeforeClose,`
- `BeforeSave,`
- `Calculate,`
- `Change,`
- `Deactivate`

These events apply to the project and are fairly simple to implement. There are also a number of application level events which allow you to specify actions based on changes in individual fields. They are somewhat more difficult to implement, but if you can follow the example below you will have no problems.

The list of application events includes:

- `ProjectAfterSave, ProjectAssignmentNew,`
- `ProjectBeforeAssignmentChange, ProjectBeforeAssignmentChange2,`
- `ProjectBeforeAssignmentDelete, ProjectBeforeAssignmentDelete2,`
- `ProjectBeforeAssignmentNew, ProjectBeforeAssignmentNew2,`
- `ProjectBeforeClearBaseline,`
- `ProjectBeforeClose, ProjectBeforeClose2,`
- `ProjectBeforePrint, ProjectBeforePrint2,`
- `ProjectBeforeResourceChange, ProjectBeforeResourceChange2,`

- ProjectBeforeResourceDelete, ProjectBeforeResourceDelete2,
- ProjectBeforeResourceNew, ProjectBeforeResourceNew2,
- ProjectBeforeSave, ProjectBeforeSave2,
- ProjectBeforeSaveBaseline,
- ProjectBeforeTaskChange, ProjectBeforeTaskChange2,
- ProjectBeforeTaskDelete, ProjectBeforeTaskDelete2,
- ProjectBeforeTaskNew, ProjectBeforeTaskNew2,
- ProjectCalculate,
- ProjectResourceNew,
- ProjectTaskNew,
- NewProject,
- LoadWebPage,
- ApplicationBeforeClose.

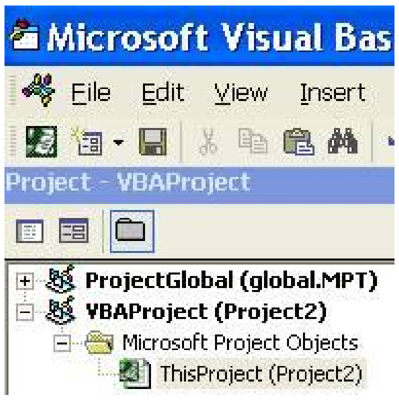
Using a Project Event

This is the simplest form of event.

Open your project file. Hit the ALT+F11 keys to open the visual basic editor. In the upper left you will see a window with a typical windows tree view. Click on the + signs until the project it expanded and you see the "ThisProject" object. It should look like the diagram on the right, although with a different project name. Double-clicking on that item will bring up a code window. In that window you can paste the following:

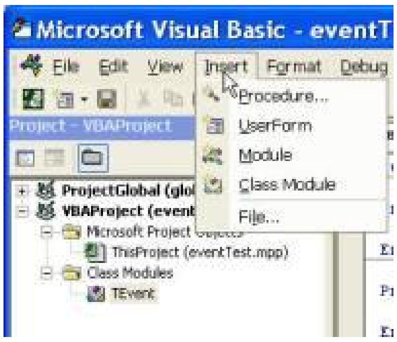
```
Private Sub Project_Open(ByVal pj As Project)
MsgBox "Project Just Opened"
End Sub
```

You can replace the MsgBox code with whatever you want to happen when you open the project. For example it could call a macro which you have already written. Similar macros can be written to take action before printing or saving. For example you may want to copy certain data into a custom field before saving the file so that you can restore it later if necessary.



Application Events:

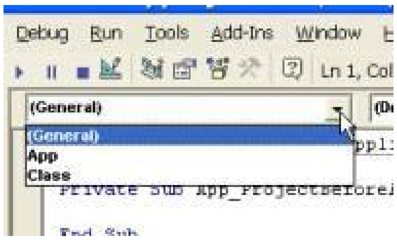
The example above only requires pasting some code in a single place. However using application events requires a few more steps. The first step is to create a new class module and declare an object of type Application with events.
Creating the class module is done by going to the insert menu and selecting "ClassModule" as shown here:



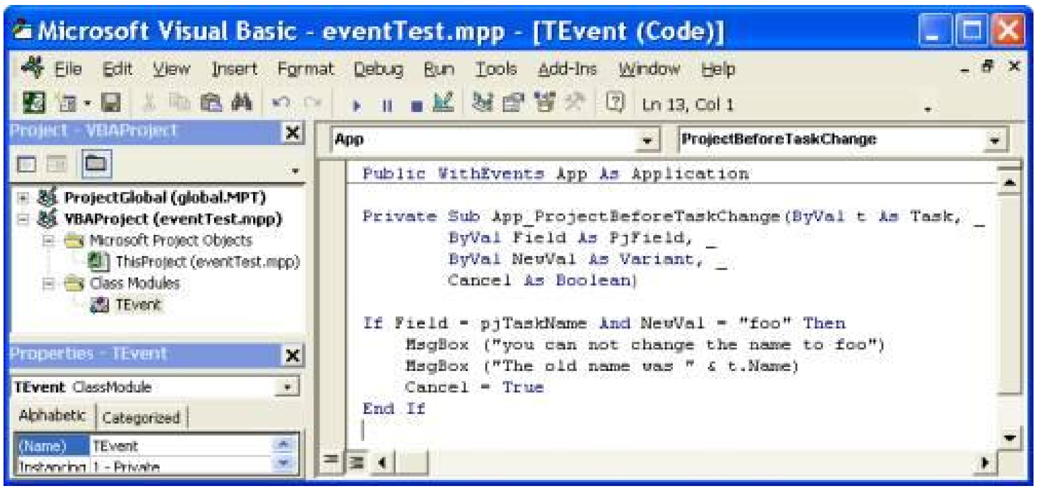
When you have done this, double click on the class module and declare the object by using the following code:

```
Public WithEvents App As Application
```

After the new object has been declared with events, it appears in the Object drop-down list box in the class module, and you can write event procedures for the new object. (When you select the new object in the Object box, the valid events for that object are listed in the Procedure drop-down list box.)



Writing the procedure is similar to writing any macro. The image below shows a simple example using the ProjectBeforeTaskChange event.


Microsoft Visual Basic - eventTest.mpp - [TEvent (Code)]
File Edit View Insert Format Debug Run Tools Add-Ins Window Help
Ln 13, Col 1
Project - VBAProject
ProjectGlobal (global.MPT)
VBAProject (eventTest.mpp)
Microsoft Project Objects
ThisProject (eventTest.mpp)
Class Modules
TEvent
Properties - TEvent
TEvent ClassModule
Alphabetic Categorized
(Name) TEvent
Instancing 1 - Private
App
ProjectBeforeTaskChange

```
Public WithEvents App As Application

Private Sub App_ProjectBeforeTaskChange(ByVal t As Task, _
        ByVal Field As PjField, _
        ByVal NewVal As Variant, _
        Cancel As Boolean)

If Field = pjTaskName And NewVal = "foo" Then
    MsgBox ("you can not change the name to foo")
    MsgBox ("The old name was " & t.Name)
    Cancel = True
End If
```

Note that NewVal holds the value that the user has input. The original value can still be referenced in the standard way (t.Name). The code to cut and paste is shown next.

```
Public WithEvents App As Application

Private Sub App_ProjectBeforeTaskChange(ByVal t As Task, _
ByVal Field As PjField, _
ByVal NewVal As Variant, _
Cancel As Boolean)

If Field = pjTaskName And NewVal = "foo" Then
MsgBox ("you can not change the name to foo")
MsgBox ("The old name was " & t.Name)
```

```
Cancel = True
End If
```

Note that a space followed with an underscore is used to break a single line of code. This is called a line continuation and I use it to keep code readable when there is a long line. Now that you have written the code, there is one final step to undertake before using it. Before the procedures will run you must connect the declared object (in this case the one we called **"App"**) in the class module with the Application object.
It sounds complicated, but it is really rather simple. First we declare a new object based on the class module. In this case our class module is named **TEvent**.
Code to do this would be something like:

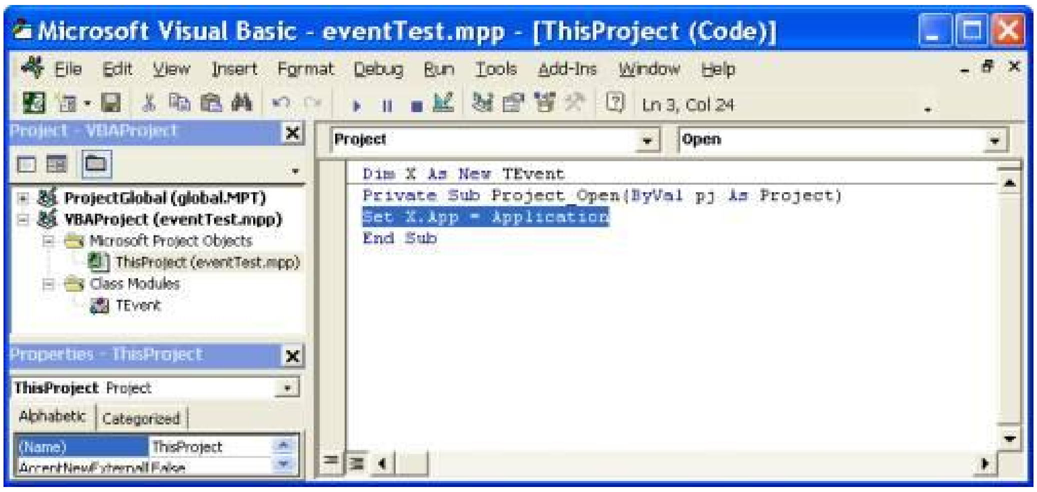
```
Dim X As New TEvent
```

Now that we have this object we need to initialize it. Basically we need to tell it what the **"App"** is.

We do this with the following code:

```
Set X.App = Application
```

After you run the InitializeApp procedure, the App object in the class module points to the Microsoft Project Application object, and the event procedures in the class module will run when the events occur.
Most of the time you will want to do the initalization when your project opens so the events will work from the start, but you can put this information in any typical module which holds some of your macros.
The screenshot below shows what it would look like if we want it to initialize when the project file opens.


Microsoft Visual Basic - eventTest.mpp - [ThisProject (Code)]
File Edit View Insert Format Debug Run Tools Add-Ins Window Help
Ln 3, Col 24
Project - VBAProject
ProjectGlobal (global.MPT)
VBAProject (eventTest.mpp)
Microsoft Project Objects
ThisProject (eventTest.mpp)
Class Modules
TEvent
Properties - ThisProject
ThisProject Project
Alphabetic
Categorized
(Name) ThisProject
AccentNewExternal False
Project
Open

```
Dim X As New TEvent
Private Sub Project_Open(ByVal pj As Project)
Set X.App = Application
End Sub
```

This example shows how events can be in a specific project file. You can also have this code in the global.mpt file so that things occur whenever you open Project as an application. The Project_Open event is also useful to distribute macros or other standard formatting. For example, you could have a Project_Open macro which sets up an environment for you (copying views tables etc.) using the organizer. When a user opens the file, those items could be copied into their global.mpt file. *(Note: You might notice this is familiar. That is because I'm porting the material from my old Microsoft Project Macros website to this one bit by bit so that everything can be found in one place)*

Posted on November 8, 2005 11:15 AM | Comments (3)

NOVEMBER 11, 2005

MS Project VBA Programming - Writing project properties to a file

Microsoft Project files have a couple of different types of properties. The first are the "BuiltinDocumentProperties" which Project inherits from the Office Suite (Word, Excel, Access ...). These properties describe things like author, title, subject, creation date and the like. The second are the CustomDocumentProperties which are specific to Project. You can also create your own custom properties as well. The custom properties can be used to report cost, duration, start and finish dates of the project and a multitude of other interesting items.

One problem that this causes is that it can sometimes be difficult to know what properties are being used in a specific file. To report them out and to give a simple example of writing to a text file I put together a macro which loops through all of them and writes them to a file. Even if you are not interested in the project properties this example illustrates some of the more commonly required programming techniques. I'll walk through the code with some comments and then offer the whole thing at the end if you want to cut and paste.

```
Sub writemyproperties2()

Dim MyString as String
Dim MyFile As String
Dim fnum as Integer
Dim myIndex As Integer
Dim myProj As Project
Dim skipme As Boolean
```

```
skipme = False
Set myProj = ActiveProject
```

Declaring the variables is optional in Project VBA, but it can help prevent some problems later. If a variable isn't defined then Project treats it as a "variant" which it needs to allocate more memory for. Project also makes some assumptions about how to treat a variant in different circumstances. In most cases it assumes correctly, but there is always the chance that it may make the wrong assumption so it is good practice to be explicit about your variables. Following this we set the initial values for some of the variables.

The next step is to set up a file to write to. The next bit of code sets the file name and then uses the `FreeFile()` method to create a file. We open the file to write to it. We choose to open the file `"for output"`. This allows us to write to it. The other possible modes are `"for input"` which would allow us to read data from the file and `"for append"` which appends data to the file. This last mode is useful for logs.

```
MyFile = "c:\" & ActiveProject.Name & "_properties.txt"
fnum = FreeFile()
Open MyFile For Output As fnum
```

Once we have created and opened the file we can write to it. In the "for output mode we do this with a `"Write"` statement. First we write a line as a header and then a blank line. Each `"write"` statement creates a new line. The comma is required.

```
Write #fnum, "Built In Properties"
Write #fnum,
```

Now we use a `"For...Next"` loop to go through all the properties. Because there are some gaps in the numbering of the properties, the macro would fail when it hits gaps in the sequence. We solve this by putting in an error handler. When the code errors then it goes to the code which we want to execute `"On Error"`

```
For myIndex = 1 To myProj.BuiltinDocumentProperties.Count
skipMe = False
On Error GoTo ErrorHandler
MyString = (myIndex & _
": " & _
myProj.BuiltinDocumentProperties(myIndex).Name & _
": " & _
myProj.BuiltinDocumentProperties(myIndex).Value)
If skipMe = False Then
Write #fnum, MyString
End If
Next myIndex
```

You can see that each loop through will write the property number, the name and the value of the property. You may be wondering why the `if...then"` statement is there. I include it because of the way the errors are handled. Our error code is very simple. It just resumes on the next statement. Since the next statement writes a line to the file it would result in re-writing the previous property again, so we add a line to the error handler which sets `skipMe` to true and then we do not write the property.

