help()

A Gtk GUI that provides the REPL help()

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8 August 2022

help()

REPL - Python interactive interpreter

Read: take user input.

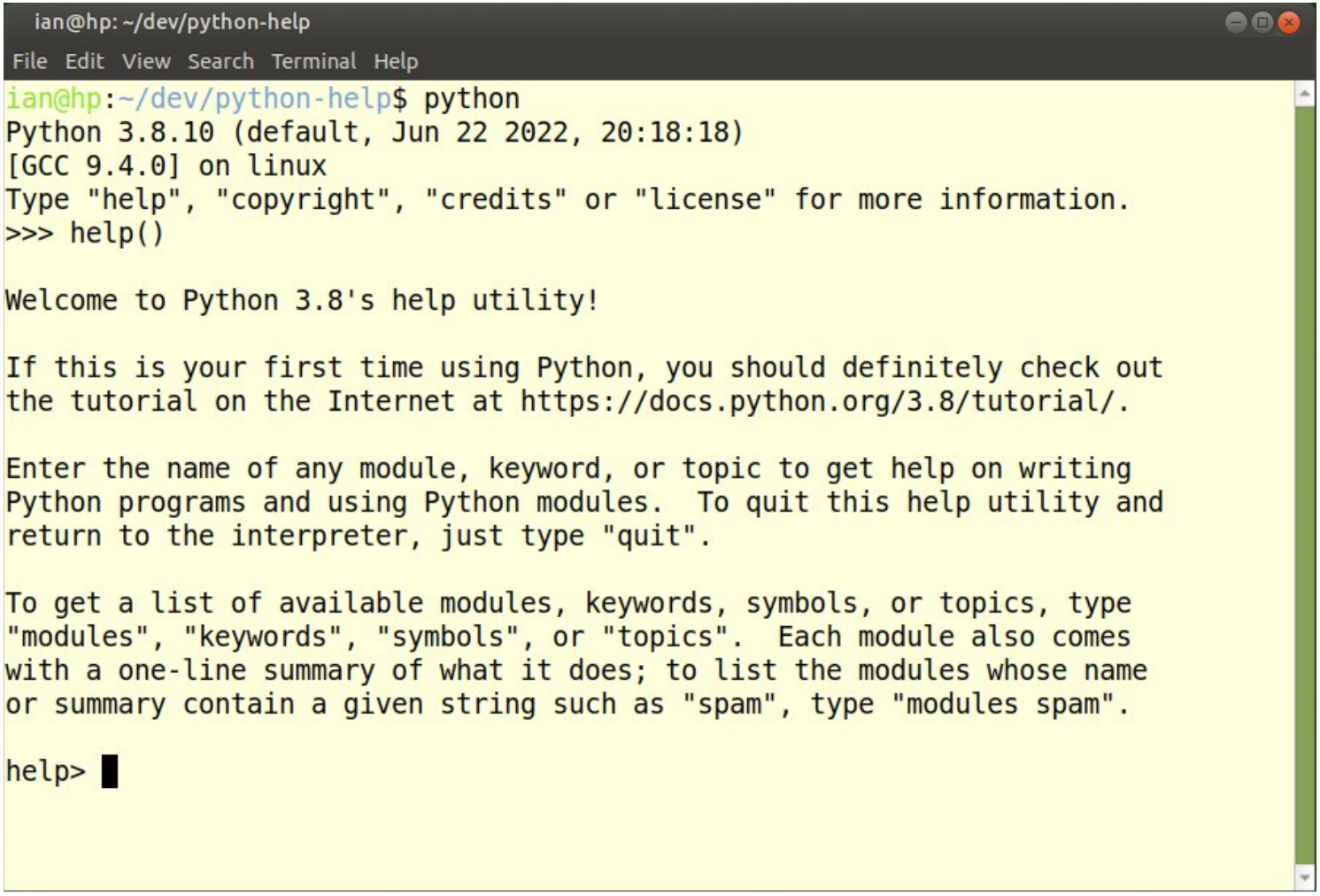
Eval: evaluate the input.

Print: shows the output to the user.

Loop: repeat.

```
$ python
Python 3.8.10 (default, Jun 22 2022, 20:18:18)
[GCC 9.4.0] on linux
Type "help", "copyright", "credits" or "license" for more info
>>> help()
```

