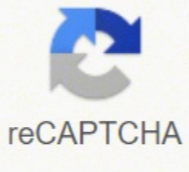




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Maya python scripting tutorial pdf

We have curated a set of free or almost free resources for someone wanting to learn right now, no matter your income level or ability. There are many ways to learn and we think these are some of the best resources for you. We hope you enjoyed the rigging resources and will find these scripting and programming links of help as you expand your skills and speed up your workflow. Remember even learning a little scripting can help you use the existing scripts and tools that are free online and help you start making your own when you find the need. If you are already scripting in Python and are ready to explore the API to make faster tools, the C++ resources will get you started. Python scripting in Maya/Python Scripting A simple tool or script with a few lines can save hours of repetitive work, start working smarter, not harder. The great thing is once you learn Python basics, it is used in many 3d applications and programming concepts are always helpful to any character TD, especially while rigging. Beginner Python for the Anxious CG Artist SERIES This series shows you how to learn the basics of Python Scripting for the CG / VFX. If you have ever been overwhelmed or discouraged by past attempts at learning scripting and python, this is for you! Introduction to Python Scripting in Maya Sometimes Autodesk learning puts out very clear and helpful content like this introduction to the basics of Python Scripting series. Here is an example from our Python Class Mentor on how to automate rigging a leg using python in Maya. Re-post: Mentor Ryan Griffin Python Leg Rigging in Maya This is a re-post from the blog of our mentor, Ryan Griffin. Griffin animation: Leg Rigging in Maya If you want to build a more robust scripted rigging system and understand how to do this with his help. Complete Maya Python API course for Artists and Technical Artist. After a successful run of this course for many years on CGCircuit and trusted by hundreds of industry professional, I published this course on YouTube for free. This program is designed for students and professionals including Artists, Technical Artists and Engineers who want to learn plugin writing using Maya python and understand the technical side of Maya. In this video series we will start with very basic fundamental of Maya API and then we will move to the beginners concepts like : like accessing and modifying the attributes of different type of objects in Maya which a Technical Artist uses in their tools almost on the daily basis and your tools are a lot faster when you are using API instructions , then we will move towards learning about custom commands - using which we will create our own Maya commands, iterators, deformer, callbacks, locators and during this we will also create different sets of tools eg. Custom locator sets for character rigs, Particle-Vfx custom command, API- IK-FK seamless switching etc. Why Maya-Python? Python is used by every industry these days, whether it is a gaming, animation or visual effects industry. The efficiency of prototyping python tools has been proven as one of the best! Technical artists, artists and engineers quickly write, prototype python scripts to prove their tools. Most of the pipelines in the industries are written in Python. Chayan Vinayak is a great quick overview of scripting with Python from Chad. Visual code and compounds Bitrost has continued to grow in functionality. While many of the core programming concepts will apply like looping and variables, this is a visual way to create tools and results that are easy to experiment with and are much faster than a python plugin and almost as fast as a full compiled C++ plugin without having to leave Maya. Bitrost Basics and Resources Autodesk Bitrost finally released and here is a quick gathering of resources that have been flying around on different social platforms. Maya API and C++ coding When you are ready to expand what you can do from Python into more low level control over Maya that is as fast as possible when creating complex results or working with heavy data then the API using C++ is where you will go next. There are many great examples of Maya artists taking their ideas for better tools and creating free or paid plugins that help everyone and the way to do that is with the API. Compiling Plugins Not wanting to write a plugin? No problem, you might have found a free plugin online but need to compile it for your version of Maya, we have some help for that. Free Maya API Training eBook Free Compile plugins for Maya eBook Check out this free eBook guide Making Plugins for Maya from our API mentor Marco where you will learn how to build the toHarmonciDefomer from the the open source "Dem Bones" skinning decomposition tool from EA While we linked you to Cult of rig for rigging, he covers many programming concepts and the API as well and we wanted