From here the code for the custom document properties is the same.

```
Write #fnum, "-----------------------------------------------"
Write #fnum,
Write #fnum, "Custom Properties"
Write #fnum,
For myIndex = 1 To myProj.CustomDocumentProperties.Count
skipMe = False
On Error GoTo ErrorHandler
MyString = (myIndex & _
": " & _
myProj.CustomDocumentProperties(myIndex).Name & _
": " & _
myProj.CustomDocumentProperties(myIndex).Value)
If skipMe = False Then
Write #fnum, MyString
End If
Next myIndex
```

We need to close the file after this.

```
Close #fnum
```

And finally we have the code to handle errors and end the procedure.

```
ErrorHandler:
skipMe = True
Resume Next
End Sub
```

Here is the complete macro to cut and paste

```
Sub writemyproperties2()
'This macro exports all the built-in and custom project properties
'to a text file. It lists the index of the property, the name and the
value.
'It demonstrates the use of a simple error handler to skip the errors
that
'occur when a property is not defined or used.

'Copyright Jack Dahlgren, Nov 2005

Dim MyString as String
Dim MyFile As String
Dim fnum as Integer
Dim myIndex As Integer
Dim myProj As Project
Dim skipme As Boolean

Set myProj = ActiveProject
skipMe = False

'set location and name of file to be written
MyFile = "c:\" & ActiveProject.Name & "_2properties.txt"
'set and open file for output
fnum = FreeFile()
Open MyFile For Output As fnum
'write project info and then a blank line
Write #fnum, "Built In Properties"
Write #fnum,

For myIndex = 1 To myProj.BuiltinDocumentProperties.Count
skipMe = False
On Error GoTo ErrorHandler
MyString = (myIndex & _
": " & _
myProj.BuiltinDocumentProperties(myIndex).Name & _
": " & _
myProj.BuiltinDocumentProperties(myIndex).Value)
If skipMe = False Then
Write #fnum, MyString
End If
Next myIndex
Write #fnum, "------------------------------------------------"
Write #fnum,
Write #fnum, "Custom Properties"
Write #fnum,
For myIndex = 1 To myProj.CustomDocumentProperties.Count
skipMe = False
On Error GoTo ErrorHandler
MyString = (myIndex & _
": " & _
myProj.CustomDocumentProperties(myIndex).Name & _
": " & _
myProj.CustomDocumentProperties(myIndex).Value)
If skipMe = False Then
Write #fnum, MyString
End If
Next myIndex
Close #fnum

ErrorHandler:
skipMe = True
Resume Next

End Sub
```

Posted on November 11, 2005 8:29 AM | Comments (3)

NOVEMBER 17, 2005

Microsoft Project Tip - Formulas and the IIF statement

`IIF`(immediate if) statements are one of the most commonly used functions in ms project formulas. An IIF statement is basically a condensed version of the `"If ...Then .. Else"` statement which is often used in programming. The iif statement takes three arguments:

```
IIf( expression, truepart, falsepart )
```

The first is the `expression` you want to evaluate. It needs to be constructed so that it has a true or false answer so it is commonly used to compare vs. a particular value. (see this article for comparing with "NA"). What the iif statement does next is dependent on whether the result is true or false.

If the expression is true then the `truepart` is returned. This sounds quite simple and can be very simple. You could return something like a text value or a number. However, the power of the iif statement is that the `truepart` can be another expression, even another `iif statement`. This allows you to construct and test many parameters in a single formula.

If the expression is false then the `falsepart` is returned. Like the `truepart` it can be an expression or set of nested expressions.

The difficult part of constructing a good nested iif statement is to put the tests in the correct order. Once the statement follows a path to the end, any other ends are not evaluated. The second limitation is that custom field formulas are limited to 256 characters so be economical with your text.

The `IIF` statement is also available in Excel for cell formulas, but in more recent versions of Excel (XP, 2003, perhaps 2000) it is called the `If` statement with exactly the same syntax.

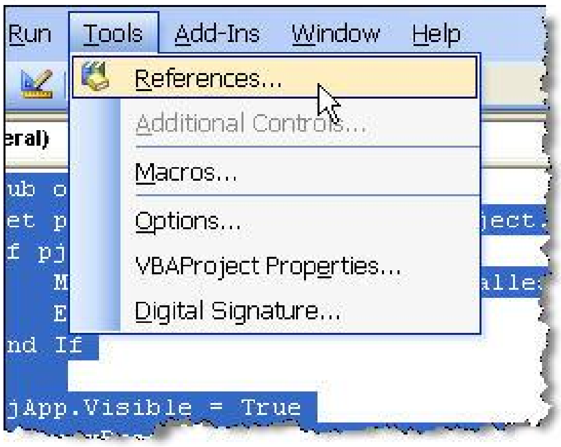
Posted on November 17, 2005 1:04 PM | Comments (1)

NOVEMBER 18, 2005

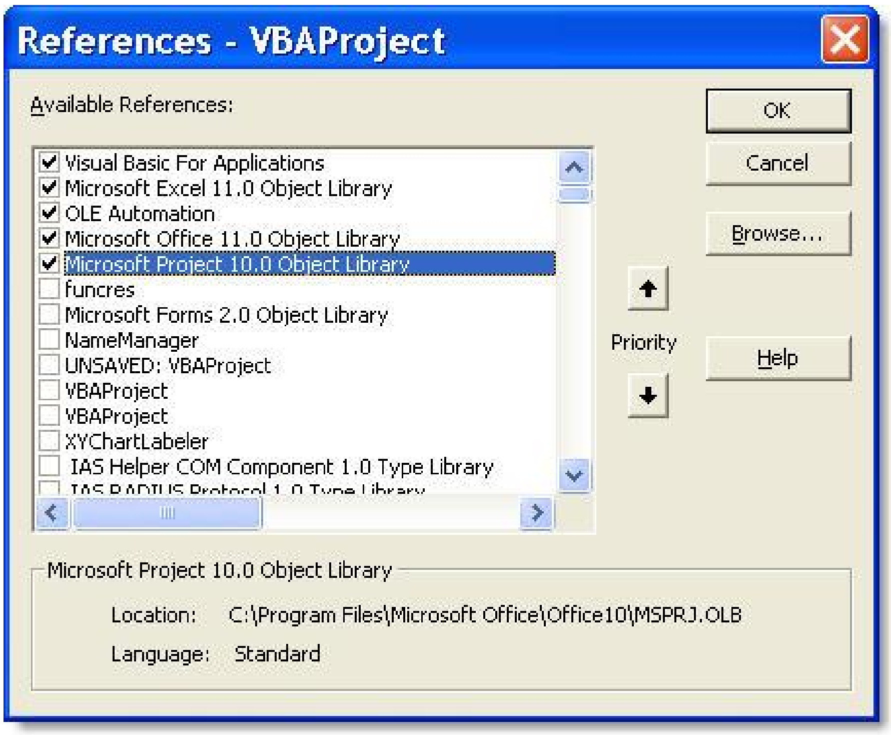
How to open MS Project from Excel

I have a number of examples of exporting to Excel from MS Project (exporting task hierarchy and exporting monte carlo simulation data) but many people want to do just the opposite. They want to open a Project file from Excel. So here is a short example which shows opening the Project application from excel, creating a new file and adding a task.

The first thing that you need to do is to set a reference to the Microsoft Project Object Library. To do this go to 'the *"Tools Menu"* in the Visual Basic Editor (hit ALT+F11 to get there from Excel).



This should bring up a dialog box showing all of the available libraries. You will probably have to scroll down a bit to find the project library. Here you can see that I'm using Project 2002 as it is version 10.



- [✓] Visual Basic For Applications
- [✓] Microsoft Excel 11.0 Object Library
- [✓] OLE Automation
- [✓] Microsoft Office 11.0 Object Library
- [✓] Microsoft Project 10.0 Object Library
- [ ] funcres
- [ ] Microsoft Forms 2.0 Object Library
- [ ] NameManager
- [ ] UNSAVED: VBAProject
- [ ] VBAProject
- [ ] VBAProject
- [ ] XYChartLabeler
- [ ] IAS Helper COM Component 1.0 Type Library
- [ ] IAS RADIUS Protocol 1.0 Type Library

Microsoft Project 10.0 Object Library

Location: C:\Program Files\Microsoft Office\Office10\MSPRJ.OLB

Language: Standard

Once you have set the reference the code is pretty simple:

```
Sub openMSProjectFromExcel()
Set pjApp = CreateObject("MSProject.application")
'this checks to see if a valid object has been created. If not it pops up
'a warning and then quits. Users without Project installed will see this
message.
If pjApp Is Nothing Then
MsgBox "Project is not installed"
End
End If
'now that we have an application we make it visible
```

```
pjApp.Visible = True
'we add a new project
Set newProj = pjApp.Projects.Add
'we set the title property (you can do whatever you want here.
newProj.Title = "My New Project"
'we make the new project the active project
Set ActiveProject = newProj
'and finally we add a new task to the project
newProj.Tasks.Add ("My First Task")
End Sub
```

Obviously you will want to do more where this leaves off, but it should be enough to get you started with using Project from Excel.

Posted on November 18, 2005 11:39 AM | Comments (5)

DECEMBER 7, 2005

More about working with the tasks collection

I've mentioned before that when looping through a collection of tasks in Project that there are a couple of holes you can fall in. This note gives an example of another problem you might run into and describes how to combine tests. The first problem is encountering a blank line. Many people insert blank lines in their project files to make the table easier to read, however when project references a task which is blank it will give an error. The easy way to do this is to test for it with an `if .. then` statement.

If your original code was something like this:

```
Sub AllTasksLoop()
For Each Task In ActiveProject.Tasks
'do something
Next Task
End Sub
```

You would simply add a test to see if the task really exists.

```
Sub AllNonBlankTasks()
For Each Task In ActiveProject.Tasks
If Not Task Is Nothing Then
'do something
End If
Next Task
End Sub
```

Another thing you might want to do is to eliminate external tasks. These are a sort of "ghost" task and don't have all of the information or properties of a real task. They merely point to the project file which has the real task. We can filter them in a similar way.

```
Sub AllNonBlankInternalTasks()
For Each Task In ActiveProject.Tasks
If Not Task Is Nothing Then
If Not Task.ExternalTask Then
'do something
End If
End If
Next Task
End Sub
```

Now, you might think, *"Why do I need two if statements? Can't I combine them?* , but you can't. If the task is a blank task, then it will cause an error when it is checking the second condition. Blank tasks do not have the `.ExternalTask` property so the check for blank tasks always must come first on its own line. You CAN combine checks for summary tasks on the same line as for external tasks. This is commonly done when you are summing values from tasks. Since the summary task often has the sum of the tasks below it, summing and including it will give you an incorrect answer. Combining the two conditions with a boolean`OR` will do the trick.

```
Sub AllNonBlankInternalIndividualTasks()
For Each Task In ActiveProject.Tasks
If Not Task Is Nothing Then
If Not (Task.ExternalTask Or Task.Summary) Then
```

```
MsgBox Task.Name
End If
End If
Next Task
End Sub
```

Posted on December 7, 2005 9:53 AM | Comments (3)

JANUARY 17, 2006

More on how NOT to skip NOT blank tasks in MS Project Macros

Clayton Scott read my post on skipping blank lines (also known as blank tasks) in project by using the statement

```
If Not Task is Nothing Then...
```

He suggested that rather than using a negative that we use:

```
If Task is Nothing Then
Next Task
End If
```

but the problem is that the `Next Task` within the `If..Then` statement is not recognized correctly by the compiler and the code won't compile. Clayton's intent was to simplify the code and remove the confusing `Not` from the statement. I think it is possible to remove the `Not` but this would require implementing a counter of some sort or using Onerror, both of which would not lead to greater simplicity.

So it looks that for the time being we are stuck with using `If Not Task is Nothing`.

I'd like to say thanks to Clayton for trying to point out possible improvements though. Comments are always welcomed.

Posted on January 17, 2006 10:13 AM | Comments (0)

MARCH 1, 2006

Project 2007 vs. Excel 2007

This post about multi-colored data bars
Microsoft Excel 12 : Conditional Formatting Trick 1 – Multi-Coloured Data Bars in the upcoming Excel 2007 is making it look even better for the small time scheduler or as a credible reporting/analysis engine for project data. I can envision a number of macros which might benefit from this feature.

Posted on March 1, 2006 1:44 PM | Comments (0)

MARCH 2, 2006

Free Monte Carlo Simulator For Microsoft Project - Want to help out?

I don't think I've mentioned it here, but if you are interested in Monte Carlo Simulation for MS Project (and who isn't?!) then you can download my quick and dirty simulator here: Microsoft Project Monte Carlo Simulator
Since it is just a VBA macro, the source is there for all to see and modify. Have at it! And if you make any improvements, please consider sharing them with me and others. Any updates will be posted with acknowledgement to the contributor. I've had this version up for a couple of years now and will keep it up until this function comes built into Project.

Posted on March 2, 2006 4:51 PM | Comments (1)

APRIL 13, 2006

Extremities

An interesting rebuttal of the Agile Manifesto here:
Burningbird » Technology is already Extreme
The points about belief, group behavior and diversity are worth investing a few minutes to digest. Fortunately it is leavened with one-liners like this:

"The tech equivalent of The Beach Boys"

It dovetails nicely with Glen's latest post on evidence.

When am I ever going to write anything thoughtful again?