>>> help()
Help categories: Modules, Keywords, Symbols, Topics



Help() utility - Recommends

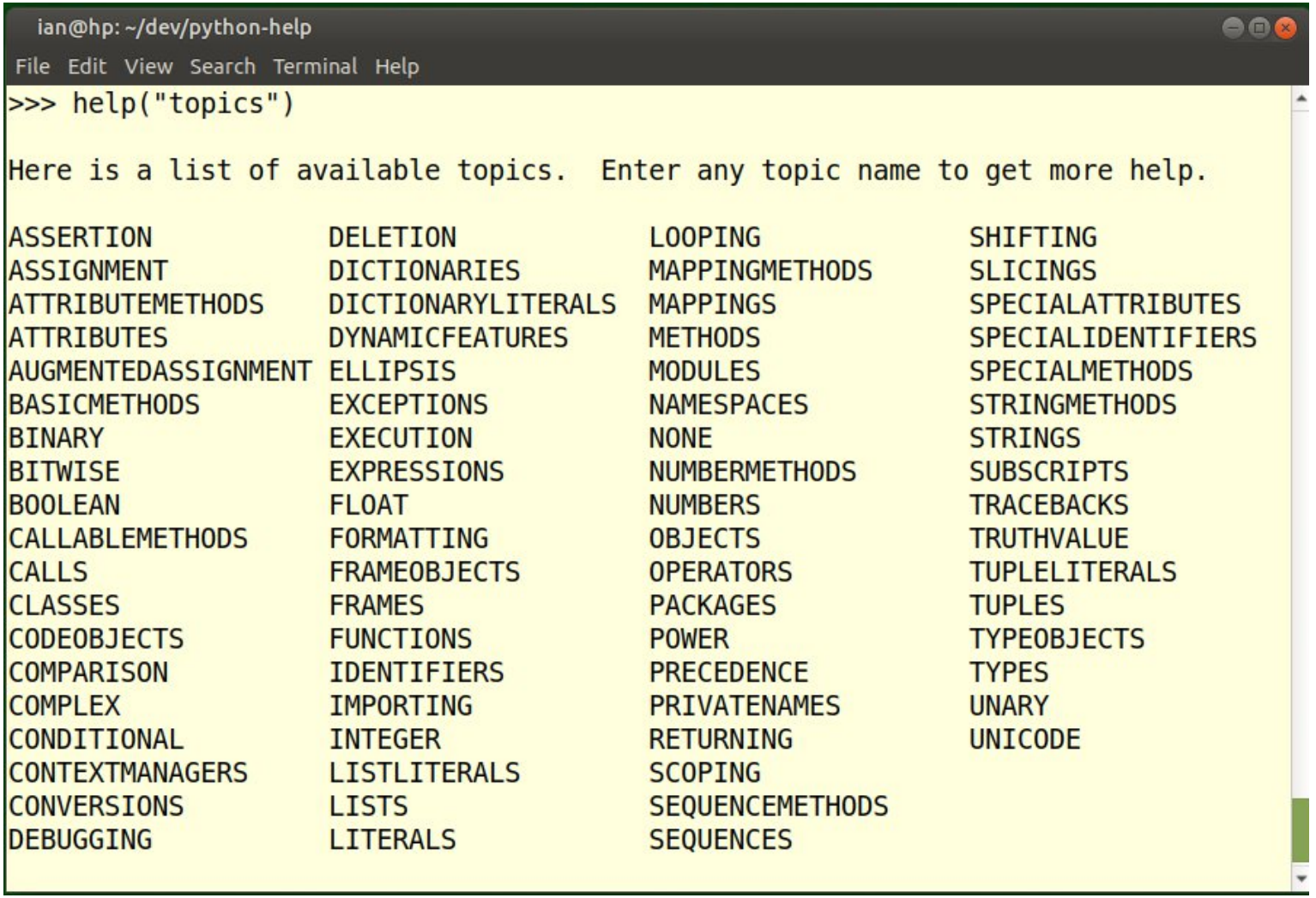
Tutorial: https://docs.python.org/3.8/tutorial/

Categories from which to obtaining lists of help available:

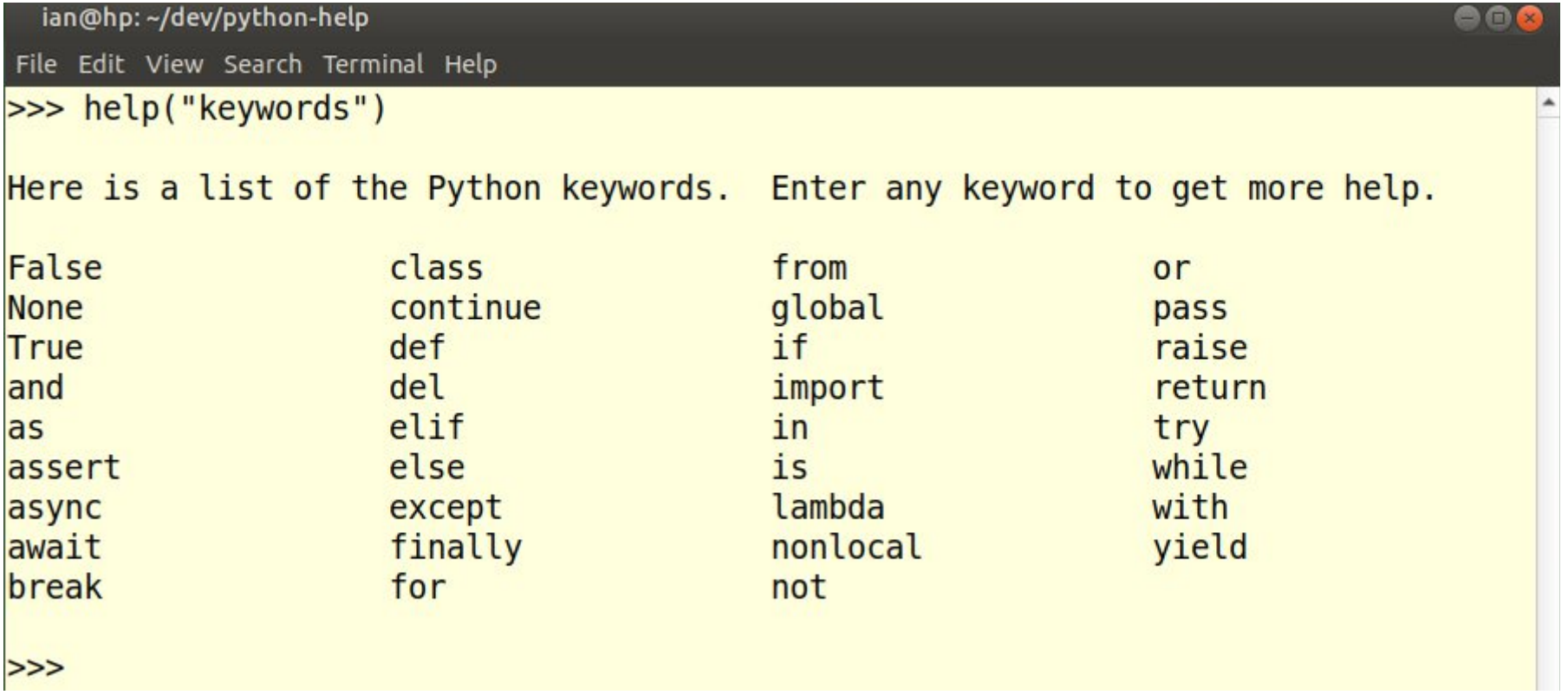
- Keywords
- Symbols
- Topics
- Modules

To quit this help utility and return to the interpreter, just type "quit".