to make sure you didn't miss that content. One more option for learning about compiling plugins is from Chad Vernon (who is coming up next) on how to use cmake to compile Maya plugins. Chad Vernon recently converted his paid courses on programming the Maya API over to free and they are a great resource. Creating a custom jiggle deformer Writing a production ready skin exporter * His applied 3d math is a good companion for helping understand the Cult of Rig videos. We hope you found this helpful and hope it will save you and or your team time and money once you apply your newly learned coding skills to your daily work. Need more? Register now for mentor led instruction Related We use cookies to make interactions with our websites and services easy and meaningful. For more information about the cookies we use or to find out how you can disable cookies, click here. You have disabled non-critical cookies and are browsing in private mode. For the best possible experience on our website, please accept cookies. For additional details please read our privacy policy. Python has many useful built-in libraries and data structures. In most cases, there is an existing library that can be used for general programming tasks, which obviates the need to create custom utilities as in the case of MEL scripts. Documentation of the built-in Python libraries can be found at . This site also provides a good introductory tutorial for general Python programming. One handy Python function is functools.partial, which can be used to pass extra information to a callback function. For example, the following class creates a window with several buttons that print a number when clicked on: from functools import partial import maya.cmds as cmds class ButtonWin(object): def __init__(self): self.win = cmds.window() self.layout = cmds.columnLayout(parent=self.win) for x in range(10): cmds.button(label="Click Here %d"%x, parent=self.layout, command=partial(self.report,x)) cmds.showWindow() def report(self,buttonIndex,value): print "button %d got %s"%(buttonIndex,value) f = ButtonWin() One advantage of using Python scripts is the availability of debuggers for use during the development process. This can save a lot of time when troubleshooting a scripting problem. Python comes with a built-in debugger in the pdb module. pdb has a text interface which is adequate for quick debugging sessions. If pdb is used in a script which is invoked from the Script Editor, an input dialog box appears whenever pdb needs input. Using pdb is as simple as importing it, and then setting a breakpoint as follows: import pdb pdb.set_trace() When execution reaches the second line, the input dialog appears and you can use standard commands to continue, step-into, print values, and so forth. Full documentation for pdb can be found on . For complicated debugging tasks, it is probably easier to use an external graphical debugger. There are several free and commercial IDEs, such as: External debuggers are used by first importing a utility module inside Maya, which opens a communication socket to the IDE. Once the IDE is connected to Maya, you can open your script files to set breakpoints, inspect variable values and so on. Each IDE will have its own required workflow; for details, consult its documentation. To start a debugging session of a Maya Python script with Wing IDE 3.1 in Windows, do as follows: Copy wingdbstub.py from the Wing IDE installation directory into the Maya Python script path. For example, copy C:\Program Files (x86)\Wing 3.1\wingdbstub.py to C:\Users\yourname\Documents\maya\scripts Ensure that Enable Passive Listen is checked in Wing IDE > Edit > Preferences > Debugger to allow connection from external processes. Windows may pop up a dialog box asking for authorization to open a communication port. You should allow this. Start Maya, and ensure your Python script can be imported successfully and run. In Wing IDE, open up the same script. Set a breakpoint using F9 or by clicking in the leftmost margin. In Maya, execute the Python statement import wingdbstub Windows may pop up another authorization dialog box asking for authorization. You should allow this. Check back in Wing IDE; the status indicator in the lower left of the main Wing IDE window should be green. This indicates that the remote debugging connection has been established, and that Maya is running. In Maya, call the Python function that contains your breakpoint. When that breakpoint is reached, the status indicator turns yellow to indicate that Maya has been paused. A red line highlights the next line of code to be executed. Now you can use all the debugging features of Wing IDE to examine the state of your program. Press F5 or the green play button to return control to Maya. Note: For more details on how to use Wing IDE, see its Help documentation. You can use the createMelWrapper function to register a Python function as a MEL procedure. Then, when the MEL procedure is invoked, it calls the Python function, passing any arguments it receives and returning the function's result. For more information regarding this function, refer to the melutils.py file in the ..