Posted on April 13, 2006 3:30 PM | Comments (0)

MAY 2, 2006

Adding tasks to MS Project using C#

Eric Landes has a brief code snippet on using C3 to automate project here:Corporate Coder : Project 2003 Adding Tasks via C#

All I can say is that C# is slightly less than elegant in the way it handles optional parameters.
For what an idea of what I'm talking about, here is how to invoke FileOpen:

```
m_ProjectProApp.FileOpen ( "MyProjectName", missingValue, missingValue,
missingValue, missingValue, missingValue, missingValue, missingValue,
missingValue, missingValue, missingValue, PjPoolOpen.pjDoNotOpenPool,
missingValue, missingValue, missingValue, missingValue);
```

Just a bit awkward, wouldn't you say?

Posted on May 2, 2006 6:19 AM | Comments (3)

MAY 24, 2006

Changing Cell background color in Microsoft Project

Yes, along with multiple undo, the ability to format cells with a background color and pattern will be here in Project 2007 which has an expected release date sometime in early 2007. The Beta2 release was yesterday and a new SDK was released (find it here).

I'll be working through this stuff over the coming weeks, but some of the best things are the simple ones. For example this bit from the table of VBA Object Model Changes:

Cell, CellColor property, CellColor as PjColor

New for Cell object. Background color of the cell. In Project 2003 as GroupCriterion property only.

Cell, FontColor property, FontColor as PjColor
New for Cell object. Foreground color of the cell font. In Project 2003 as GroupCriterion property only.

Cell, Pattern property, Pattern as PjBackgroundPattern

New for Cell object. Background pattern of the cell. In Project 2003 as GroupCriterion property only.

Global, Application Font method Boolean Font(Optional Variant Name, Optional Variant Size, Optional Variant Bold, Optional Variant Italic, Optional Variant Underline, Optional Variant Color, Optional Variant Reset, Optional Variant CellColor, Optional Variant Pattern)

Changed: added parameters CellColor and Pattern.

See that? Cells have colors and patterns. Welcome to 1995! Now to install the beta and see if we are still limited to 16 colors...

PS: Don't take the 1995 comment too harshly. From the other new things in Project Server 2007 it is clear that the team has focused on solid improvements to functionality

Posted on May 24, 2006 10:03 AM | Comments (1)

OCTOBER 19, 2006

Microsoft Project VBA the Rod Gill way

Rod Gill has put out a new book which covers most of what you need for Microsoft Project VBA programming. As far as I know it is the only book about VBA that I know of. The last edition of Tim Pyron's "Using Microsoft Project" was so full that the VBA chapters were moved to an addendum on the web so it is great to see a book dedicated to just VBA. The book moves from the most basic concepts through creating some useful macros and userforms. It even offers an updated version of something very similar to my "Trace" macro. At the end of each chapter there are some example questions/problems which would make this book very useful if you are teaching VBA in a class. In the US the book was localized by Gary Chefetz and Dale Howard of MSProjectExperts and if you are familiar with their Project Server books you will be happy to see that the same high quality is embodied here. Highly recommended for anyone who wants a solid grounding in Microsoft Project VBA. Here is a link to the book at Amazon.

While you are at it check out Gary and Dale's Project Server Books:

Disclaimer: I know these guys and have had dinner with them at least once.

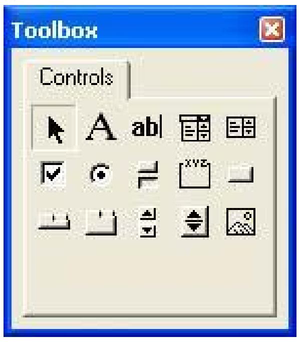
Posted on October 19, 2006 5:41 PM | Comments (2)

JANUARY 19, 2007

Using a ComboBox in a Microsoft Project Userform

I got a question from someone who wanted to create a userform which would set some values in project. It was to be populated by some preset values. So here are the basics:

The first thing to do is to create a form. Going to the Visual Basic editor, you would choose "Insert / UserForm". This creates a blank userform and should display the toolbox.



Drag a combo box from the toolbox onto the form. It will be called "ComboBox1" if it is the first one. You can rename it using properties (and you should) but for this example we are not.

Now to write some code for the form. Hit F7 or go to the view menu and select "Code". This should bring up a window which you can type code in. The first thing is some code which will initialize the values for the combo box. I've called this simply "InitializeME" but name it what you like. The code in this sub has one line for each value you want to add. Here the values are hardcoded, but you could substitute it with code which reads values from a file stored somewhere or an array of values you have gathered from the project file itself. You are limited only by your imagination. Here is the code:

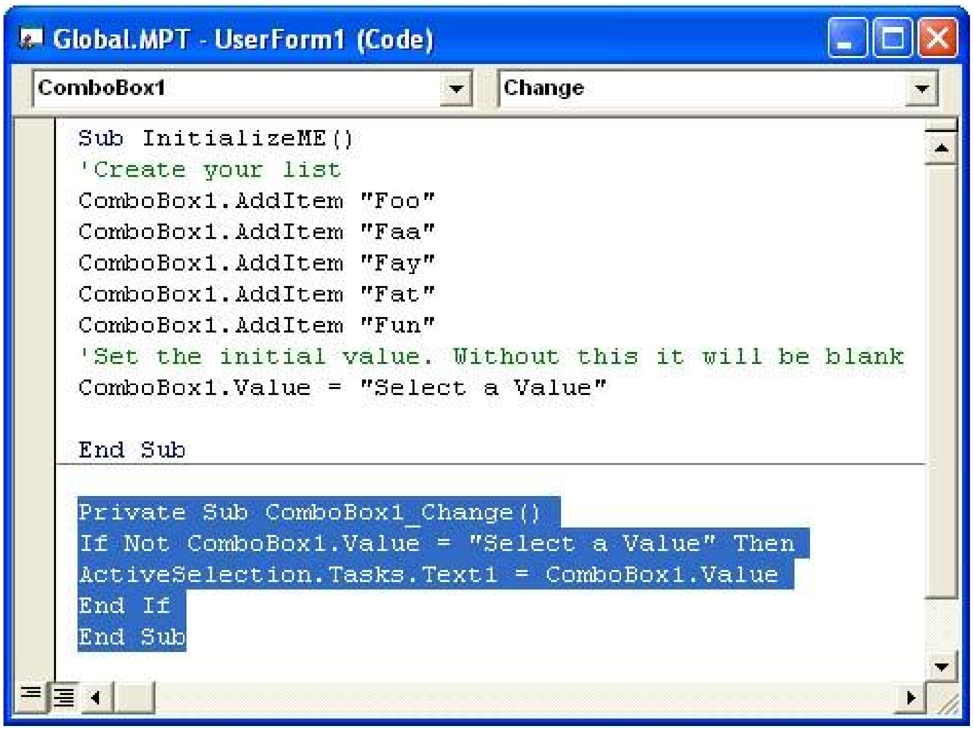
```
Sub InitializeME()
'Create your list
ComboBox1.AddItem "Foo"
ComboBox1.AddItem "Faa"
ComboBox1.AddItem "Fay"
ComboBox1.AddItem "Fat"
ComboBox1.AddItem "Fun"
'Set the initial value. Without this it will be blank
ComboBox1.Value = "Select a Value"
End Sub
```

Next you need some code to start the form. To keep this example pathetically simple we will only do two things here, initialize the combo box values and then show the form. You could do it the other way around, but better to have the form ready to go when the user first sees the form.

To do this insert a module (again from the insert menu). Then call the code to initialize the combo box, then show the form. The code is very simple:

```
sub ShowTheUserFormAlreadyPlease()
UserForm1.InitializeME
UserForm1.Show
end sub
```

You can run the code now. Go to tools macros and select the ShowTheUserFormAlreadyPlease macro. The form should display and have a working combo box. Of course it does NOTHING right now. So the next thing is to look at the methods of the combo box and see what it can do. If you look at the top of the code window you see on the left a box which says "ComboBox1". This selects an object to work on. On the right is a box which says "Change". This is a list of procedures associated with that object.



```
Sub InitializeME()
'Create your list
ComboBox1.AddItem "Foo"
ComboBox1.AddItem "Faa"
ComboBox1.AddItem "Fay"
ComboBox1.AddItem "Fat"
ComboBox1.AddItem "Fun"
'Set the initial value. Without this it will be blank
ComboBox1.Value = "Select a Value"

End Sub

Private Sub ComboBox1_Change()
If Not ComboBox1.Value = "Select a Value" Then
ActiveSelection.Tasks.Text1 = ComboBox1.Value
End If
End Sub
```

With the combo box selected on the left and the "change" procedure selected on the right the shell of a procedure will open and we will type code into it. This code sets the text1 field of selected tasks to the value that is selected in the combo box. When you change the combo box value it will run. Selecting a value in the combo box counts as a change. Here is the code:

```
Private Sub ComboBox1_Change()
If Not ComboBox1.Value = "Select a Value" Then
ActiveSelection.Tasks.Text1 = ComboBox1.Value
End If
End Sub
```

The only trick in there is the if then statement so that the text1 value does not change when you are setting the value of the combo box when it first displays. The code that you can put in the procedure again is only limited by what you can imagine. It could be extensive and create and initialize a new project with default values etc. As much as you are capable of.

Warning: I have not shown any error handling here. If you had no tasks selected you would have gotten an error or if there was no project open or ... so be careful and write procedures to handle that. And always test against whatever scenarios you can imagine.

Posted on January 19, 2007 1:22 PM | Comments (1)

FEBRUARY 2, 2007

MS Project VBA - Trim Function

Solving a recent custom field formula problem required reaching into the toolbox and pulling out the trim() string function. Trim is one of the simplest string functions. It does one thing and does it well. It just strips any leading or trailing spaces from a text string. So if you have a string like this:

```
myString = " There is space in front and in back "
```

you can use:

```
trim(mystring)
```

to return `"There is space in front and in back"`

The problem was that converting a Microsoft Project Unique ID to a string adds a leading space to the string (why? I don't know, but it does) so you can use trim to obtain just the characters you want.

Trim is not just a VBA function, you can use it in Excel formulas, MS Project custom field formulas and just about any programming language I've seen. I've used it extensively with spreadsheets that contain data pasted in from other sources.

Posted on February 2, 2007 11:50 AM | Comments (1)

FEBRUARY 5, 2007

www.clasespersonales.com

VBA Writing to a text file (MS Project, Excel)

One common question is how do I write from an office app like Excel or Project to a text file. I have the code embedded in a few samples here, but this short sample shows it most clearly. There are just a couple of steps. Use FreeFile to get the file number of the next file. Open the file for Output, then write or print into it. Finally close the file. Here is the commented code to do this:

```
Sub WriteToATextFile
'first set a string which contains the path to the file you want to
create.
'this example creates one and stores it in the root directory
MyFile = "c:\" & "whateveryouwant.txt"
'set and open file for output
fnum = FreeFile()
Open MyFile For Output As fnum
'write project info and then a blank line. Note the comma is required
Write #fnum, "I wrote this"
Write #fnum,
'use Print when you want the string without quotation marks
Print #fnum, "I printed this"
Close #fnum
End Sub
```

There are a few other pieces of the puzzle to clarify. `Open for` has a number of mode parameters. You can open for input (read only), output (write only), append (write at end - good for logs), binary and random (read/write default). You can also control this by an optional access keyword (read, write, read write) but why bother if you have the mode set. Freefile is used to get the filenumber of the next free file.

Posted on February 5, 2007 2:44 PM | Comments (9)

VB / C# robotic car

A new article on making your own robotic car using Microsoft Robitics Studio was posted here
Bill Gates has been quoted as saying robots are the next frontier (or something like that).

Posted on February 5, 2007 7:46 PM | Comments (1)

DECEMBER 8, 2007

Microsoft Project VBA - the Instr function

The `Instr` function is used to find out if one set of characters (string) is contained in another. It can be used in VBA macros (in Word, Excel, Project etc.) and also in Microsoft Project and Microsoft Project Server Custom Field Formulas. In Project this can be used to find out if a task name contains some special coding. For example perhaps you have used a special naming convention to separate time tracking tasks from other tasks and you need to roll them up separately. By using Instr you don't need to have the coding in a specific position. You can put it at the beginning, middle or end of the name and Instr will still find it.

Instr is also useful in string manipulation because it returns the position of the first occurrence of a string in another string. Using it in conjuntion with the left function you can strip out leading characters.

The InStr syntax is pretty simple:

```
InStr( [start], string_to_search_in, string_to_search_for, [compare] )
```

`start` is optional. The default is to start at the first character, but if you want to skip the first character then you can set it to another value. This could be useful for looking for the second occurance of the string you are looking for. You could feed in the result + 1 of another `instr` function to see if the string occurs again. Using this recursively you could count specific characters.

`string_to_search_in` is the string that will be searched.

`string_to_search_for` is the string to search for.

`compare` is optional. By default it does a text compare so most likely you can leave it out. The valid choices are: `vbBinaryCompare`, `vbTextCompare` and `vbDatabaseCompare`. I'm not even sure what vbDatabaseCompare is so don't worry about setting compare unless you are doing something a bit more advanced.

Here are a couple of examples:

- InStr(1, "This is a time tracking task", "tracking") would return 16.
- InStr("This is a time tracking task", "is") would return 3.
- InStr(10, "This is a time tracking task", "t") would return 11.
- InStr("This is a time tracking task", "abalone") would return 0.

From the examples, you can see when it CAN'T find what it is looking for it will return 0. This is an important point to remember. The typical test I'd use in a custom field formula would be to test the return from instr in an iif formula. Maybe something like this:

```
iif(instr("My haystack","needle")>0,"ouch", "zzzzzzzzz")
```

Posted on December 8, 2007 8:33 AM | Comments (2)

APRIL 1, 2008

Analyze Microsoft Project Resource Usage Data In Excel

The "Analyze Timescaled Data In Excel" add-in which ships with Microsoft Project has a couple of limitations, the first is that it is not easy to find, and the second is that it is task-based only, so if you want to export resource data you are out of luck. In this post I'll show how to write your own code to export resource timescaled data and use what you have learned to export almost any sort of timescaled data you can think of.