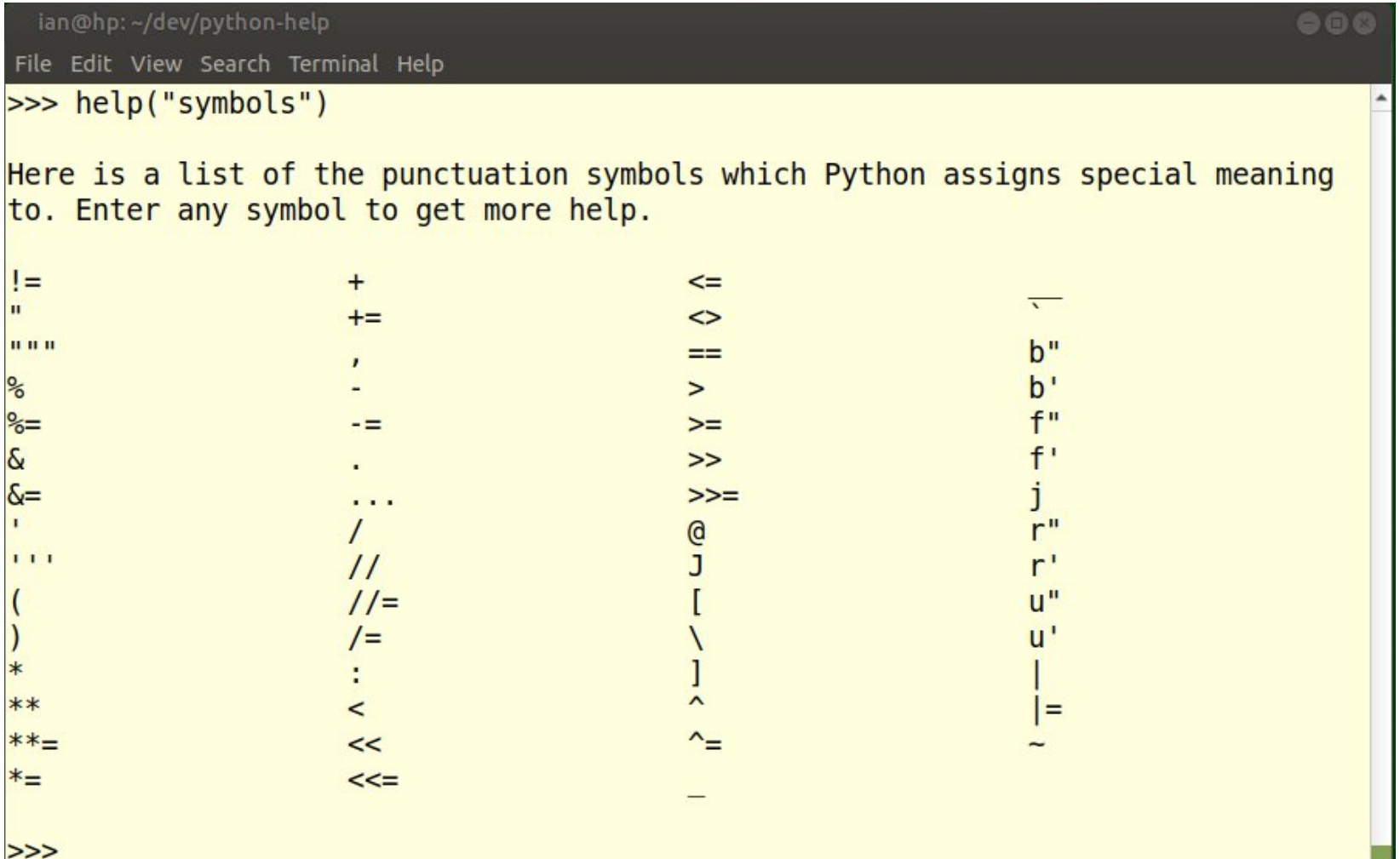
help("topics")


ian@hp: ~/dev/python-help
File Edit View Search Terminal Help
>>> help("topics")
Here is a list of available topics. Enter any topic name to get more help.
ASSERTION DELETION LOOPING SHIFTING
ASSIGNMENT DICTIONARIES MAPPINGMETHODS SLICINGS
ATTRIBUTEMETHODS DICTIONARYLITERALS MAPPINGS SPECIALATTRIBUTES
ATTRIBUTES DYNAMICFEATURES METHODS SPECIALIDENTIFIERS
AUGMENTEDASSIGNMENT ELLIPSIS MODULES SPECIALMETHODS
BASICMETHODS EXCEPTIONS NAMESPACES STRINGMETHODS
BINARY EXECUTION NONE STRINGS
BITWISE EXPRESSIONS NUMBERMETHODS SUBSCRIPTS
BOOLEAN FLOAT NUMBERS TRACEBACKS
CALLABLEMETHODS FORMATTING OBJECTS TRUTHVALUE
CALLS FRAMEOBJECTS OPERATORS TUPLELITERALS
CLASSES FRAMES PACKAGES TUPLES
CODEOBJECTS FUNCTIONS POWER TYPEOBJECTS
COMPARISON IDENTIFIERS PRECEDENCE TYPES
COMPLEX IMPORTING PRIVATENAMES UNARY
CONDITIONAL INTEGER RETURNING UNICODE
CONTEXTMANAGERS LISTLITERALS SCOPING
CONVERSIONS LISTS SEQUENCEMETHODS
DEBUGGING LITERALS SEQUENCES

