Python Console by tools

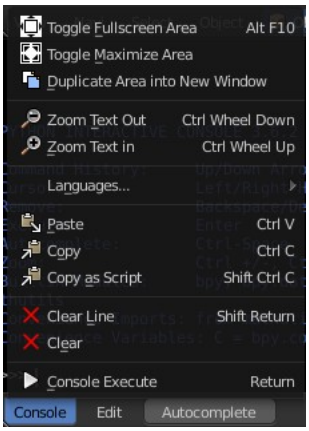
Python Console

The Python console is a quick way to execute commands, with access to the entire Python API, command history and auto-complete. It's a research tool for addon- and script developers. But also a place to quickly

execute single operators or to try out some simple code.

Console Menu

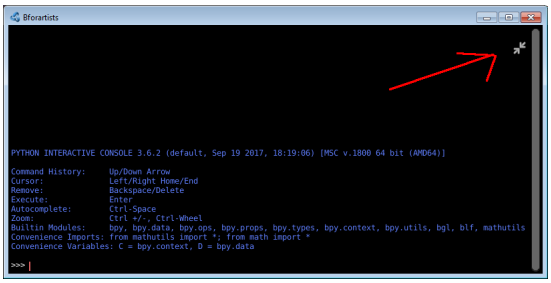
The Console menu provides some console editor window specific functionality.



Toggle Full screen Area

Displays the editor maximized without menus.

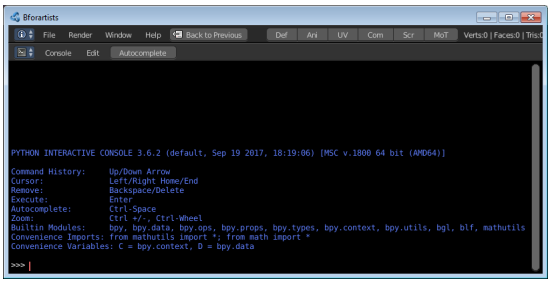
To return from the full screen view press hotkey Alt F10, or use the little button that appears up right when you move the mouse in this corner.



Toggle Maximize Area

Displays the editor maximized with menus.

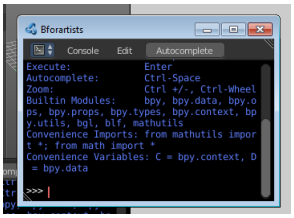
To return to previous view press hotkey Ctrl Up Arrow, or reuse the menu item in the View menu.



Duplicate Area into new Window

Duplicate Area into New Window makes the selected editor window floating. You can then drag it around at the monitor.

A separated window cannot be merged into the main window again. You have to close it when not longer needed.

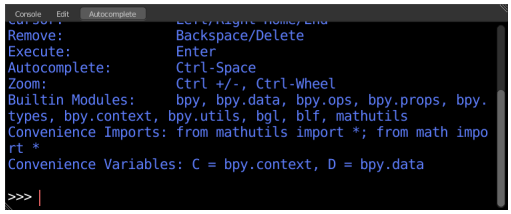


Zoom Text Out

Zooms out the text in the console window.

Zoom Text In

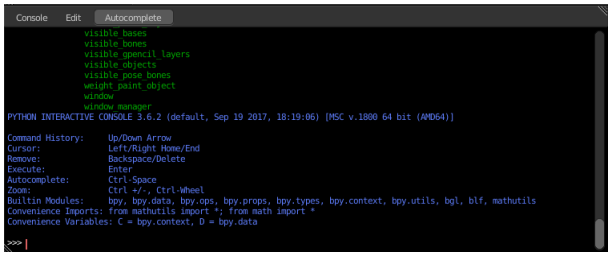
Zooms in the text in the console window.



Languages

Languages is a sub menu where you can choose the language.

This menu looks pretty uselesss, since there is just one language available. But it has its useage. With a click at the Python button you can restart the console when you have lost yourself in the deeps of the api.



Paste

Pastes copied content

Copy

Copies selected content.

Copy as Script

Copies the whole content of the console as a script that can be pasted into the Text editor.

Clear Line

Clears the selected line(s)

Clear

Clears all lines. The blue help text remains.

