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PYTHON CRASH COURSE

A HANDS-ON, PROJECT-BASED INTRODUCTION TO PROGRAMMING

ERIC MATTHES



Mitch Samuels Frontend Developer

hello@ceev.io 7605764824 linkedin.com/in/mitchas Minneapolis, Minnesota github.com/mitchas

Frontend-focused web developer with a passion for design. I have experience working with Angular, React, Django, Python, Go, MEAN stack, jQuery, and countless other frontend and backend frameworks and tools, but I spend most of my time fighting with HTML, Javascript, and CSS/SASS/LESS.

PROJECTS

ineedaresu.me

Mar 2015

A dead-simple resume generator that lets you create a resume in minutes. Built on AngularJS using localstorage to save user data. The generator creates a well-designed resume that is printable or can be downloaded as a PDF.

Ceev.lo

February 2018

December 2017

Open Source Electron Apps

This is my latest project - basically a re-do of ineedaresu.me since I sold that and no longer have access to it. Ceev makes creating resumes insanely simple on any device. Users can save their resumes to access anywhere, and the webapp offers a ton of customization options to create an awesome resume.

EXPERIENCE

Frontend Developer Contractor

Jun 2014 - Present Madison, WI • Create and maintain a style guide for use throughout our group's web applications to ensure consistent design, fonts, colors, UI elements, etc. • Design and apply styling and layout changes to existing applications.

Design and develop map-based web applications.
Design, develop, and maintain the group home page at wim.usgs.gov.

 Ensure mobile compatibility/responsiveness of all group websites and applications on all platforms and browsers.

 Make sure the sites and applications meet federal government standards and requirements (at least if they are reasonable requirements :)).

Freelance Frontend Web Developer Mitchs.co

Jan 2009 - Present Minnesota

 Design, develop, and deploy full-stack websites for clients, normally using HTML, CSS/LESS, Angular, and Firebase if needed.