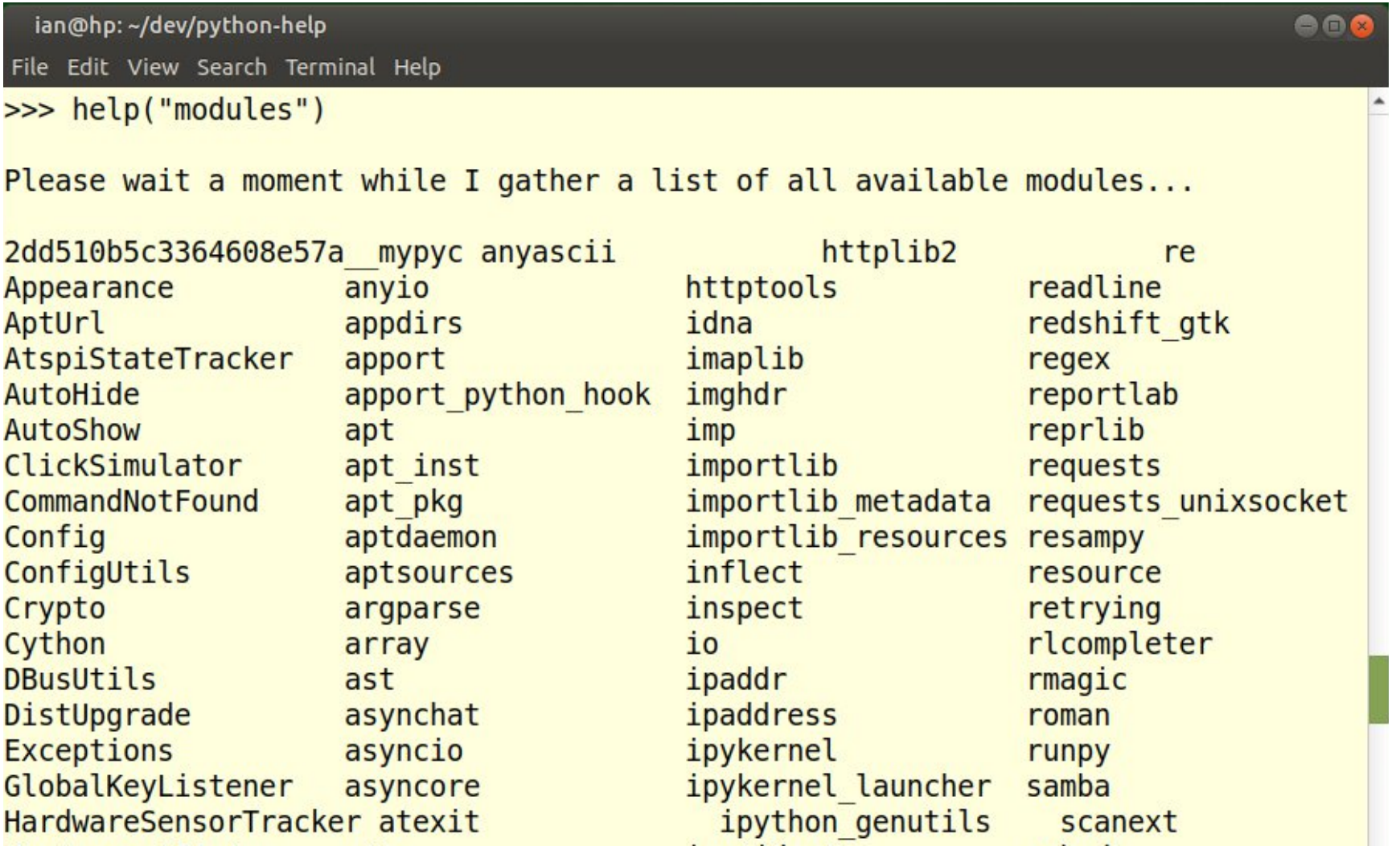
help("keywords")



help("symbols")



help("modules") – Beginning section...



help("modules") – Ending section...

ian@hp: ~/dev/python-help

File Edit View Search Terminal Help

```
_testcapi           gruut_lang_de       pylab               xapp
_testimportmultiple gruut_lang_en       pymacaroons         xattr
_testinternalcapi   gruut_lang_es       pynndescent         xdg
_testmultiphase     gruut_lang_fr       pyparsing           xdrlib
_thread             gruut_lang_it       pypinyin            xkit
_threading_local    gruut_lang_nl       pypredict           xml
_tkinter            gruut_lang_pt       pyrsistent          xmlrpc
_tracemalloc        gruut_lang_ru       pysbd               xxlimited
_uuid               gruut_lang_sv       python-help-gui     xxsubtype
_version            gzip                python-help-gui-full yaml
_warnings           h11                 python-help-gui_no_module youtube_dl
_weakref            hashlib             python-help-gui_original zipapp
_weakrefset         heapq               pytz                zipfile
_xxsubinterpreters  hexdump             pytz_deprecation_shim zipimport
_xxtestfuzz         hmac                pyworld             zipp
_yaml               hpmudext            pyximport           zlib
abc                 html                queue               zmq
aifc                html5lib            quopri
antigravity         http                random

Enter any module name to get more help.  Or, type "modules spam" to search
for modules whose name or summary contain the string "spam".
```

help()

Examples of obtaining Help from the four categories...