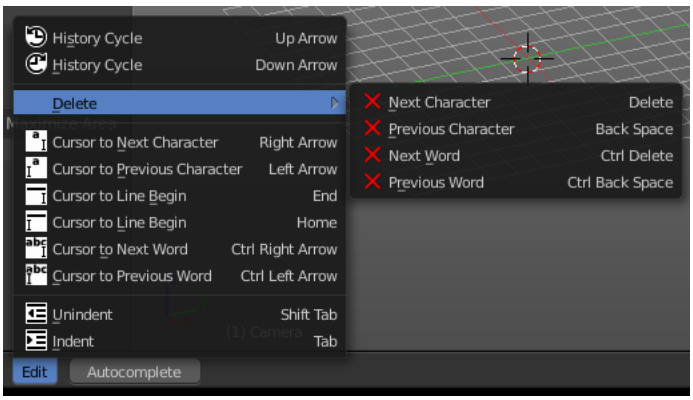
Console Execute

The expressions in the python console are not read only. You can execute them like you would do from a script.

This button executes a selected command.

Edit Menu

The Edit menu provides you with text specific functionality. Its content should be used by hotkeys. The menu is more to show that this functionality exists.



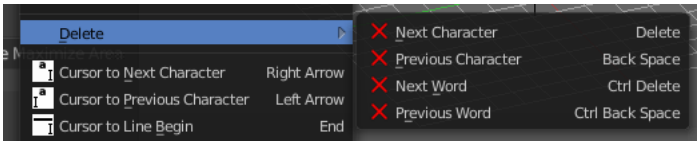
History Cycle

Cycles through the history. Up arrow cycles forwards through the history.

Down arrow cycles backwards through the history.

What does this mean? When you write some text, then add something more, delete something, then all this steps are entries in the history. And with History cycle you can access this steps.

Delete



Delete is a sub menu with several delete methods.

Next character

Deletes the character beyond the caret.

Previous Character

Deletes the character before the caret.

Next Word

Deletes the word beyond the caret.

Previous Word

Deletes the word before the caret.

Cursor to Next character

Sets the caret in front of the next character.

Cursor to Previous Character

Sets the caret in front of the previous character.

Cursor to Line End

Sets the caret to line end.

Cursor to Line Begin

Sets the caret to line begin.

Cursor to Next word

Sets the caret in front of the next word.

Cursor to Previous word

Sets the caret in front of the previous word.

Unindent

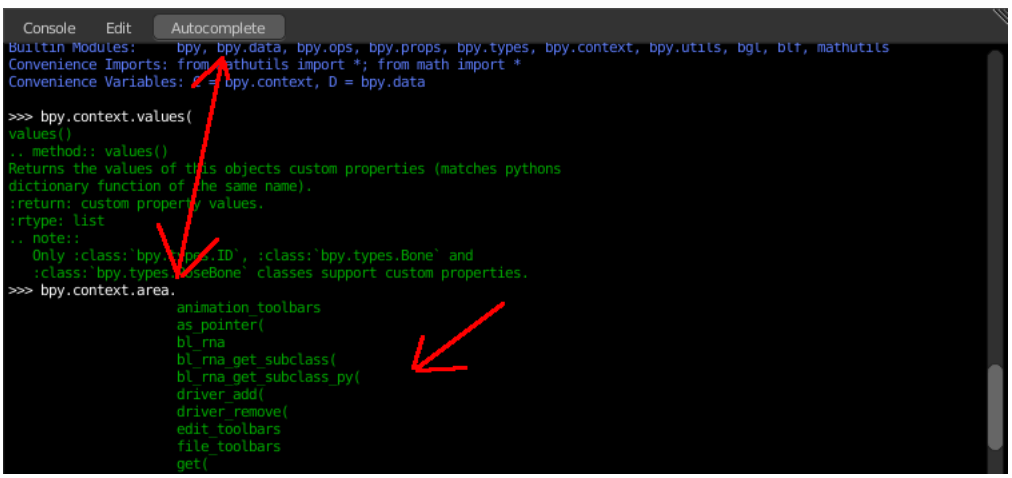
Removes indention of the selected text.

Indent

Indents the selected text.