\Python\libs\site-packages\maya\mel folder of your Maya installation directory. Or, execute the following in the Script Editor: import maya.mel help(maya.mel.createMelWrapper) Advantages of using this function: By registering your Python function as a MEL procedure, you do not need to source the MEL script if the procedure and the script share the same name. By comparison, if you are using Python, you must import the script explicitly before you can access the functions or classes it contains. Using this wrapper function allows Maya to source on the fly and not have to have every script available loaded at all times. Some attributes in Maya only accept MEL procedures. For example, in the asset (formerly container) node, the Rmb Command attribute under the Context Properties section only accepts MEL procedures. The following is an example of how to use the createMelWrapper function to register a Python function as a MEL procedure in order to use the Rmb Command attribute in the asset (formerly container) node. Save the following as rmbScript.py in the scripts directory of your preferences folder: import maya.cmds as cmds import maya.mel as mel def exCoNotes(node): if(cmds.nodeType(node)=='container'): objCont = node else: objCont = cmds.container(q=True, findContainer=node) exec(cmds.getAttr(objCont+'.notes')) pyfunction = 'main("+node+"."+objCont+")' exec(pyfunction) cmds.select(node, r=True) def setThisContainerCurrent(node): if(cmds.nodeType(node)=='container'): objCont = node else: objCont = cmds.container(q=True, findContainer=node) cmds.container(objCont, e=True, c=True) cmds.select(node, r=True) def rmbMyContainerScript(): return ("Execute Container Notes", "exCoNotes", "Set This Container Current", "setThisContainerCurrent") Execute the following from a Python tab in the Script Editor. This will create the MEL wrapper scripts needed: from rmbScript import * import maya.cmds as cmds import maya.mel as mel mel.createMelWrapper(rmbMyContainerScript, retType='string') mel.createMelWrapper(exCoNotes) mel.createMelWrapper(setThisContainerCurrent) Create an object. Select Assets > Advanced Assets > Create and add rmbMyContainerScript to the asset's Rmb Command attribute. Note: You can also use this step with Assets with Transform; however, the node type would be dagContainer instead. Add something similar to the following to the asset node's Notes section: def main(node, container): print node print container Enter in the MEL tab in the Script Editor: rehash; Right-click your object and select Custom from the marking menu. You can now see your custom right-mouse-button menu. See Assign a custom command or menu to an asset for more information. You can use this Python example script to create an animated curve and set its key frames: import maya.OpenMaya as om import maya.OpenMayaAnim as oma def addkeys(pluginName, times, values, changeCache): # Get the plug to be animated. sel = om.MSelectionList() sel.add(pluginName) plug = om.MPlug() sel.getPlug(0, plug) # Create the animCurve. animfn = oma.MFnAnimCurve() animCurve = animfn.create(plug, oma.MFnAnimCurve.kAnimCurveTL) # Copy the times into an MTimeArray and the values into an MDoubleArray. timeArray = om.MTimeArray() valueArray = om.MDoubleArray() for i in range(len(times)): timeArray.append(om.MTime(times[i], om.MTime.uUnit())) valueArray.append(values[i]) # Add the keys to the animCurve. animfn.addKeys(timeArray, valueArray, oma.MFnAnimCurve.kTangentGlobal, oma.MFnAnimCurve.kTangentGlobal, False, changeCache) The sample code above adds keyframe animation to a channel (in other words, a plug). If you do not need to be able to undo the change, you can call it as follows: addkeys('pCube1.tx', [1.0, 3.0, 5.0], [0.6, 1.2, 2.4], changeCache) and then do the following to undo the changes: changeCache.undoIt() Note: For simplicity, this function assumes the plug specified by pluginName is not currently animated. It is left as an exercise for you to add the checks required to make that assumption unnecessary. When using the dgInfo command to obtain information about the DG, you may see information messages such as DIRTY BLOCK, DIRTY PROP and so forth. You can do this in a Python script using API calls. The following demonstrates how you would register a new user event type called myEvent: import maya.OpenMaya as om om.MUserEventMessage.registerUserEvent('myEvent') To have a function called myFunc execute whenever the event occurs, do as follows: def myFunc(data): print('Got a myEvent event!') callbackId = om.MUserEventMessage.addUserEventCallback('myEvent', myFunc) To send a myEvent event, do as follows: om.MUserEventMessage.postUserEvent('myEvent') To remove the callback function when done, do as follows: om.MUserEventMessage.removeCallback(callbackId)

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