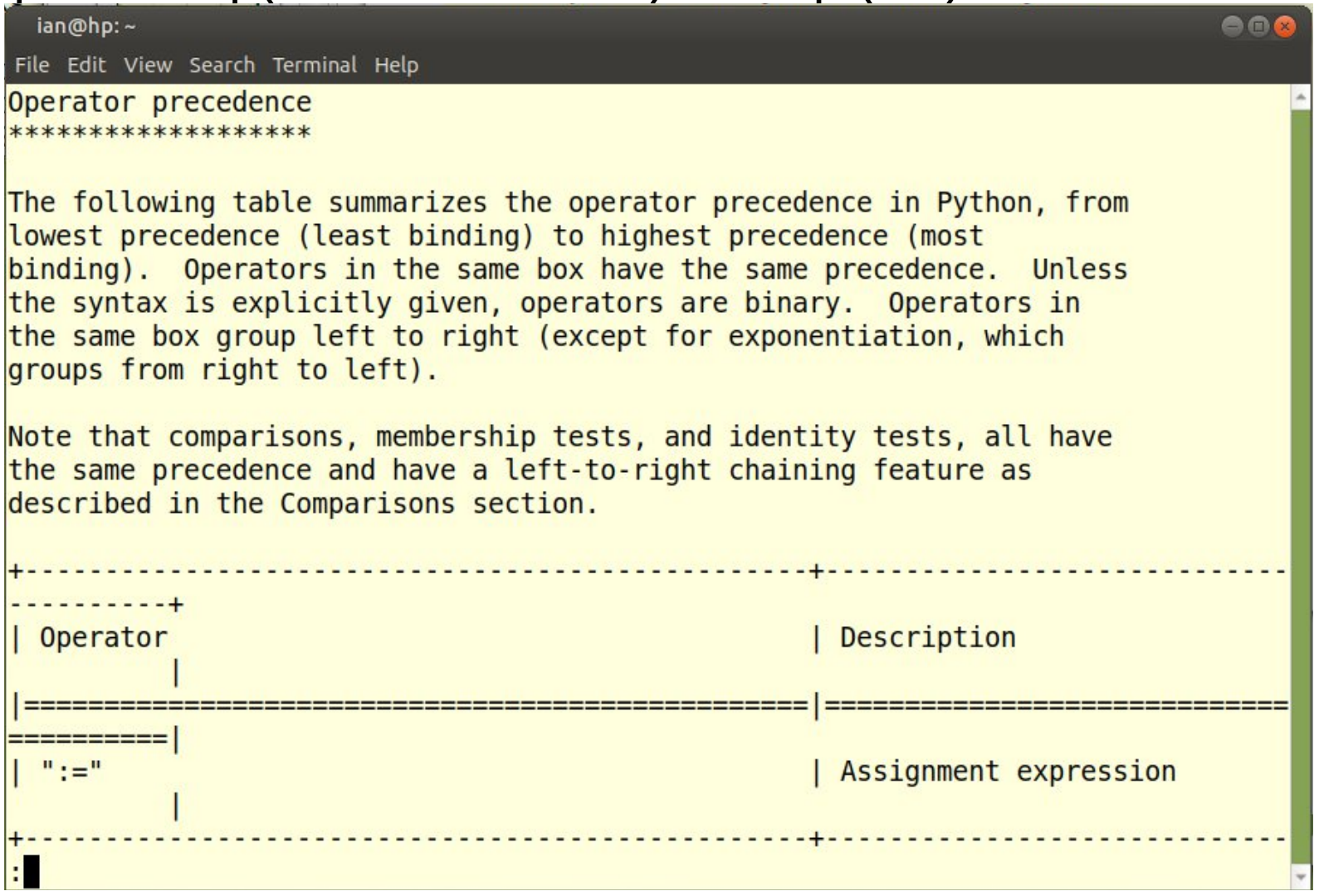
```
>>> help("OPERATORS")  # topic from 73 topics

>>> help("+")  # symbol from 59 symbols

>>> help("break")  # keyword from 35 keywords

>>> help("sys")  # module from 500+ modules
```

Example of help("OPERATORS") or help ("+")



Objective: Write a GUI help() using GTK3

Programming steps:

- Get >>> help() on each of the four categories.
- Output each category with its 4 column lists to a temp file.
- Read back the temp file to a buffer.
- Filter out pre and post amble text.
- Extract the data from the four columns into a single list.
- Sort the data alphabetically
- Store the data in a “help” dictionary.

- Launch a *GTK.Window*
- Add a Scrolled *TextView* widget to display the help information
- Add a Scrolled *TreeView* widget to display the categories.
- Use a *TreeStore* to hold the “help” dictionary.

Writing a category to a temp file using the contextlib module .

```
import contextlib
```

```
def write_help(func, out_file):
    """
    Write the output of help() to a file.
    Usage example: write_help(int, 'integer_info.txt')
    Requires: contextlib
    """
    with open(out_file, 'w') as f:
        with contextlib.redirect_stdout(f):
            help(func)


def create_help_files():
    """
    Use python help to output files that contain the help topics.
    """
    write_help("keywords", 'keywords.txt')
    write_help("topics", 'topics.txt')
    write_help("symbols", 'symbols.txt')
    write_help("modules", 'modules.txt')
```

Avoiding writing to a temp file by using the io.StringIO module.

```
import contextlib
from io import StringIO
```

```
def get_help(func):
    """
    Write the output of help() to a text buffer and return as text string.
    Usage example: get_help("float")
    Requires: contextlib and io.StringIO
    """
    output = StringIO()
    with contextlib.redirect_stdout(output):
        help(func)
    contents = output.getvalue()
    output.close()
    return contents
```

Passing the Help() category to obtain a list.

```
def get_help_list(data):
    """
    Python help has categories of topics, symbols and keywords.
    These topics are displayed in four columns
    Convert the category into a list and sort alphabetically
    """
    new_data = data.replace("\n", " ")  # change newlines to spaces.
    position = new_data.find("help.")  # Find end of heading
    new_data = new_data[position+5:]  # Start after heading
    data_list = new_data.split(" ")

    # Clear the list of empty fields using pop()
    data_len_index = len(data_list) - 1
    for index, item in enumerate(reversed(data_list)):
        if item == "":
            data_list.pop(data_len_index - index)

    data_list.sort()
    return data_list
```

help()

Having obtained all the recognised help words and symbols, then they may be called. E.g.

help("+")
help("OPERATORS")
help("int")
help("sys")

… and using contextlib and io.StringIO, the information is placed in the text.buffer of *TextView* and is displayed.