What is Timescaled Data?
Project is different from other applications like Excel because it has a dimension of time. Tasks have values for work and cost, but also contain the time dimension in the form of duration. On a specific task, the amount of work or cost may vary during the task instead of being spread evenly across the task. Because of this users sometimes need to view this information by day or week or hours. Within project they do this using the task usage view or the resource usage view and setting the timescale the way they want to see it. But sometimes they want this data outside of project and when they try and cut and paste, they find that it is not a simple matter. The view can not simply be copied and pasted. So to do this you need help from VBA.

Using VBA to Export Data
Underneath the surface of project is a powerful programming language called Visual Basic for Applications (VBA). It can be used to do just about everything that you can do manually in Microsoft Project but it can also do things which would be quite tedious or difficult to do manually. This example presumes you know have some understanding of VBA and if you don't I suggest you read the articles I've posted here (link to programming archive). VBA can open and operate other Microsoft Office applications. In this case we will open Excel and write data into it.

The TimeScaleData Method and the TimeScaleValues Collection
The TimeScaleData method is used to get a collection of timescaled values from tasks, assignments or resources which you can iterate through or read. The syntax for TimeScaleData method is a bit complex so it needs some explanation before we get into writing our code.

expression`.TimeScaleData(StartDate, EndDate, Type, TimeScaleUnit, Count)`

Where *expression* is one of the following:
An Assignment or Assignments Collection, A Resource or Resources Collection, A Task or Tasks Collection.

< some are there but simple, pretty method the parameters>

`StartDate` is the start date for the data. The twist here is that if the date you provide falls within an interval you are requesting, the `StartDate` is rounded to the start of that interval. For example if you are using TimeScaleUnits of months and enter a date in the middle of the month, `StartDate` will "round down" to the start of the first day of the month.

`FinishDate` is the finish date for the data. Like `StartDate` it rounds, but in this case to the end of the time interval you are using.

`Type` is the type of data. If you leave out this parameter the default is to return work. Even if you want work it is generally best to specify the type instead of leaving it blank. There is a long list of the defined types at the end of this article but to illustrate the type here are a few examples:

- `pjAssignmentTimeScaledCumulativeCost`
- `pjTaskTimeScaledPercentComplete`
- `pjResourceTimeScaledWork`

`TimeScaleUnit` is used to set the size of the time slice. By default weeks are used, but it is always good practice to set it explicitly. The possible values are:

- `pjTimescaleYears`
- `pjTimescaleQuarters`
- `pjTimescaleMonths`
- `pjTimescaleWeeks`
- `pjTimescaleDays`
- `pjTimescaleHours`
- `pjTimescaleMinutes`

`Count` is the final parameter. It controls how many timescale units are grouped together. Use it if you want to group the data by a timescale which is different than the ones available. For example if you wanted your data by half years, you could set `TimeScaleUnit` to `pjTimescaleMonths` and use a `Count` of 6.

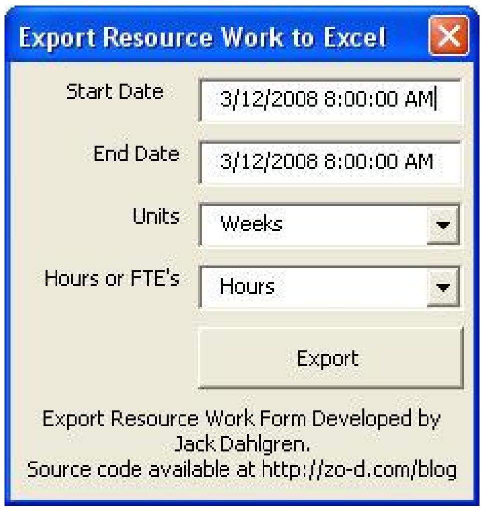
The `TimeScaledData` method returns a `TimeScaleValues` collection. This is a collection which contains all of the timeslices and their values. We use the `TimeScaleData` method on an object and use the resulting `TimeScaleValues` as the source of our data.

Our Export form is built around this method. The key operation is: `Set TSV = r.TimeScaleData(tbStart.Value, tbEnd.Value, TimescaleUnit:=cboxTSUnits.Value, 1)` Now all we need to do is build a form which will supply the correct parameters and which will export the data to Excel.

Using a Form in VBA

Many of the examples on this site or my other site (link to masamiki.com) don't ask the user for much information, but the `TimeScaleData` method has a number of parameters that must be supplied. And some of those parameters are selected from a list. Because of this we need to move from the simple input box to a form. A form can have a number of different controls on it. This example is kept very simple. It has `Start Date` and `End Date` text boxes. `Units` and `Hours or FTE` combo boxes and a button which will run the code to export the data. A more fully developed version could have selections for Resource, Assignment or Task and could also have a list of all possible data types.

Here is the form I put together:


Export Resource Work to Excel

Start Date: 3/12/2008 8:00:00 AM

End Date: 3/12/2008 8:00:00 AM

Units: Weeks

Hours or FTE's: Hours

Export

Export Resource Work Form Developed by Jack Dahlgren.
Source code available at http://zo-d.com/blog

Behind the form there are a number of subroutines. The first one runs when the form is first shown.

```
Private Sub UserForm_Initialize()
'set the start date textbox value
tbStart = ActiveProject.ProjectStart
'set the end date textbox value
tbEnd = ActiveProject.ProjectFinish
'call a subroutine to set values for Units box
fillTSUnitsBox
'call a subroutine to set values for the hours or FTE box
fillFTEBox
End Sub
```

The routine to fill the Units box:

```
Sub fillTSUnitsBox()
'sets Units constants
Dim myArray(5, 2) As String
myArray(0, 0) = "Days"
myArray(0, 1) = pjTimescaleDays
myArray(1, 0) = "Weeks"
myArray(1, 1) = pjTimescaleWeeks
myArray(2, 0) = "Months"
myArray(2, 1) = pjTimescaleMonths
myArray(3, 0) = "Quarters"
myArray(3, 1) = pjTimescaleQuarters
myArray(4, 0) = "Years"
myArray(4, 1) = pjTimescaleYears
```

```
cboxTSUnits.List = myArray
'use weeks as default value
cboxTSUnits.Value = 3
End Sub
```

The routine to set the Hours/FTE box

```
Sub fillFTEBox()
'sets choice of FTE or Hours
cboxFTE.List = Array("Hours", "FTE")
'sets to hours
cboxFTE.Value = "Hours"
End Sub
```

The code which runs when the button is clicked

```
Private Sub btnExport_Click()
exportResourceUsage
End Sub
```

And finally at the heart of it all the exportResourceUsage subroutine:

```
Sub exportResourceUsage()
'first define our variables
Dim r As Resource
Dim rs As Resources
Dim TSV As TimeScaleValues
Dim pTSV As TimeScaleValues
Dim i As Long, j As Long
'define excel variables
Dim xlRange As Excel.Range
Dim xlCol As Excel.Range
Dim xlRow As Excel.Range
Dim xlApp As Excel.Application

'open excel and set the cursor at the upper left cell
Set xlApp = New Excel.Application
xlApp.Visible = True
AppActivate "Microsoft Excel"
Set xlBook = xlApp.Workbooks.Add
Set xlsheet = xlBook.Worksheets.Add
xlsheet.Name = ActiveProject.Name
Set xlRange = xlApp.ActiveSheet.Range("A1:A1")

'start writing column headers
xlRange.Value = "Resource Name"
Set xlRange = xlRange.Offset(0, 1)
xlRange.Value = "Generic"

'use the dates from the project summary task TSV to set column headings
Set pTSV = ActiveProject.ProjectSummaryTask.TimeScaleData(tbStart.Value,
tbEnd.Value, TimescaleUnit:=cboxTSUnits.Value)
For j = 1 To pTSV.Count
Set xlRange = xlRange.Offset(0, 1)
xlRange.Value = pTSV.Item(j).StartDate
Next j

'go to first cell of next row
```

```
Set xlRange = xlRange.Offset(1, -j)

'loop through all resources and write out values
Set rs = ActiveProject.Resources
For Each r In rs
If Not r Is Nothing Then
xlRange.Value = r.Name
Set xlRange = xlRange.Offset(0, 1)
If r.EnterpriseGeneric Then
xlRange.Value = r.EnterpriseGeneric
End If

Set xlRange = xlRange.Offset(0, 1)

Set TSV = r.TimeScaleData(tbStart.Value, tbEnd.Value,
TimescaleUnit:=cboxTSUnits.Value)
'loop through all timescale data and write to cells
For i = 1 To TSV.Count
If Not TSV(i).Value = "" Then
'convert to FTE if FTE is set
If cboxFTE.Value = "FTE" Then
Select Case cboxTSUnits.Value
Case 0 'years
xlRange.Value = TSV(i).Value / (60 * ActiveProject.HoursPerDay *
ActiveProject.DaysPerMonth * 12)

Case 1 'quarters
xlRange.Value = TSV(i).Value / (60 * ActiveProject.HoursPerDay *
ActiveProject.DaysPerMonth * 3)

Case 20 'months
xlRange.Value = TSV(i).Value / (60 * ActiveProject.HoursPerDay *
ActiveProject.DaysPerMonth)

Case 3 'weeks
xlRange.Value = TSV(i).Value / (60 * ActiveProject.HoursPerWeek)

Case 4 'days
xlRange.Value = TSV(i).Value / (60 * ActiveProject.HoursPerDay)

End Select
Else
'if not FTE, work hours are written
xlRange.Value = TSV(i).Value / (60)
End If
End If
Set xlRange = xlRange.Offset(0, 1)
Next i
End If
Set xlRange = xlRange.Offset(1, -(TSV.Count + 2))
Next r

'some minor excel formatting of results
xlApp.Rows("1:1").Select
xlApp.Selection.NumberFormat = "m/d/yy;@"
xlApp.Cells.Select
xlApp.Cells.EntireColumn.AutoFit
xlApp.Activate
End Sub
```

To keep this readable I've left out all error handling and the like. It is meant as an example of how to use the `TimeScaleData` method and read from the `TimeScaleValues` collection.

If you hadn't noticed, the code which runs when the button is clicked contains only one command. It is possible to put the whole `exportResourceUsage` subroutine code under the handler for that button, but by putting it in a separate subroutine, it is easier to reuse the subroutine and keep the code readable.

Now, we have the form and the code (rightclick here to save a copy of the form to your computer). The next step is getting the form to display. To do this we need to write a single line of code.

```
Sub showExportForm()
exportResourceTimescaledData.Show
End sub
```

This macro can then be assigned to a button on your toolbar. Clicking the button runs the macro which shows the form.

The **TimeScaleData** Type Reference

There are a large range of `TimeScaleData` types available and which can be used to produce everything from Earned Value S-charts to cashflows or resource availability. The types possible depend on whether you are looking at Assignment, Resource or Task data. For example, Percent Complete is only available when looking at a task or task collection. WorkAvailability is only relevant to resources.

The constants to specify the `Type` always follow the same format, beginning with "pj" then the type of object you are referencing (Task, Resource or Assignment), then "Timescaled" and finally the data you are looking for. For example you would use `pjTaskTimescaledDataActualCost` for actual cost for a task, but `pjResourceTimescaledDataActualCost` for costs of a specific resource.

The following are available for Tasks, Assignments, and Resources

- ActualCost
- ActualOvertimeWork
- ACWP (actual cost of work performed - use in Earned Value calculations)
- BaselineCost (and Baseline1-10 cost)
- BaselineWork (and Baseline1-10 work)
- BCWP (budgeted cost of work performed - used for Earned Value calculations)
- BCWS (budgeted cost of work scheduled - used for Earned Value calculations)
- Cost
- CumulativeCost
- CumulativeWork
- CV (cost variance - used in Earned Value)
- Overallocation
- OvertimeWork
- RegularWork
- SV (schedule variance - used in Earned Value)
- Work

The following are available for Assignments and Resources only:

- PeakUnits
- PercentAllocation

The following are available for Resources only:

- RemainingAllocation
- UnitAvailability
- WorkAvailability

The following are available for Tasks only:

- ActualFixedCost
- CPI (cost performance index)
- CumulativePercentComplete
- CVP
- FixedCost
- PercentComplete
- SPI (schedule performance index)
- SVP

The Form which contains this code can be found here: ExportTimescaledData.zip. Unzip and then open project, hit ALT+F11 to open the visual basic editor. From the file menu in the editor select "Import File" and browse to the file. Don't forget to write a macro to make the form show like I explained earlier. It is useful to have that macro assigned to a button on the toolbar.

Posted on April 1, 2008 1:01 AM | Comments (11)

MAY 13, 2008

Office VBA for Mac After 2008

For those who work on Apple Macs there was some good news today. Microsoft announced that it is bringing back VBA support for the Macintosh version of Office. Support will be coming in the versions after 2008. Here is the text of the announcement:

VBA Returns to Future Versions of Office for Mac

The Mac BU also announced it is bringing VBA-language support back to the next version of Office for Mac. Sharing information with customers as early as possible continues to be a priority for the Mac BU to allow customers to plan for their software needs.Although the Mac BU increased support in Office 2008 with alternate scripting tools such as Automator and AppleScript -- and also worked with MacTech Magazine to create a reference guide, available at http://www.mactech.com/vba-transition-guide -- the team recognizes that VBA-language support is important to a select group of customers who rely on sharing macros across platforms. The Mac BU is always working to meet customers' needs and already is hard at work on the next version of Office for Mac.

