Getting Started with Revit Macros

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Class summary

Take command of your software and learn to program! This lab will get you started with the Revit API and the VB.Net programming language. We’re going to cover the basics of programming and write some useful macros that automate tedious tasks in Revit.

Let’s get started!
At the end of this class, you will be able to:

- Explain the four different ways to automate repetitive tasks in Revit.
- Create your own custom macros in Revit using the Revit macro editor and the VB.Net programming language.
- Learn how to utilize resources from the Revit Software Development Kit to get more information about .NET and the Revit API.
- Understand how to structure your own macros using a step-by-step process to break complex problems into manageable tasks.
Work smarter, not harder.
Who am I?

ArchSmarter
Helping architects and designers work smarter, not harder
My Story
What I want for you
4 Ways to Automate Revit

- Dynamo
- Macros
- Add-ins
- Python Shell
Revit API

- Application
- Programming
- Interface
Programming Languages

- C#
- VB.Net
- Python
- Ruby

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Programming Languages

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Let’s get started

- Download Revit SDK
- Install on hard drive
- Revit API help file
- Macro samples

http://www.autodesk.com/developrevit
Learning the Revit API

- It’s a roadmap, not a narrative
- Namespaces
- Code samples
Revit Lookup

- Free Revit add-in
- Explore project via API
- Very useful!

Revit Coaster or www.archsmarter.com/lookup
Writing Macros

SharpDevelop

- Open-source
- Built into Revit
- Access from Manage > Macro Manager
- Can’t record macros like in MS Office
Where is the macro?

- Saved in RVT file
- Must open file to run macro
- Run using Macro Manager
- Different from add-ins
- Application vs project macros
Your first macro – Hello World
Element ID

- Unique ID for every object in the project
- ID is not unique across projects
- ID can change
Next Macro - Objectives

- Describe basic elements of programming
  - Subroutines and functions
  - Variables and lists
  - Conditional statements
  - Loops
- Use collectors to get elements in model
- Use Revit API to make changes to model
- Explain when to use a transaction
Delete Unused Views

Problem

- Your model is messy
- Lots of views and schedules that are not on sheets
- Can do this manually but...
  - Takes time
  - Easy to make mistakes
Delete Unused Views

Solution
Write a macro to automatically delete views not on a sheet
- Go through each view in the model
- Check if view is placed on a sheet
- If no - delete the view
- If yes - do nothing
Plan the Macro
Plan the Macro

1. Specify the model file
Plan the Macro

1. Specify the model file
2. Get all the views in the model
Plan the Macro

1. Specify the model file
2. Get all the views in the model
3. Loop through each view
Plan the Macro

1. Specify the model file
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4. Check if placed on a sheet
Plan the Macro

1. Specify the model file
2. Get all the views in the model
3. Loop through each view
4. Check if placed on a sheet
5. If no, delete view
Plan the Macro

1. Specify the model file
2. Get all the views in the model
3. Loop through each view
4. Check if placed on a sheet
5. If no, delete view
6. If yes, do nothing
Plan the Macro

1. Specify the model file
2. Get all the views in the model
3. Loop through each view
4. Check if placed on a sheet
5. If no, delete view
6. If yes, do nothing
7. Alert user which views deleted
Subs, Functions and Variables

- Subroutines do something
  - “Please close the door”
- Functions do something and return something back
  - “Please bring me a glass of water”
- Both subroutines and functions can accept arguments
  - “Please bring me a glass of water using this glass”
- Variables store values
  - Typed vs dynamic variables
Which model are you working on?

- Must specify which model file you are working on the macro’s model file
  or
  the active model file
- For macros, specify the active document
Collecting Revit Elements

- Use FilteredElementCollector
- Filter Document or View
- Can specify:
  - ByCategory
  - ByClass
- ByCategory can reference Revit’s built-in categories
- Can use filters
Collecting Revit Elements

- FilteredElementCollector
  - OfCategory
  - BuiltInCategory
  - OST_Views
Loops

- Execute the same code repeatedly
  - Specific group of elements
  - Specific # of times
  - While condition exists
  - Until condition occurs
Conditional Statements

- Evaluates a condition as true or false
- IF … ELSE statement
- Use ELSEIF (ELIF) for additional evaluations
- Can use AND, OR or NOT as part of statement
View Class

- View
  - IsTemplate
Viewport Class

- Viewport
  - CanAddViewToSheet
- Need to provide
  - Current document
  - Element ID of view
  - Element ID of sheet
Using Lists

- Collection of values or elements
- Access elements by their index
- Can easily sort and manipulate list
Transactions

- Needed anytime you make a change to the Revit model
- Locks the model while changes take place
- Revit throws an error if you try to change model without one
- Need to commit changes after change is made
- Location determines undo point
Debugging

- Print to the Output window
- Step into macros
- Use breakpoints
- Comment your code!
- Handle exceptions
Learn to Write Code

- Patience
- Persistence
- Trial and error
- Lots of resources available

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Additional Resources

- **Blogs**
  - ArchSmarter – [http://www.archsmarter.com](http://www.archsmarter.com)

- **Online Forums**

- **Online Courses**
  - Mastering Revit Macros – [http://learn.archsmarter.com](http://learn.archsmarter.com)
  - Learn to Program the Revit API - [https://www.udemy.com/revitapi/](https://www.udemy.com/revitapi/)

- **Books**
  - *Autodesk Revit 2013 Customization with .Net How-to* by Don Rudder
Mastering Revit Macros

- Online course
- Access anytime
- 8 step-by-step lessons in video format
- Revit macro template
- Use “AU2015” coupon for 20% off

http://learn.archsmarter.com
Thank You!

- Contact me
  - michael@archsmarter.com
  - @michaelkilkelly
Be heard! Provide AU session feedback.

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- AU 2016 passes awarded daily!
- Give your feedback after each session.
- Give instructors feedback in real-time.