Gtk3 code. Importing and launching Window..

```
import gi
try:
    gi.require_version("Gtk", "3.0")
except ValueError as e:
    print(e)
    sys.exit("Unable to run {} program. Exiting...".format(sys.argv[0]))
from gi.repository import Gtk, Gdk
```

```
    # Start up the window
    win = Window()
    win.connect("destroy", Gtk.main_quit)
    win.show_all()
    Gtk.main()
```

Gtk3 code. *Gtk.Window* being set up...

```
class Window(Gtk.Window):
    def __init__(self):
        Gtk.Window.__init__(self)

        # Add the title to the window
        version = sys.version.split(" ")[0]
        self.set_title("Help for Python version {}".format(version))
        # Set default window size
        self.set_default_size(1400, 600)

        self.grid = Gtk.Grid()
        self.add(self.grid)

        self.create_textview()
        self.setup_treeview()
        self.set_style()
        self.textbuffer.set_text(WELCOME)
```

Gtk3 code. In a *Gtk.ScrolledWindow* add *Gtk.TextView*...

```
def create_textview(self):
    scrolled_window = Gtk.ScrolledWindow()
    scrolled_window.set_hexpand(True)
    scrolled_window.set_vexpand(True)
    scrolled_window.set_border_width(10)
    self.grid.attach(scrolled_window, 0, 0, 7, 1)

    self.textview = Gtk.TextView()
    self.textview.set_name("textview")
    self.textbuffer = self.textview.get_buffer()
    self.textbuffer.set_text("")
    scrolled_window.add(self.textview)
```

Gtk3 code. In a *Gtk.TreeStore* add the help() dictionary to store. Create *Gtk.TextView* and get it to use the store...

```
def setup_treeview(self):
    # create a TreeStore with one string column to use as the model
    store = Gtk.TreeStore(str)

    # From help dictionary add the categories and items to the store
    for category, items in help_dict.items():
        category_key = store.append(None, [category])
        for item in items:
            store.append(category_key,[item])

    # create the TreeView using treestore data
    self.treeview = Gtk.TreeView()
    self.treeview.set_model(store)
```

Gtk3 code. Continue setting up *Gtk.TreeView*

```
        # Set unique name so css can be applied to widget
        self.treeview.set_name("treeview")

        # Preference for self.treeview. Adjust via contants at start of program
        self.treeview.set_activate_on_single_click(SINGLE_CLICK)

        treeview_column = Gtk.TreeViewColumn(COLUMN_HEADING)
        self.treeview.append_column(treeview_column)

        cell = Gtk.CellRendererText()

        treeview_column.pack_start(cell, True)
        treeview_column.add_attribute(cell, 'text', 0)

        # call-back on the self.treeview
        self.treeview.connect ("row-activated", self.cb_on_row_activate,)
```

Gtk3 code. Place *Gtk.TreeView* in a *GTK.ScrolledWindow*

```
        # Create a window that can be scrolled
        scrolled_window = Gtk.ScrolledWindow(hexpand=True, vexpand=True)
        scrolled_window.set_policy(Gtk.PolicyType.NEVER, Gtk.PolicyType.AUTOMATIC)
        scrolled_window.set_border_width(10)

        scrolled_window.add(self.treeview)

        self.grid.attach(scrolled_window, 8, 0, 1, 1)
```

Gtk3 code. Call-back when “click” on *Gtk.TreeView*

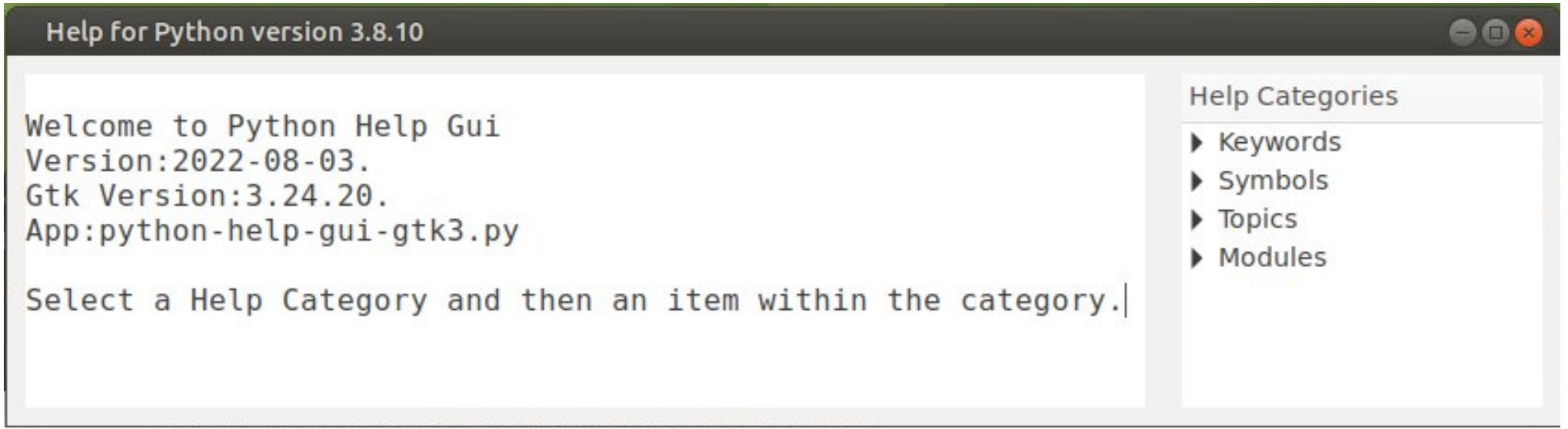
```
def cb_on_row_activate (self, treeview, path, column,):
    ' Call back when click on a row in the treeview. Select station'
    model = treeview.get_model()
    iter  = model.get_iter (path)
    #print(model[iter][0]) # Whatever item is clicked on

    # Don't want the categories only the items which have two fields
    pointer_list = path.to_string().split(":")
    if len(pointer_list) == 2:
        self.item_selected = model[iter][0]
        # Update the title to reflect selected item
        version = sys.version.split(" ")[0]
        self.set_title("Help for Python version {} - Selection: {}"
                .format(version, self.item_selected))
        # Retrieve the help information and display
        info = get_help(self.item_selected)
        self.textbuffer.set_text(info)
```