Source: http://biz.yahoo.com/prnews/080513/aqtu077.html?.v=48

Posted on May 13, 2008 1:53 PM | Comments (0)

MAY 21, 2008

Making the move from VBA to VSTO in Microsoft Project

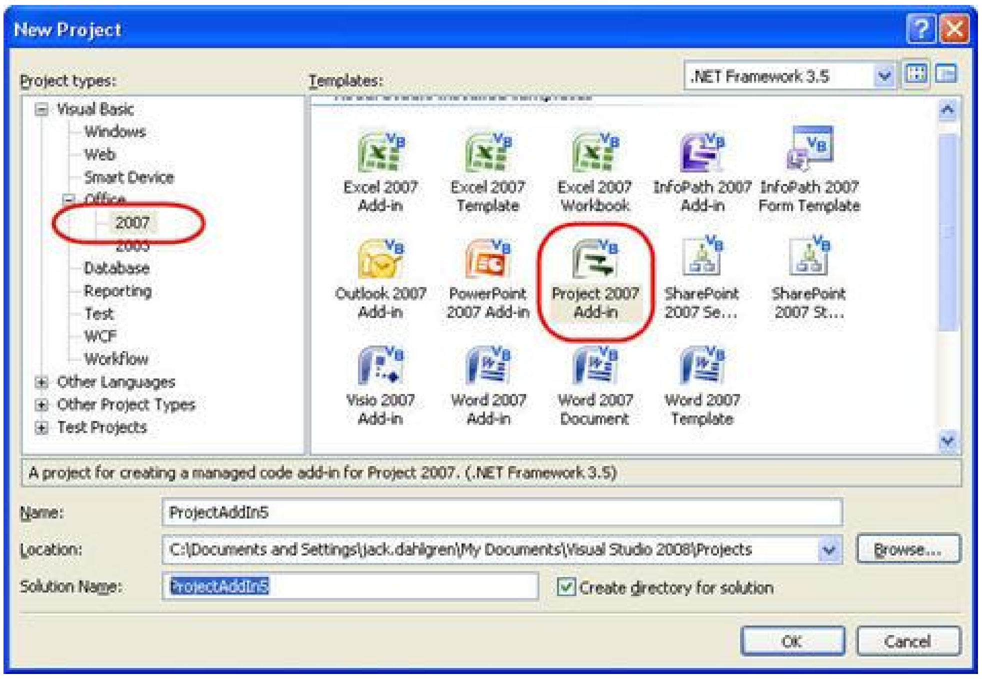
One of the most useful features of Microsoft Project is the ability to automate actions with it. Primarily this is done by writing VBA (Visual Basic for Applications) code, or by just recording a macro and then editing the VBA code that the macro recorder produces. But a few years back Microsoft came out with VSTO (Visual Studio Tools for Office) which allow you to more easily write code to automate office applications within Visual Studio which is their main line programming environment.

For a long time I ignored VSTO because it didn't live up to the promise it made. It was clumsy to use and difficult to deploy the applications. I also avoided it because I couldn't get the project add-in templates to work.

However, with Visual Studio 2008 they provided two things which make it much easier for the casual developer to use. The first is what they call "ClickOnce" deployment. What this means is that you can easily deploy by publishing your solution to a local drive, a website (HTTP) on a CD/DVD or even USB locations. Deployment also supports offline, automatic updating and rollback. The second is an improved template for building a Project Add-in. At the MVP summit there was a lot of talk of using VSTO as a way to automate Project, so I gave it another chance and I like what I found. It took a while to get up to speed, so I decided to post a tutorial showing how to create a simple add-in. Here it is:

Starting a New Add-in

This tutorial assumes you have Microsoft Visual Studio 2008 installed. The first step is to open Visual studio and from the "File" menu, select "New Project...". This brings up the "New Project" dialog box.



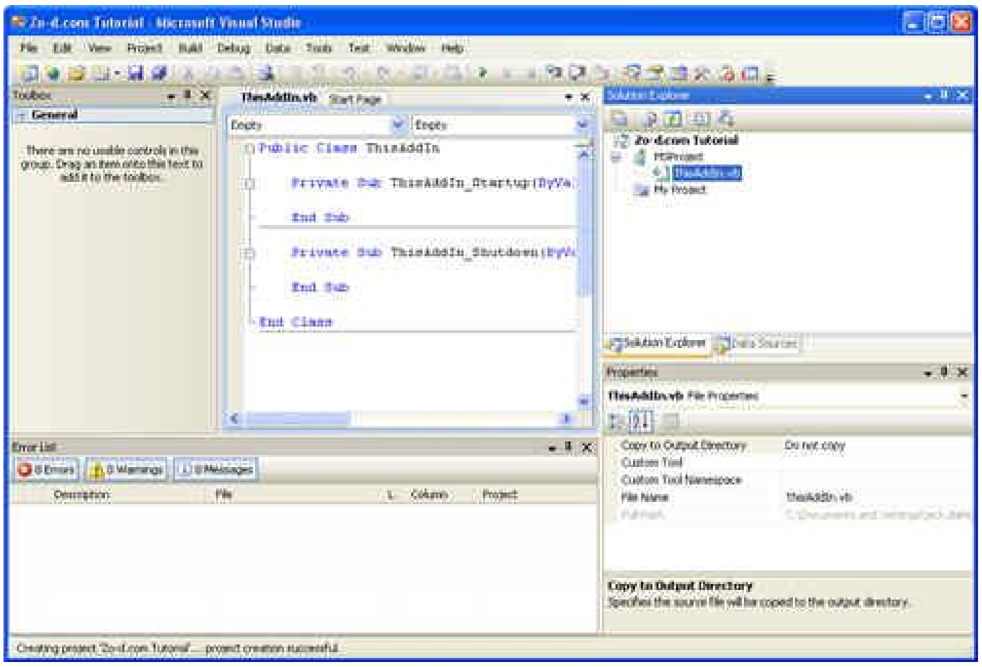
A project for creating a managed code add-in for Project 2007. (.NET Framework 3.5)

Name: ProjectAddIn5

Location: C:\Documents and Settings\jack.dahlgren\My Documents\Visual Studio 2008\Projects

Solution Name: ProjectAddIn5 ☑ Create directory for solution

In this case I'm using Visual Basic as the language as it is closest to VBA so it is easier for me to deal with. Expand the "Project Type" tree on the left to find "Visual Basic/Office/2007" then enter a name for your solution. If you do not enter a descriptive name now you will regret it later. Highlight "Project 2007 Add-in" and click "OK". The solution will be displayed with two subroutines, one which occurs when the add-in opens and the other when it closes.



There are no usable controls in this group. Drag an item onto this text to add it to the toolbox.

```
Public Class ThisAddIn

    Private Sub ThisAddIn_Startup(ByVa

    End Sub

    Private Sub ThisAddIn_Shutdown(ByV

    End Sub

End Class
```

ThisAddIn.vb File Properties

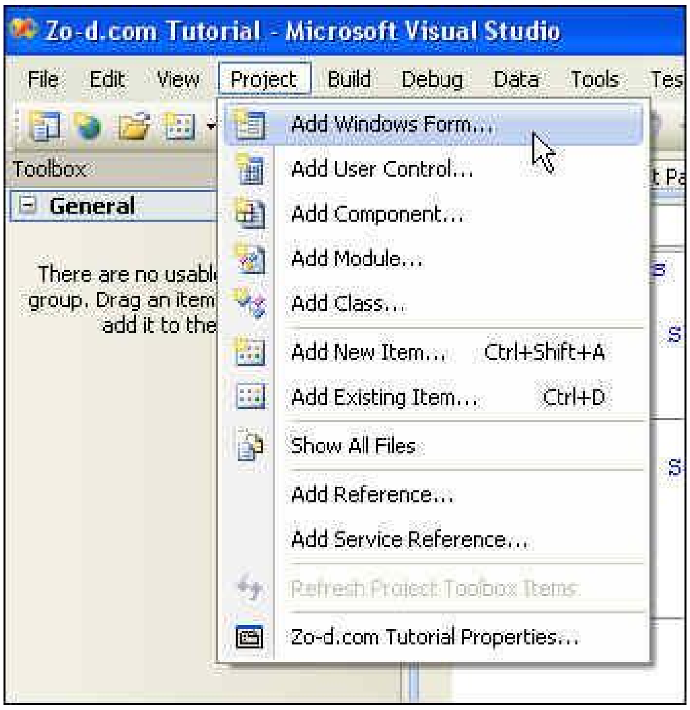
Copy to Output Directory	Do not copy
Custom Tool	
Custom Tool Namespace	
File Name	ThisAddIn.vb
Full Path	C:\Documents and Settings\jack.dahl

Copy to Output Directory
Specifies the source file will be copied to the output directory.

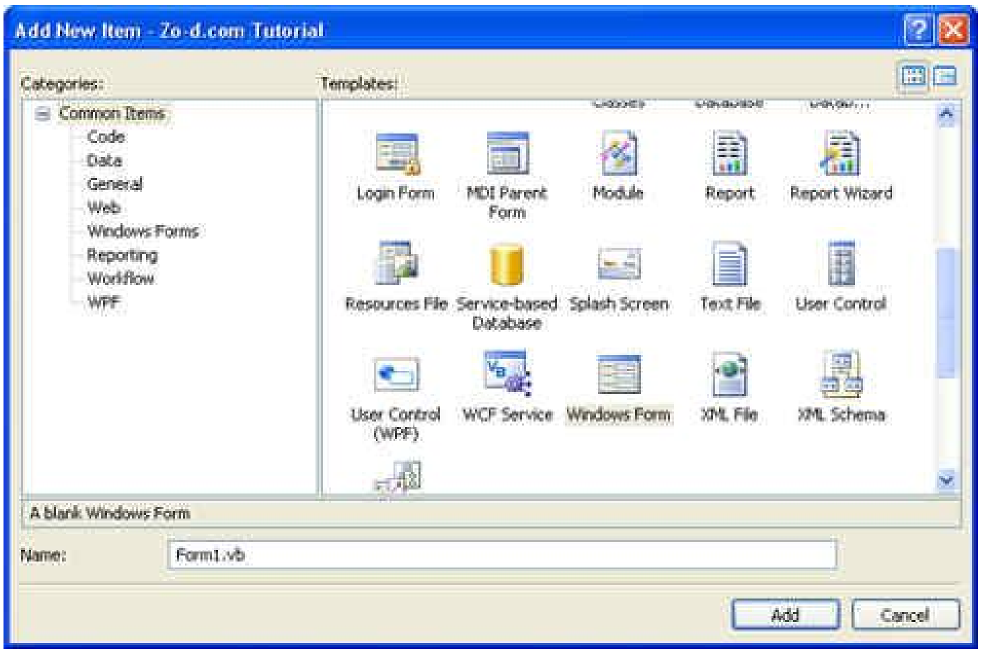
Creating project 'Zo-d.com Tutorial'... project creation successful.

Adding a Form to Your VSTO Solution

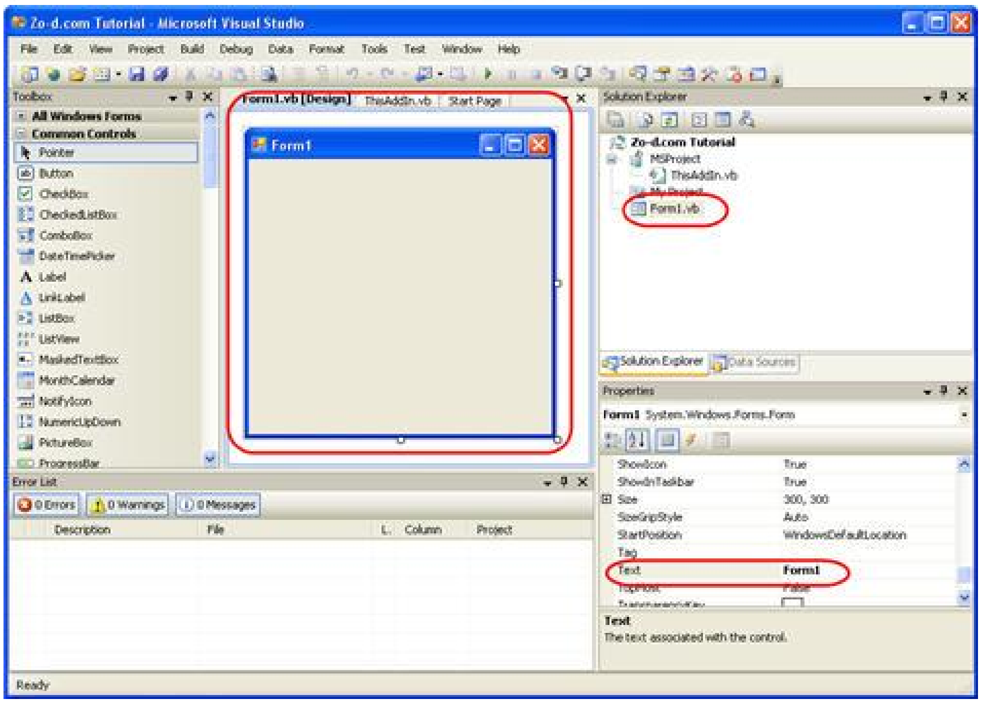
In most cases you want the user to be able to do something. That means we need to provide some sort of user interface. In this simple case we are just going to display a user form. To add a form go to the "Project" menu and select "Add Windows Form..."



In the dialog box that appears you can see all of the other types of objects you can add to your project. Things like the splash screen allow you easily build some commonly used user interface elements. But for now, we need just one form.



Once you have added the form you will see the form itself in the design window in the center of the screen. You should also see it in the "Solution Explorer" on the upper right side of the screen. The design window is tabbed so you can see the original thisaddin.vb code tab behind the current "Form1.vb" tab.



Form1 System.Windows.Forms.Form

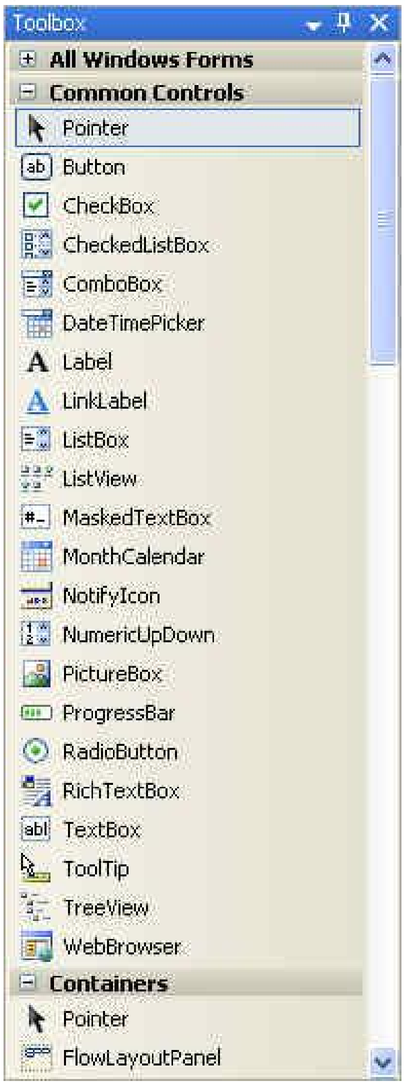
ShowIcon	True
ShowInTaskbar	True
Size	300, 300
SizeGripStyle	Auto
StartPosition	WindowsDefaultLocation
Tag	
Text	Form1
TopMost	False

Text
The text associated with the control.