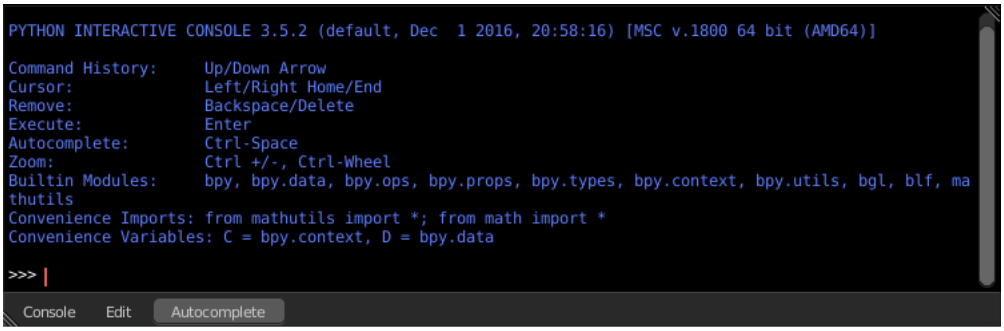
Autocomplete

Autocomplete is a functionality to autocomplete what you have written in the console. It lists for example all available bpy operators when you type in bpy.context.area. , and then hit the Autocomplete button. That way you can go through the whole bpy hierarchy down to what you need for your code, starting with bpy. , and having a look at what is available.



Usage

Accessing Built-in Python Console

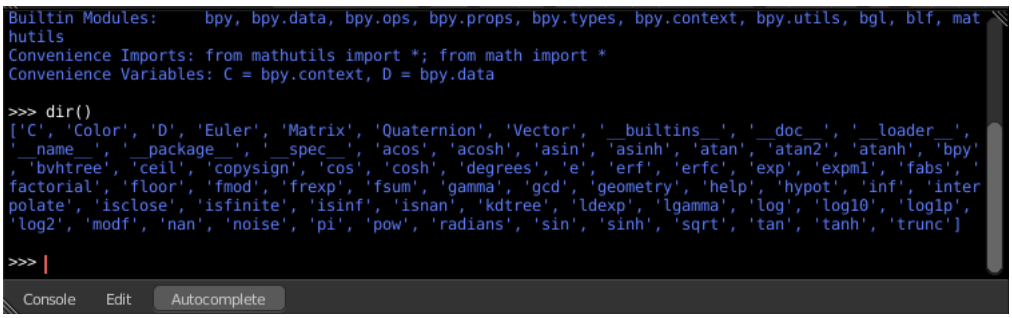


From the screen shot above, you will notice that by clicking at the Autocomplete button you can enable Auto-complete feature.

The command prompt is typical for Python 3.x, the interpreter is loaded and is ready to accept commands at the prompt >>>

First look at the Console Environment

To check what is loaded into the interpreter environment, type dir() at the prompt and execute it.



Following is a quick overview of the output

C
: Quick access to `bpy.context`

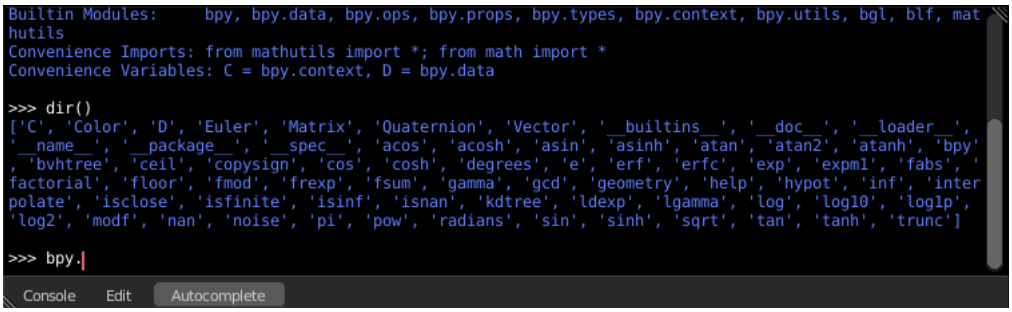
D
: Quick access to `bpy.data`

bpy
: Top level Bforartists Python API module.

The rest of the commands are of various content. Most of them are mathematical expressions.

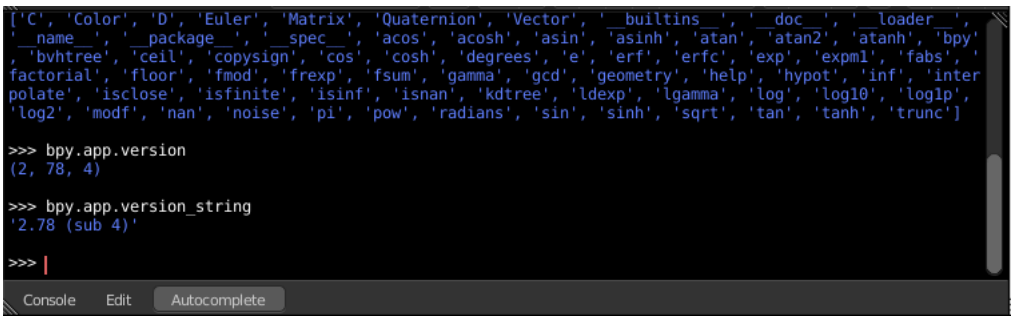
Auto Completion at work

Now, type bpy. and then press the Autocomplete button, and you will see the Console auto-complete feature in action.