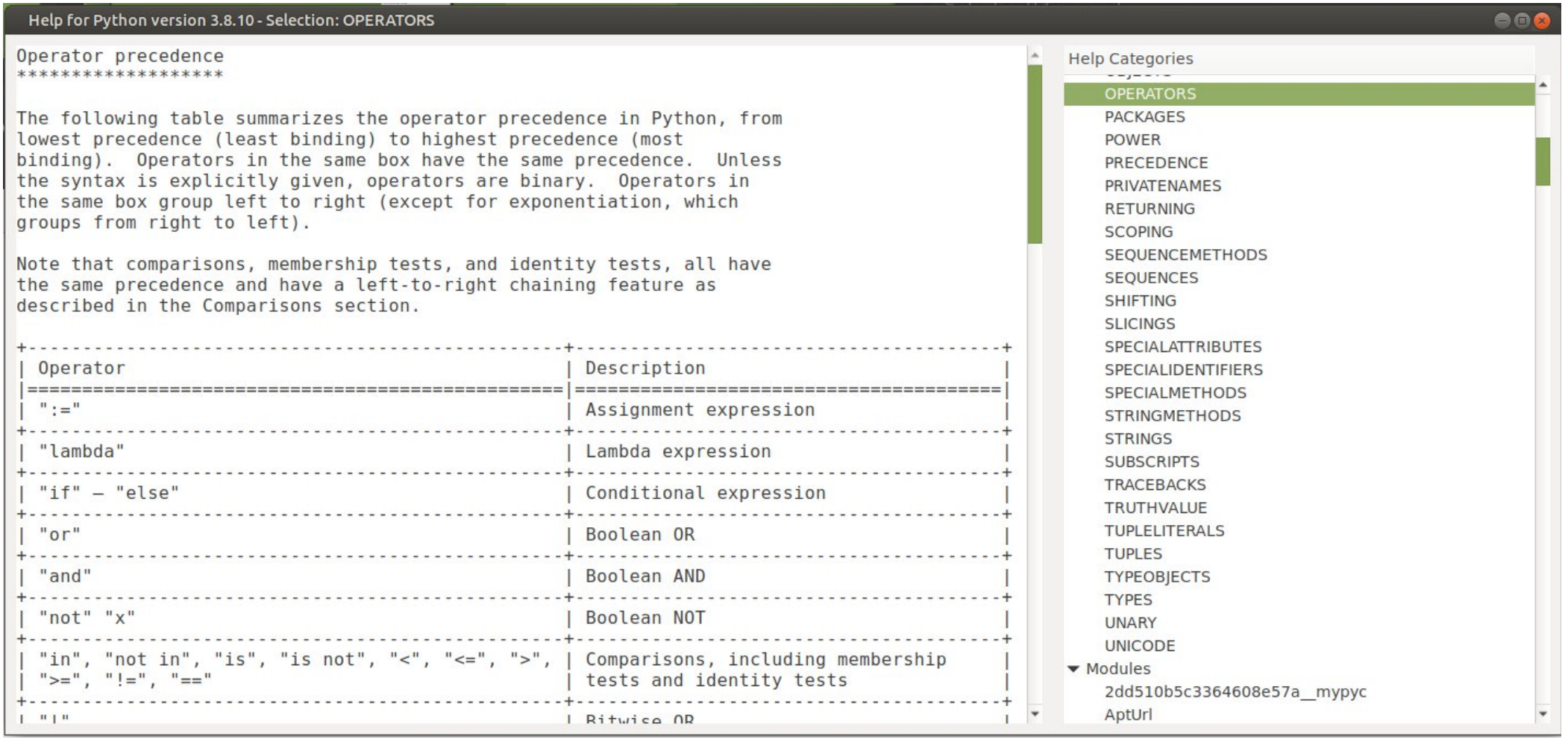
Gtk3 code. Apply CSS for fonts in *Gtk.TextView* and *Gtk.TreeView*...

```
def set_style(self):
    """ Loads custom CSS for textview and treeview"""
    style_provider = Gtk.CssProvider()
    style_provider.load_from_data(b"""
    #textview {
        font: 16px "Monospace";
        /*color: #000000;  Black will conflict with dark themed display */
        }
    #treeview {
        font: 14px Sans;
        /* border-width: 10px; Around the column header */
        }
    """)
    Gtk.StyleContext.add_provider_for_screen(Gdk.Screen.get_default(),
            style_provider,
            Gtk.STYLE_PROVIDER_PRIORITY_APPLICATION)
```