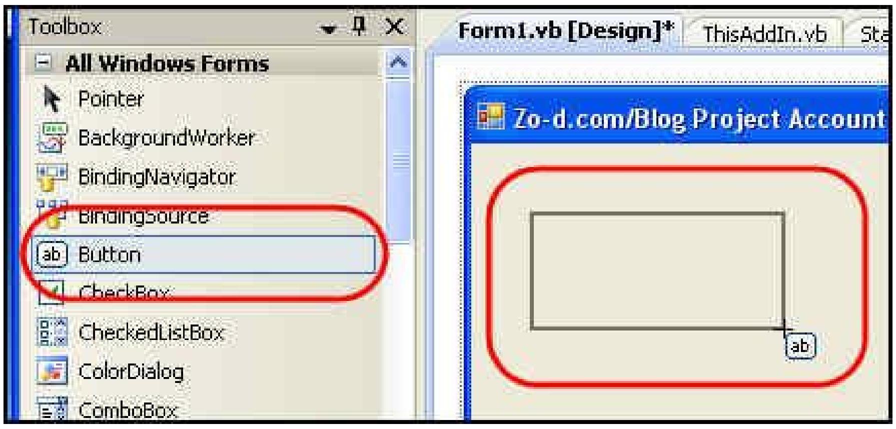
The new form is just like a user form in Project VBA. You can edit the `Text` property to give it a new name in the title bar. Set it however you would like. There are a number of different properties which you can set for font, color, size, behavior etc. Try playing around with some of them. There is one property we really want to set for this form, `topmost` property should be set to `True` so that the form always stays visible on top of the application.

Adding Controls to the Form

Now that we have the form we want to put some controls on it. For those who aren't familiar with using forms, a control is typically just something on the form - a label perhaps or a button, textbox or perhaps something more complex like a date picker. The next screenshot shows the common controls in the toolbox. There are many other controls available as well. One of the biggest advantage of using an Add-in rather than a VBA user form is that there are a much wider variety of controls available. The Windows forms also offer standard things like the ability to easily resize the form.



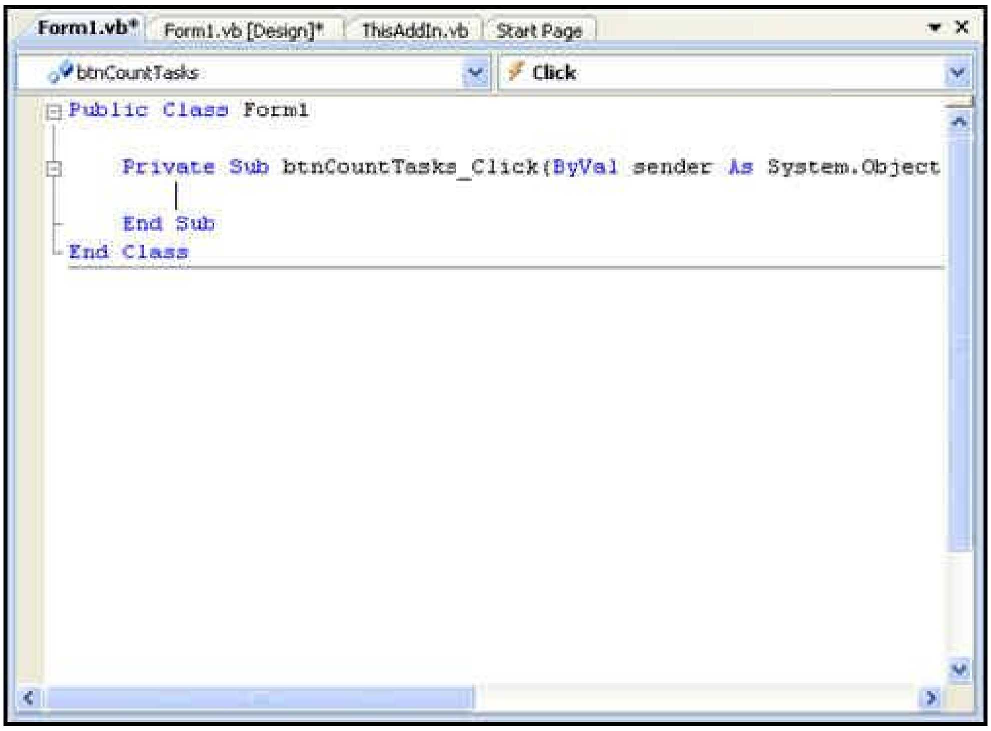
To keep this example really simple I am just going to add one button and one label. Clicking on the button will count the tasks in the active project and then put that value in the label. To do this we just select the button control in the toolbox. When it is selected the cursor will change as shown below. Then just click and drag anywhere on the form to create the size and shape of button you want.



The button will be created with a name like "Button1". If you are going to change the name of the button, this is the best time to do it. Make sure the button is selected and then in the "Properties" box at the lower right side of the screen find the "Name" property at the top of the list. Edit it to whatever you like. I usually name the button with the action that they are going to perform. This one I call "btnCountTasks". When you have renamed the button, you will notice that the text on the button has not changed. It still reads "Button1". Scroll a bit further down the list of properties and set the "Text" property to "Count Tasks". You can look at some of the other properties while you are there, but to keep things simple don't change any of the other properties.

Writing Code for a Windows Forms Button

The next step is to write some code so that clicking on the button actually does something. Double Click on the button and Visual Studio will automatically switch to the code view for the form. It will also automatically create a handler which will run whenever you click the button.

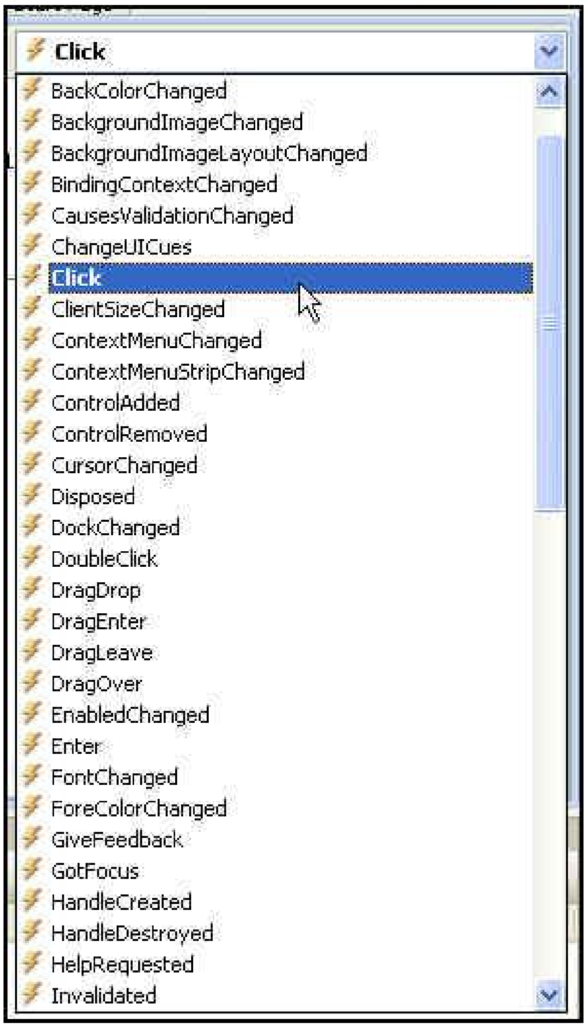


```
Public Class Form1

    Private Sub btnCountTasks_Click(ByVal sender As System.Object

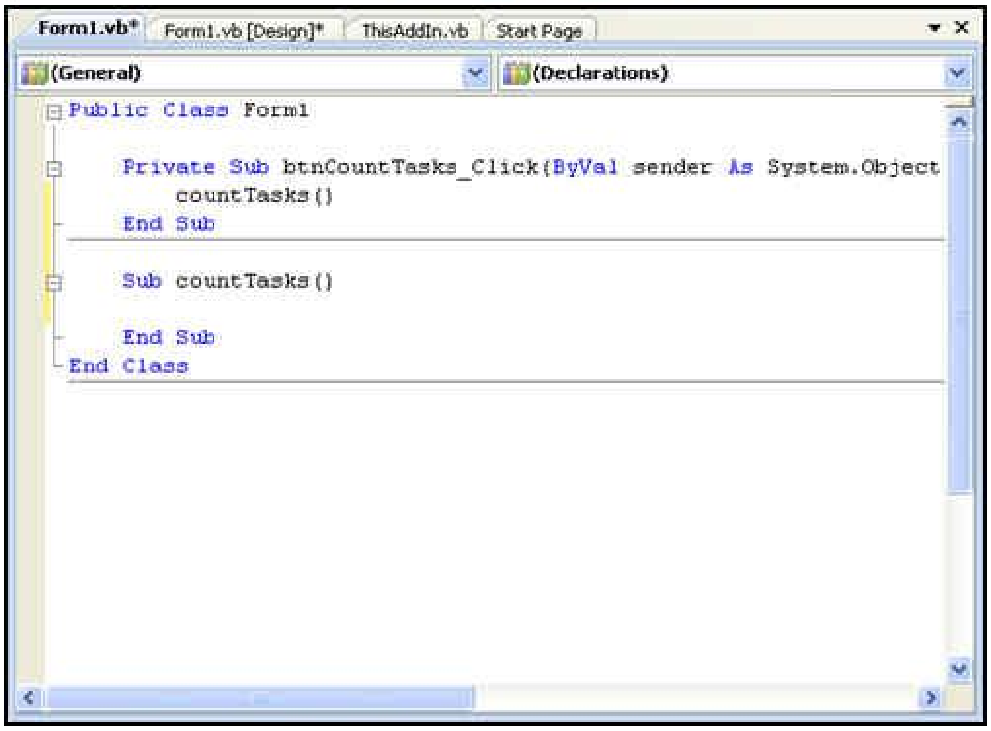
    End Sub
End Class
```

If you want to create a handler for a different event, select the appropriate event from the drop down list of events at the right top corner of the window. If the event exists it will be shown in bold and selecting it will take you to that section of code. If it doesn't exist, then the shell of the handler will be created for you.



When the event handler is created the cursor is sitting there waiting for you to type code. At this point you could simply start writing code, but to make things easier and more modular, I prefer to have a button click call a sub-routine. That way another button can call the same sub-routine. It also makes writing and debugging the code easier. So the only thing we are going to do is call the sub-routine I'll call "countTasks".

To do this, select a line outside of the event handler and type `"sub countTasks()"`. The editor will create an end for it and a blank line for your code. Now go back to the event handler and on the blank line there write `"countTasks"`. You now have a button which when clicked will run the countTasks sub-routine.



```
Public Class Form1

    Private Sub btnCountTasks_Click(ByVal sender As System.Object
        countTasks()
    End Sub

    Sub countTasks()

    End Sub
End Class
```

Refering to the Project Application and Active Project

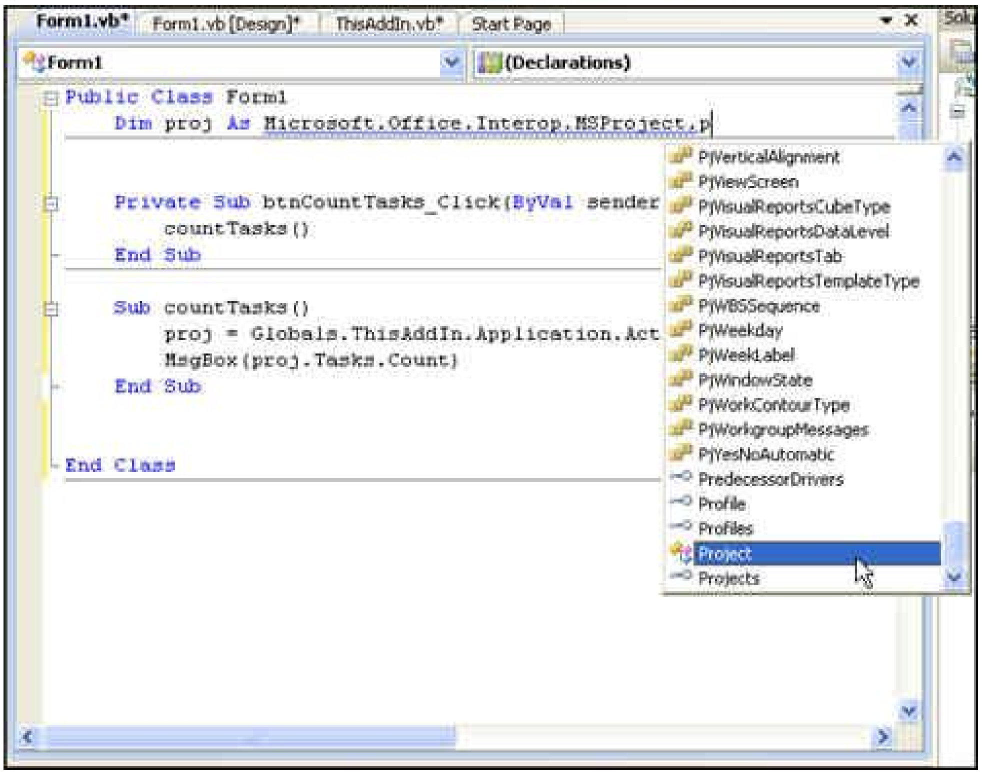
Up until now we have just been working within Visual Studio and have not been making any references to Microsoft Project. We are about to get started with that. In this example we are just going to work with the active project. To make this easy we will define a variable named `proj`. To do this we write a typical `dim` statement which references the Microsoft.Office.Interop.MSProject namespace. If we were writing VBA within project we could write:

```
dim proj as Project
```