You will notice that a list of sub-modules inside of bpy appear. These modules encapsulate all that we can do with Bforartists Python API and are very powerful tools.

Lets list all the contents of bpy.app module.



Notice the green output above the prompt where you enabled auto-completion. What you see is the result of auto completion listing. In the above listing all are module attribute names, but if you see any name end with ‘(‘, then that is a function.

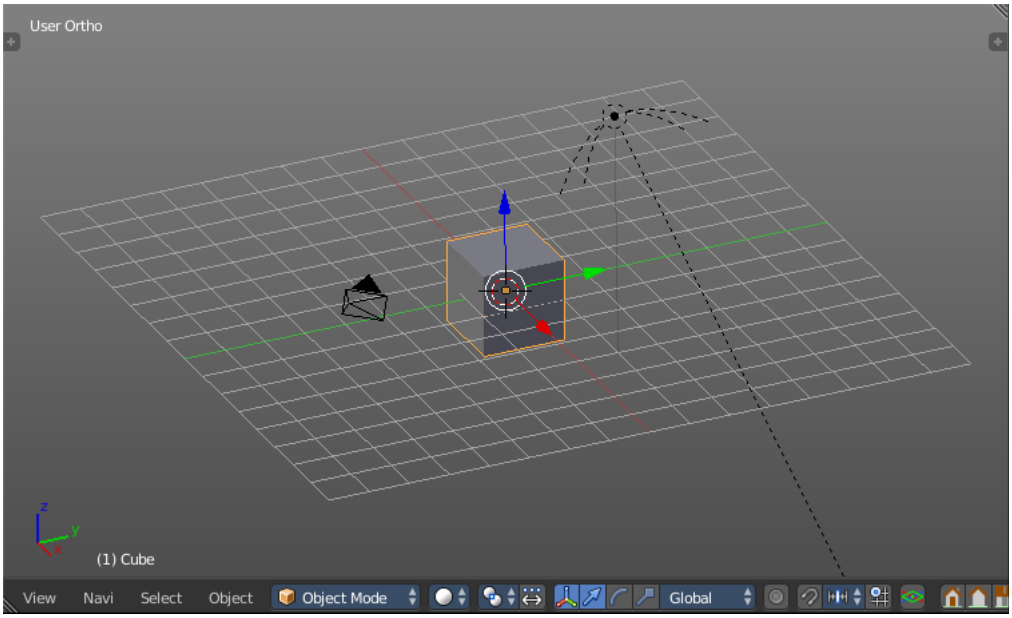
We will make use of this a lot to help our learning the API faster. Now that you got a hang of this, lets proceed to investigate some of modules in bpy.

Before tinkering with the modules..

If you look at the 3D Viewport in the default Bforartists scene, you will notice some objects. We have added a cube here too.

- All objects exist in a context and there can be various modes under which they are operated upon.
- At any instance, only one object is active and there can be more than one selected objects.
- All objects are data in the Bforartists file.
- There are operators/functions that create and modify these objects.

For all the scenarios listed above (not all were listed, mind you..) the bpy module provides functionality to access and modify data.

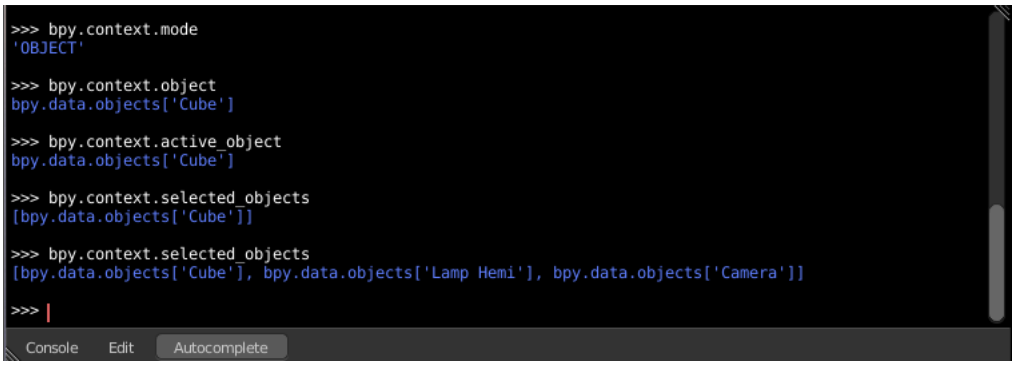


Examples

Note

For the commands below to show the proper output, make sure you have selected object(s) in the 3D view.