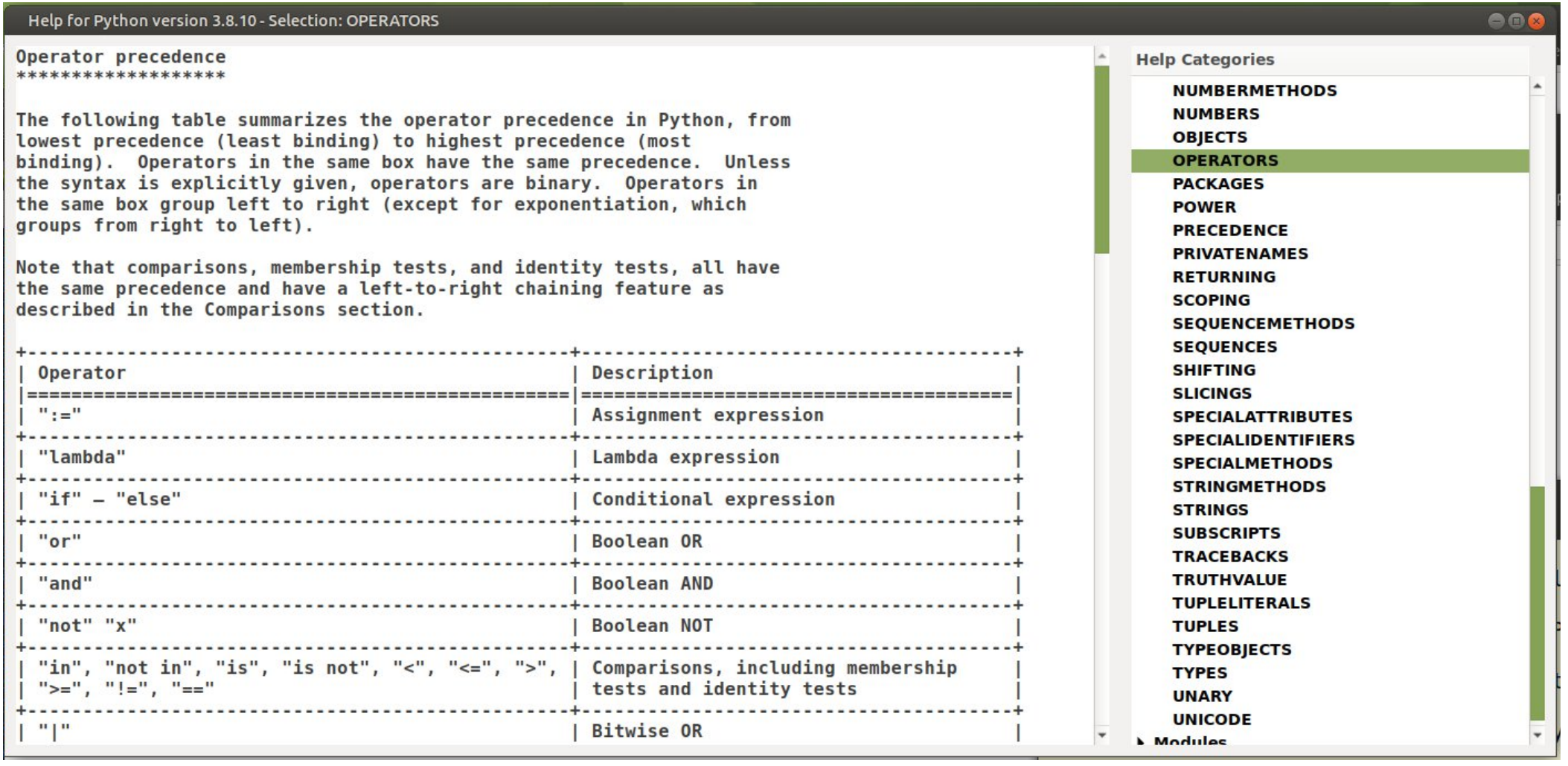
Run the program...



Run the program. In help category “Topics” clicked on “OPERATORS”



Darkened View: In help category “Topics” clicked on “OPERATORS”



help()

Demo Program.

help()

Python Observations

Get rid of the empty fields in the list (1/2)...

```
>>> a_str = "abc\nd  e"

>>> a_str
'abc\nd  e'

>>> print(a_str)
abc
d  e

>>> a_str = a_str.replace("\n", " ")

>>> print(a_str)
abc d  e

>>> a_str
'a b c  d   e'

>>> a_list = a_str.split(" ")

>>> a_list
['a', 'b', 'c', '', 'd', '', '', 'e']
```

Get rid of the empty fields in the list (2/2)...

```
>>> DATA_LEN_INDEX = len(a_list) - 1
>>> for index, item in enumerate(reversed(a_list)):
...     print(index, DATA_LEN_INDEX, item)
...     if item == "":
...         a_list.pop(DATA_LEN_INDEX - index)
...
0 7 e
1 7
''
2 7
''
3 7 d
4 7
''
5 7 c
6 7 b
7 7 a

>>> a_list
['a', 'b', 'c', 'd', 'e']
```

Fails when length is not held at initial value...

```
>>>> a_str = "a b c  d    e"
>>> a_list = a_str.split(" ")
>>> a_list
['a', 'b', 'c', '', 'd', '', '', '', 'e']
>>> for index, item in enumerate(reversed(a_list)):
...     print(len(a_list), index, item)
...     if item == "":
...         a_list.pop((len(a_list) - 1) - index)
...
9 0 e
9 1
''
8 2
''
7 3
''
6 4
'b'
5 5
'e'
4 6 d
4 7 c
4 8 a
>>> a_list
['a', 'c', 'd', '']
>>>
```

Iterate with list.remove() until ValueError...

```
>>> a_str = "a b c  d    e"
>>> a_list = a_str.split(" ")
>>> a_list
['a', 'b', 'c', '', 'd', '', '', '', 'e']

>>> try:
...     while True:
...         a_list.remove("")
... except ValueError as e:
...     print(e)
...
list.remove(x): x not in list

>>> a_list
['a', 'b', 'c', 'd', 'e']



>>> # Same as remove:
>>> while True:
...     x = a_list.index("")
...     a_list.pop(x)
```

How a list in a dictionary is preserved as a list...

```
>>> a = [1,2,3,4]
>>> a
[1, 2, 3, 4]

>>> d = {}

>>> d["a-list"]=a

>>> d
{'a-list': [1, 2, 3, 4]}

>>> a
[1, 2, 3, 4]

>>> a.pop()
4

>>> a
[1, 2, 3]

>>> d
{'a-list': [1, 2, 3]}
```

List is part of dictionary...

```
>>> a_str = "a b c d e"
>>> a_list = a_str.split(" ")
>>> a_list
['a', 'b', 'c', 'd', 'e']

>>> a_dict = {}
>>> a_dict["a_list_key"] = a_list

>>> a_dict
{'a_list_key': ['a', 'b', 'c', 'd', 'e']}

>>> a_list.reverse()

>>> a_list
['e', 'd', 'c', 'b', 'a']

>>> a_dict
{'a_list_key': ['e', 'd', 'c', 'b', 'a']}
>>>
```