Since we are not within Project VBA we need to specify more about where the project object can be found so we write:

```
Dim proj As Microsoft.Office.Interop.MSProject.Project
```

The intellisense within Visual Studio will suggest to you the likely object after you type a letter or two as shown below:



```
Public Class Form1
    Dim proj As Microsoft.Office.Interop.MSProject.p

    Private Sub btnCountTasks_Click(ByVal sender
        countTasks()
    End Sub

    Sub countTasks()
        proj = Globals.ThisAddIn.Application.Act
        MsgBox(proj.Tasks.Count)
    End Sub

End Class
```

The next thing to do is to set `proj` to the active project. This isn't strictly necessary, but it does make things easier. To do this we write:

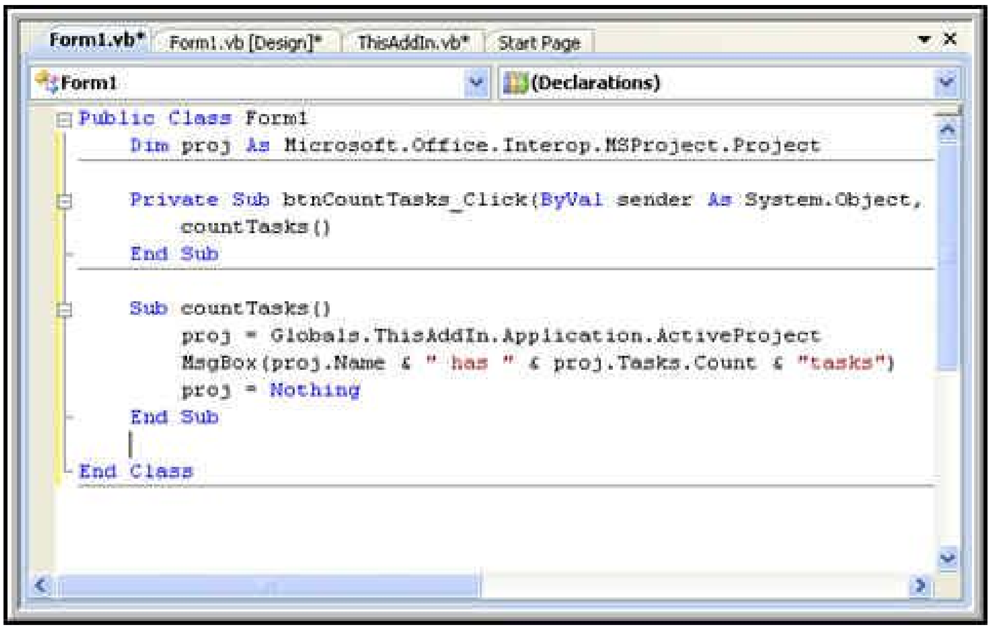
```
proj = Globals.ThisAddIn.Application.ActiveProject
```

The final step is to output some things about the active project. In this case we will just use a message box to report to the user. You could have the text be displayed in a text box or on a label within the form as well. The line we are going to use to output the project name and the number of tasks is:

```
MsgBox(proj.Name & " has " & proj.Tasks.Count & " tasks")
```

Finally, after we are done reporting on the number of tasks in the project we release the `proj` variable by setting it to nothing:

```
proj = Nothing
```



```
Public Class Form1
    Dim proj As Microsoft.Office.Interop.MSProject.Project

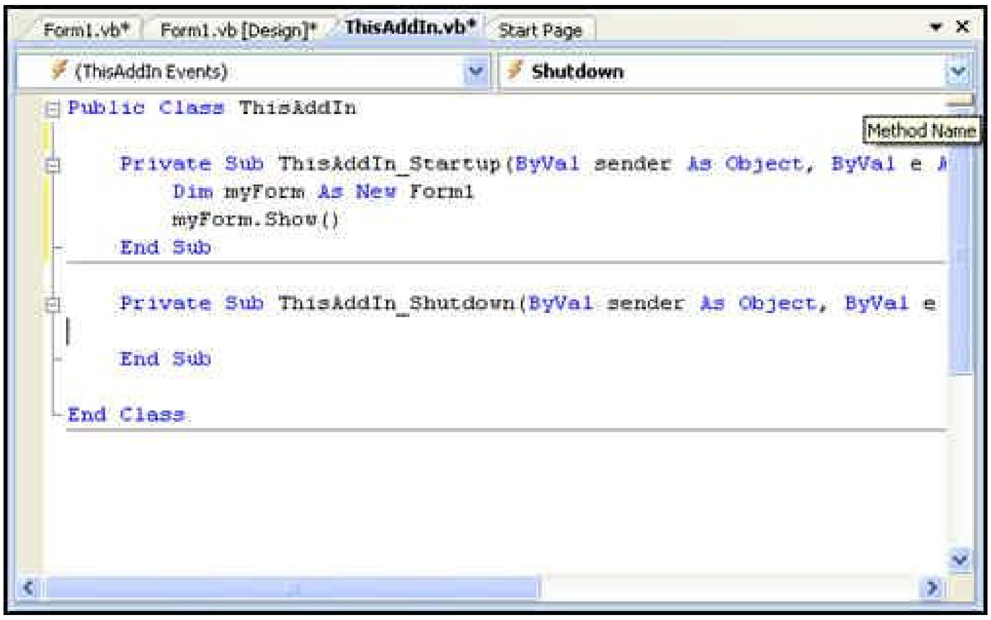
    Private Sub btnCountTasks_Click(ByVal sender As System.Object,
        countTasks()
    End Sub

    Sub countTasks()
        proj = Globals.ThisAddIn.Application.ActiveProject
        MsgBox(proj.Name & " has " & proj.Tasks.Count & "tasks")
        proj = Nothing
    End Sub

End Class
```

Showing the Form

The final thing we have to do with our add-in before we can publish it is to make the form we just made show. Go back to the `ThisAddIn.vb` tab and in the `Startup` event, define a form (here I use "myForm" as the object and use the `show` method to display the form. In another tutorial I'll post a cleaner way of doing this by creating a menu bar and buttons to show the form. This form is just going to show when the add-in is loaded. Here is the final code for this:



```
Public Class ThisAddIn

    Private Sub ThisAddIn_Startup(ByVal sender As Object, ByVal e A
        Dim myForm As New Form1
        myForm.Show()
    End Sub

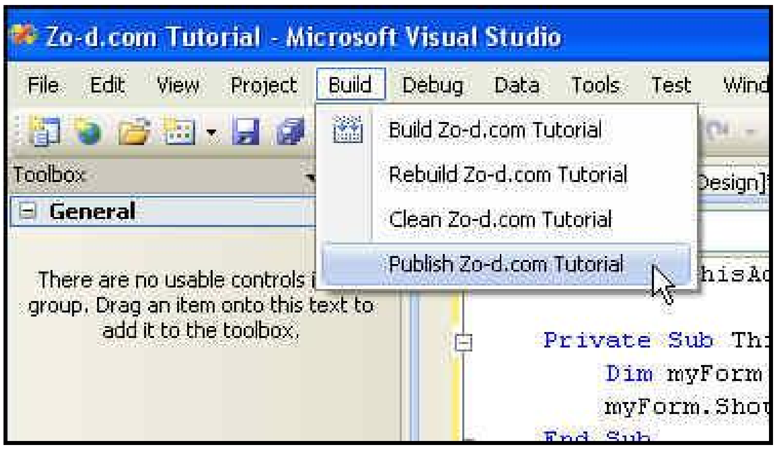
    Private Sub ThisAddIn_Shutdown(ByVal sender As Object, ByVal e

    End Sub

End Class
```

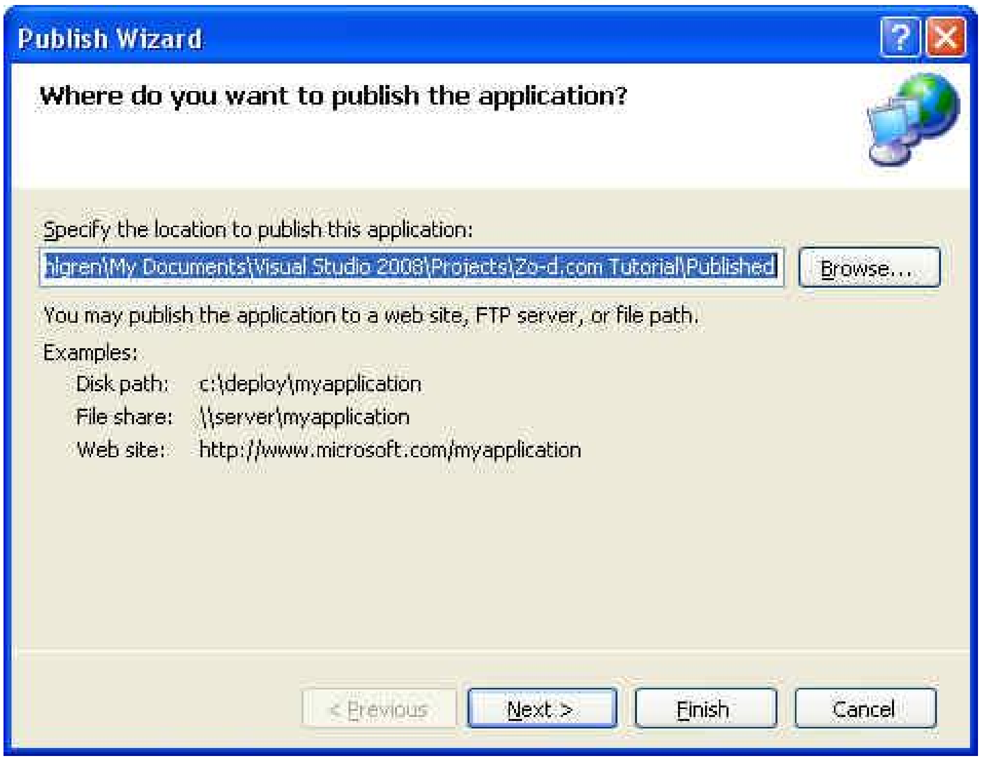
Publishing the Add-in

There are several options for publishing the add-in. That subject is also worth a separate post detailing all the different ways, but for now I'm just going to publish to a folder on my own hard drive. To do this go to the "Build" menu and select "Publish ..."


Zo-d.com Tutorial - Microsoft Visual Studio
File
Edit
View
Project
Build
Debug
Data
Tools
Test
Wind
Build Zo-d.com Tutorial
Rebuild Zo-d.com Tutorial
Clean Zo-d.com Tutorial
Publish Zo-d.com Tutorial
Toolbox
General
There are no usable controls i
group. Drag an item onto this text to
add it to the toolbox.
Design]

```
hisAd
    Private Sub Thi
        Dim myForm
        myForm.Sho
    End Sub
```

When the wizard runs, enter the location you want to publish to and click your way through the rest of the wizard. It might take a little while and when you are done you will see a notification in the lower left corner that "Publish succeeded".



Publish Wizard

Where do you want to publish the application?

Specify the location to publish this application:

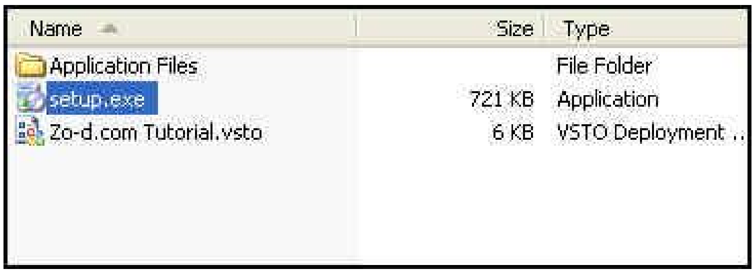
hlgren\My Documents\Visual Studio 2008\Projects\Zo-d.com Tutorial\Published

You may publish the application to a web site, FTP server, or file path.

Examples:

Disk path:	c:\deploy\myapplication
File share:	\\server\myapplication
Web site:	http://www.microsoft.com/myapplication

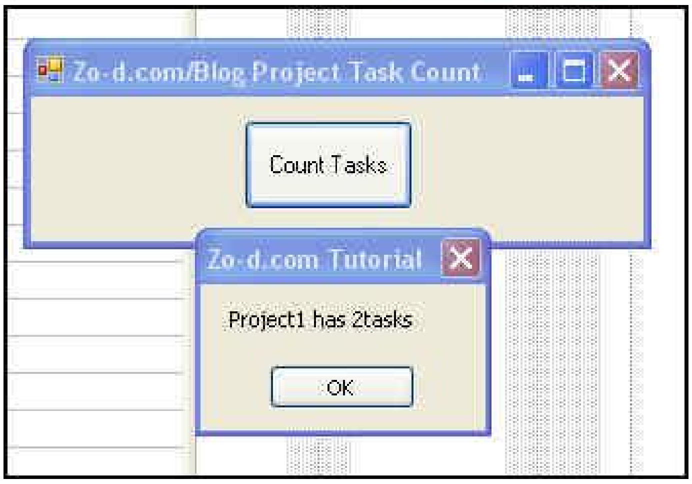
Using Windows Explorer, navigate to the location that you saved the file to and double-click the "Set-up" file.



Name	Size	Type
Application Files		File Folder
setup.exe	721 KB	Application
Zo-d.com Tutorial.vsto	6 KB	VSTO Deployment ..

Using the Add-in

After installing, the add-in will run whenever you open project. This add-in will float above your project and can be clicked at any time. If you want to close it, just click the x.