bpy.context



Try it out!

bpy.context.mode
: Will print the current 3D View mode (Object, Edit, Sculpt etc.,)

bpy.context.object or bpy.context.active_object
: Will give access to the active object in the 3D View

```
>>> bpy.context.object.location.x = 1
```

Change x location to a value of 1

```
>>> bpy.context.object.location.x += 0.5
```

Move object from previous x location by 0.5 unit

```
>>> bpy.context.object.location = (1, 2, 3)
```

Changes x, y, z location

```
>>> bpy.context.object.location.xyz = (1, 2, 3)
```

Same as above

```
>>> type(bpy.context.object.location)
```

Data type of objects location

```
>>> dir(bpy.context.object.location)
```

Now that is a lot of data that you have access to

bpy.context.selected_objects
Will give access to a list of all selected objects.

```
>>> bpy.context.selected_objects
```

... then press `Ctrl-Spacebar`

```
>>> bpy.context.selected_objects[0]
```

Prints out name of first object in the list

```
>>> [object for object in bpy.context.selected_objects if object != bpy.context.object]
```

Complex one... But this prints a list of objects not including the active object

---

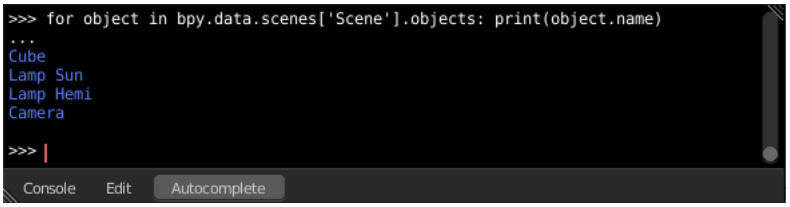
bpy.data

`bpy.data` has functions and attributes that give you access to all the data in the Bforartists file.

You can access following data in the current Bforartists file: objects, meshes, materials, textures, scenes, screens, sounds, scripts, ... etc.

That’s a lot of data.

Try it out!



Exercise

```
>>> for object in bpy.data.scenes['Scene'].objects: print(object.name)
```

`Return` twice Prints the names of all objects belonging to the Bforartists scene with name “Scene”

```
>>> bpy.data.scenes['Scene'].objects.unlink(bpy.context.active_object)
```

Unlink the active object from the Bforartists scene named ‘Scene’

```
>>> bpy.data.materials['Material'].shadows
```

```
>>> bpy.data.materials['Material'].shadows = False
```

---

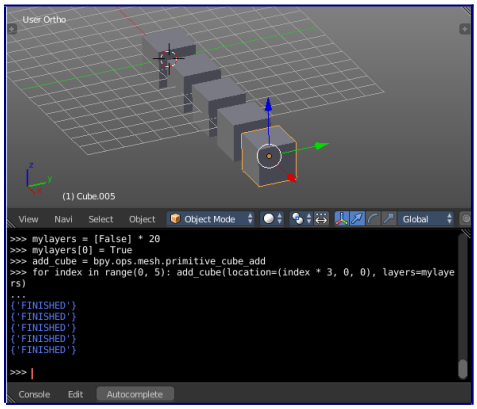
bpy.ops

The tool/action system in Bforartists is built around the concept of operators. These operators can be called directly from console or can be executed by click of a button or packaged in a python script. Very powerful they are..

For a list of various operator categories, click here

Lets create a set of five Cubes in the 3D Viewport. First, delete the existing Cube object by selecting it and pressing `X`

Try it out!



The following commands are used to specify that the objects are created in layer 1. So first we define an array variable for later reference:

```
>>> mylayers = [False] * 20
>>> mylayers[0] = True
```

We create a reference to the operator that is used for creating a cube mesh primitive

```
>>> add_cube = bpy.ops.mesh.primitive_cube_add
```

Now in a for loop, we create the five objects like this (In the screenshot above, I used another method) Press ENTER-KEY twice after entering the command at the shell prompt.

```
>>> for index in range(0, 5): add_cube(location=(index * 3, 0, 0), layers=mylayers)
```