If you want to disable it, go to the "Tools" menu, select "Com add-ins" and then deselect the item from the list that shows. You can also remove the Add-in by going to your Windows control panel, choosing the "Add-Remove Programs" option, find the add-in and click on "uninstall".

I hope that you found this tutorial helpful in understanding the basic principles of building and deploying a VSTO Microsoft Project Add-in. With a bit of work you can take this very rough and simplistic Add-in and create something useful and easy to deploy. Feel free to leave comments or ask questions.

UPDATE: *Find the second part of this tutorial which shows how to add a command bar and command buttons here*.

Posted on May 21, 2008 9:33 PM | Comments (2)

JUNE 12, 2008

VBA to VSTO Tutorial Part Two - Adding a Command Bar and Buttons

In my previous tutorial on using VSTO to create a Microsoft Project Add-in, I covered what is necessary to create an Add-in which displays a simple form but most of the time we don't want the form to show up every time. A better way to do this is to add a tool bar (aka: CommmandBar) and some buttons / icons (aka: CommandBarButtons). This way if your add-in is installed it can have its own toolbar which users can click if they want to perform some action or display a form. Project 2003 and Project 2007 still use the same sort of command bar and command bar button interface as earlier versions of Office Applications. If you are creating an Add-in for Excel 2007 or Word 2007 you will be working with the new Ribbon interface. I'll write about that when Project catches up with that interface...

Adding a Command Bar / Tool Bar to the Microsoft Project Interface

This installment covers how to add a command bar and a couple of buttons. If you have not read the first tutorial you should go back and read it here.

The first thing to do is to define the objects we are going to use. We want them available from any other object in our add-in so define them right at the top. The command bar is going to use two buttons only. One will display a form with buttons and other controls. The other will display a form with "About" information on it.

```
Public Class ThisAddIn
Dim commandBar as Office.CommandBar
Dim firstButton as Office.CommandBarButton
Dim secondButton as Office.CommandBarButton
```

A Subprocedure to Add the Command Bar

The next thing to do is to add the command bar. I've put this in its own subprocedure so tha I can easily reuse the code in another add-in or if I want to add multiple command bars to the same add-in. It takes a string `barName` as the name of the bar. This code should be really simple, but we want to make sure that we have the latest version of the command bar so first we check to see if the bar exists. If it does then we delete it and add it again.

```
Private Sub addToolBar(ByVal barName As String)
Try
commandBar = Application.CommandBars(barName)
Catch ex As ArgumentException
' Toolbar does not exist so we should create it later
End Try
If Not commandBar Is Nothing Then
Application.CommandBars(barName).Delete()
```

```
End If

Application.CommandBars.Add(barName, 1, False, False)
commandBar = Application.CommandBars(barName)
End Sub
```

Adding Buttons to the Command Bar

The next step is to add the buttons to the toolbar. Once again I'm writing this as a subprocedure so that I can easily reuse it or modify it. The names of the buttons are hardcoded but you could add them as a parameter as well if you feel like it.

```
Private Sub addButton(ByVal cBarName As String)
commandBar = Application.CommandBars(cBarName)
Try
' Add a button to the command bar and create an event handler.
firstButton = CType(commandBar.Controls.Add(1), Office.CommandBarButton)
firstButton.Style = Office.MsoButtonStyle.msoButtonCaption
firstButton.Caption = "Monte Carlo"
firstButton.Tag = "montecarlo"
AddHandler firstButton.Click, AddressOf Button1Click
' Add a second button to the command bar and create an event handler.
secondButton = CType(commandBar.Controls.Add(1), Office.CommandBarButton)
secondButton.Style = Office.MsoButtonStyle.msoButtonCaption
secondButton.Caption = "about"
secondButton.Tag = "about"
AddHandler secondButton.Click, AddressOf Button2Click
commandBar.Visible = True Catch ex As Exception
MsgBox(ex.Message)
End Try
End Sub
```

Adding Handlers for Button Clicks

If we run these two subprocedures we get a tool bar and add two buttons to it. Next we need to set up what the buttons should do. Similar to any button control, we use an event handler (defined above). The first button will create and show our master form.

```
Private Sub Button1Click(ByVal ctrl As Office.CommandBarButton, ByRef
Cancel As Boolean)
Dim monteCarlo As New fmMonteCarlo
monteCarlo.Show()
End Sub
```

We do a similar thing for the "About" form.

```
Private Sub Button2Click(ByVal ctrl As Office.CommandBarButton, ByRef
Cancel As Boolean)
Dim aBox As New AboutBox1
aBox.Show()
End Sub
```

Run when Add-in Starts

The next thing to do is to make sure that these subprocedures run when the add-in starts. We put the two subprocedures in the "Startup" event for the addin.

```
Private Sub ThisAddIn_Startup(ByVal sender As Object, ByVal e As
System.EventArgs) Handles Me.Startup
...
addToolBar("Monte Carlo")
addButton("Monte Carlo")
```

```
...
End Sub
```

Cleaning Up at the End

The very final thing to do is clean up after ourselves. If a user wants to remove or unload the add-in we would expect that the command bar would go away as well. To do this we just delete the command bar in the Shutdown event for the Add-in.

```
Private Sub ThisAddIn_Shutdown(ByVal sender As Object, ByVal e As
System.EventArgs) Handles Me.Shutdown
Application.CommandBars("Monte Carlo").Delete()
...
End Sub
```

With this and the previous tutorial you should be able to get through the initial hurdles that you face moving from VBA to VSTO and should be able to create and deploy a Project 2007 Add-in that adds a command bar and displays a form. And you should be able to create a form with some simple controls and code. From this point on, coding in visual basic using Visual Studio 2008 is very similar to using VBA.

Posted on June 12, 2008 6:57 AM | Comments (3)

JUNE 16, 2008

VBA and Visual Basic For ... to ... statements

Most of the Microsoft Project or Excel macros I write include looping through a collection of tasks or resources or assignments and use the a `For Each ... Next` loop, but that doesn't mean we should neglect the `For ... to ...Next` statement.

This statement uses a counter which you set to determine how many times it runs. The syntax is as follows:

For *counter* = *start* **To** *end* [**Step** *step*] [statements] [**Exit For**]
[statements] **Next** [counter]

`counter` is the number of times that the loop will run. It is a required input to the statement. The most common terms used for counter are the lower case letters starting with `i`. When dealing with arrays or other sorts of multidimensional data it is common to end up with nested `For...Next` statements so sticking to a standard convention helps you keep your place. An example of nested statements is:

```
For i = 1 to 10
For j from 1 to 10
myArray(i,j) = i * j
Next j
Next i
```

The next part is the start parameter. This is often just an integer like 0 or 1, but you can pass any numeric vaue to it. End is similar, but it is more likely to be a variable something like `ActiveProject.Tasks.Count or UBound(myArray())` work nicely.

The final piece of the puzzle is the `step` value. Step can be any integer both positive OR negative. I've used negative step values when deleting or inserting tasks as the task ID can change if you insert or delete a task, so working from the last task to the first is a good idea. Here is an example of deleting blank tasks working from the last task in the active project and working your way back to the top:

```
For i = ActiveProject.Tasks.Count To 1 Step -1
If ActiveProject.Tasks(i) Is Nothing Then
SelectRow Row:=i, rowrelative:=False
EditDelete
End If
Next i
```

The value of the counter `i` can even be set within the statement, but be aware that this can cause problems. It is certainly possible to create an endless loop this way. It can also be more difficult to debug. Do it only if you have to.

Posted on June 16, 2008 6:58 AM | Comments (0)

JULY 18, 2008

Microsoft Project Undo Levels and Macros

One of the new features of Project 2007 is that it allows more than one level of Undo. This is of great comfort to those of us who have made more than one error while working on a file. It also has a benefit for those who automate microsoft project with VBA or VSTO as typically there are many things done during the execution of a macro. In Project 2003 this often meant that macros were irreversible unless you somehow built your own log of the changes and then went back through it to restore things to their prior state.

Taking advantage of this new capability within a macro is easy. There are two methods you need to know:

```
Application.OpenUndoTransaction ("name of the transaction")

Application.CloseUndoTransaction
```

Use these to bracket the code you are going to run in your macro for example:

```
Sub renameTasks()
Application.OpenUndoTransaction ("rename tasks")
For Each Task In ActiveProject.Tasks
Task.Name = "foo"
Next Task
Application.CloseUndoTransaction
End Sub
```

Then when you click on the undo button, all of the changes within that transaction will be reversed in a single click. This is very valuable when you are making a very large number of changes - for example if you modified all of tasks in your macro.

You might be wondering what the transaction name is used for. It is the name which shows up when you click on the undo button, so make it as descriptive as possible. You could also use it if you want to go back to a certain place. To determine where the place is you can read the list of transactions in the undo list. Here is a code sample which shows a message box with all of the undo transactions. If you run it, you can see what you have done so far. Note that many of the names are not very useful for knowing what has been done as they don't include which task the change was made to. Still they offer enough breadcrumbs to see where you have been:

```
Sub showUndo()
Dim numUndo As Integer
Dim i As Integer
Dim undoString As String
numUndo = Application.GetUndoListCount
For i = 1 To numUndo
undoString = undoString & Application.GetUndoListItem(i) & vbCrLf
Next i
MsgBox undoString
End Sub
```

Using the name of your transactions you can find out how far back you need to go to reverse the effects of your code even if the user has performed some steps in between. An example would be something like this:

```
Sub backToStart()
Application.OpenUndoTransaction ("very start")
'do lots of things to the file
Application.CloseUndoTransaction
Application.OpenUndoTransaction ("middle")
For Each Task In ActiveProject.Tasks
Task.Name = "foo"
Next Task
Application.CloseUndoTransaction
End Sub
```

You would then look through the list of transactions until you find the one with the name you like and then reverse that many transactions. It would be great if you could undo out of order, but I have not found any way of doing that. Just like a stack of cards, you have to take the top one off in order to get to the ones underneath.

There are a few things to be careful about undo. First, be aware of the number of undos. Once a transition drops off the bottom of the list it is gone. Second, a project save will clear the undo list. Third, large numbers of undo may affect performance as all that information needs to be held temporarily. Check it with some samples to see the effects in your environment with the types of changes you are going to make.

Posted on July 18, 2008 6:59 AM | Comments (3)

Microsoft Project Undo Levels and Macros

One of the new features of Project 2007 is that it allows more than one level of Undo. This is of great comfort to those of us who have made more than one error while working on a file. It also has a benefit for those who automate microsoft project with VBA or VSTO as typically there are many things done during the execution of a macro. In Project 2003 this often meant that macros were irreversible unless you somehow built your own log of the changes and then went back through it to restore things to their prior state.

Taking advantage of this new capability within a macro is easy. There are two methods you need to know:

```
Application.OpenUndoTransaction ("name of the transaction")

Application.CloseUndoTransaction
```

Use these to bracket the code you are going to run in your macro for example:

```
Sub renameTasks()
Application.OpenUndoTransaction ("rename tasks")
For Each Task In ActiveProject.Tasks
Task.Name = "foo"
Next Task
Application.CloseUndoTransaction
End Sub
```

Then when you click on the undo button, all of the changes within that transaction will be reversed in a single click. This is very valuable when you are making a very large number of changes - for example if you modified all of tasks in your macro.

You might be wondering what the transaction name is used for. It is the name which shows up when you click on the undo button, so make it as descriptive as possible. You could also use it if you want to go back to a certain place. To determine where the place is you can read the list of transactions in the undo list. Here is a code sample which shows a message box with all of the undo transactions. If you run it, you can see what you have done so far. Note that many of the names are not very useful for knowing what has been done as they don't include which task the change was made to. Still they offer enough breadcrumbs to see where you have been:

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Next i
MsgBox undoString
End Sub
```

Using the name of your transactions you can find out how far back you need to go to reverse the effects of your code even if the user has performed some steps in between. An example would be something like this:

```
Sub backToStart()
Application.OpenUndoTransaction ("very start")
'do lots of things to the file
Application.CloseUndoTransaction
Application.OpenUndoTransaction ("middle")
For Each Task In ActiveProject.Tasks
Task.Name = "foo"
Next Task
Application.CloseUndoTransaction
End Sub
```

You would then look through the list of transactions until you find the one with the name you like and then reverse that many transactions. It would be great if you could undo out of order, but I have not found any way of doing that. Just like a stack of cards, you have to take the top one off in order to get to the ones underneath.

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JULY 29, 2009

Iterating through Microsoft Project Subprojects

Master Projects in Microsoft Project don't always behave the way you expect, especially if you are trying to iterate through all the tasks in them. The reason is that the file doesn't really contain the subprojects, it merely acts as a shell to display them. So if you are writing some code which has to work on a master project you need to take this into account.

The simplest explanation is an example. The code below will start with a master project, then find the list of subprojects, open each one in turn and display a message box with the project name. You can of course do whatever you want with the subproject as soon as you have it open.

```
Sub openMySubProjects()
Dim sProj As Project
Dim mProj As Project
Set mProj = ActiveProject
For Each Subproject In mProj.Subprojects
FileOpen (Subproject.Path)
Set sProj = ActiveProject
MsgBox sProj.Name
'for each task in sProj...
'do things to the tasks in your subproject
'next task
Next Subproject
mProj.Activate
End Sub
```

A couple of things to note here. First, I'm using the `mProj` and `sProj` variables to reference the different projects I have open. We want to return to the master project at the end so I set `mProj` equal to the `ActiveProject` when we start and then return to it by calling `mProj Activate` at the end.

The second thing is that the subproject object only has a few properties. It is a reference to a project and not a project itself. We use the `Path` of the subproject to open the file that it is referring to and then use sProj to refer to that file once it is open. Just to be sure you get the point, subprojects point to the file, we are using a project variable to refer to that file when it is opened. You can't get typical project properties (not even `Name`) from subprojects. You only use the subproject object to get to the project.

It goes without saying that this is a trivial example. You should probably close it once you are done with it, and maybe even validate that it exists before you do anything with it, but I just wanted to make this as simple to follow as I possibly can.