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itertools.zip longest(*iterables, fillvalue=None) Example: >>> colors = ['red', 'orange', 'yellow', 'green', 'blue',] >>> data = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10,] >>> for each in itertools.zip longest(colors, data, fillvalue=None): >>> print(each) ('red', 1) ('orange', 2) ('yellow', 3) ('green', 4) ('blue', 5) (None, 7) (None, 7) (None, 9) (None, 10) Comprehension >>> a = [1, 3, 5, 7, 9, 11] >>> [i - 1 for i in a] [0, 2, 4, 6, 8, 10] Set comprehension >>> b = {"abc", "def"} >>> {v: k for k, v in c.items()} {'Pooka': 'name', 5: 'age'} A List comprehension can be generated from a dictionary: >>> c = {'name': 'Pooka', 'first_name': 'Oooka'} >>> ["{}:{}".format(k.upper(), v.upper()) for k, v in c.items()] ['NAME:POOKA', 'FIRST_NAME:OOOKA'] Manipulating Strings Escape Characters Prints as \' Single quote \" Double quote \t Tab Newline (line break) \\ Backslash Example: >>> print("Hello there!How are you?I\'m doing fine.") Hello there! How are you? You will need to import Python's traceback module before calling this function. content = bacon file.read() >>> print(content) Hello world! Bacon is not a vegetable. You can use it anywhere you want to match one of many expressions. They can be compared to other objects of the same type. It allows you to declare the libraries your project depends on and it will manage (install/update) them for you. Install it with: pip install anyconfig load("/path/to/foo/conf.d/a.yml") Debugging Raising Exceptions are raised with a raise statement. self.val = val ... For example, the character class [aeiouAEIOU] will match any vowel, both lowercase and uppercase. def box print(symbol, width, height): if len(symbol) != 1: raise Exception('Symbol must be a single character string.') if width > class Number: ... [^abc] any character that isn't between the brackets. Sparse is better than dense. It is not optional: >>> bat regex = Curly Brackets If you have a group that you want to repeat a specific number of times, follow the group in your regex with a number in curly brackets. example zip.extractal() The extract() method for ZipFile objects will extract a single file from the ZIP file. However, If you don't want specify the datatype then, use typing. Any. Factorial 7 is 1 × 2 × 3 >>> finally: >>> print("-- division finished -- 21.0 >>> print(spam(1)) -- division finished -- 3.5 >>> print(spam(1)) -- division finished -- 21.0 +>>> print(spam(1)) -- division finished -- 21.0 +>>>> print(spam(1)) -- division finished -- 21.0 +>>> prin 'elephant'] Getting Individual Values in a List with Indexes >>> spam = ['cat', 'bat', 'rat', 'elephant'] >>> spam[3] 'elephant'] >>> spam[2] 'rat' >>> spam[3] 'bat' >>> spam elephant is afraid of the bat.' Getting Sublists with Slices >>> spam = ['cat', 'bat', 'rat', 'elephant'] >>> spam[0:4] ['cat', 'bat', 'rat'] >>> spam[0:4] ['cat', 'bat', 'rat', 'elephant'] >>> spam[1:3] ['bat', 'rat', 'elephant'] >>> spam[0:4] ['cat', 'bat', 'rat', 'elephant'] >>> spam[1:3] ['bat', 'rat', 'elephant'] >>> spam[0:4] ['cat', 'bat', 'rat', 'elephant'] >>> spam[1:3] ['bat', 'rat', 'elephan copy: >>> spam2 = spam[:] ['cat', 'bat', 'rat', 'elephant'] >>> spam = ['cat', 'bat', 'rat', 'elephant'] >>> spam2 ['cat', 'bat', 'rat', 'elephant'] >>> s = 'aardvark' >>> spam ['cat', 'aardvark', 'rat', 'elephant'] >>> spam ['cat', 'aardvark', >>> spam = [1, 2, 3] >>> spam = spam + ['A', 'B', 'C'] >>> spam ['cat', 'bat', 'elephant'] >>> del spam[2] >>> spam ['cat', 'bat'] Using for Loops with Lists =>>> spam ['cat', 'bat'] Using for Loops with Lists =>>> spam ['cat', 'bat'] Using for Loops with Lists =>>> spam ['cat', 'bat'] Using for Loops with Lists =>>> spam ['cat', 'bat'] Using for Loops with Lists =>>> spam ['cat', 'bat'] Using for Loo 'binders'] >>> for i, supply in enumerate(supplies): >>> print('Index {} in supplies is: flame-throwers Index 3 in supplies is: staplers Index 3 in supplies is: flame-throwers Index 3 in supplies is: flame-thrower for n, a in zip(name, age): >>> print('{} is {} years old John is 23 years old John is 23 years old Elizabeth is 44 years old The in and not in Operators >>> 'howdy', 'heyas'] >>> 'cat' in spam False >>> 'cat' not in spam True The Multiple Assignment Trick The multiple assignment trick is a shortcut that lets you assign multiple variables with the values in a list in one line of code. >>> for k, v in spam.items(): spaw.items(): spa Exists in a Dictionary >>> spam = {'name': 'Zophie', 'age': 7} >>> 'color' in spam.keys() True >>> # You can omit the call to keys() when checking for a key >>> 'color' in spam.keys() True >>> # You can omit the call to keys() the checking for a key >>> 'color' in spam.keys() True >>> # You can omit the call to keys() the checking for a key >>> 'color' in spam.keys() True >>> # You can omit the call to keys() the checking for a key >>> 'color' in spam.keys() True >>> # You can omit the call to keys() the checking for a key >>> 'color' in spam.keys() True >>> # You can omit the call to keys() the checking for a key >>> 'color' in spam.keys() True >>> # You can omit the call to keys() the checking for a key >>> 'color' in spam.keys() the checking for a key >>> 'color' in spam.keys() True >>> # You can omit the call to keys() the checking for a key >>> 'color' in spam.keys() the checking for a key = checking f picnic_items = {'apples': 5, 'cups': 2} >>> 'I am bringing {} cups.'.format(str(picnic_items.get('cups', 0))) 'I am bringing 2 cups.' >>> 'I am bringing 0 eggs.' The setdefault() Method Let's consider this code: spam = {'name': 'Pooka', 'age': 5} if 'color' not in spam: spam['color'] = 'black' Using setdefault we could write the same code more succinctly: >>> spam = {'name': 'Pooka', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam.setdefault('color', 'black') 'black' >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam.setdefault('color', 'black') 'black' >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing >>> spam {'color': 'black', 'age': 5, 'name': 'Pooka'} Pretty Printing Pretty Pretty Printing Pretty Pretty Pretty Printing Pretty Pretty Printing Pretty Pretty Printing Pretty Pretty Pretty Pretty Pretty Printing Pretty Pret message = 'It was a bright cold day in April, and the clocks were striking >>> thirteen.' >>> count[character] = count[charact 4, 'o': 2, 'p': 1, 'r': 5, 's': 3, 't': 6, 'w': 2, 'y': 1} Merge two dictionaries # in Python 3.5+: >>> $z = \{'a': 1, 'b': 3\}$ # in Python 2.7 >>> $z = \{'c': 4, 'a': 1, 'b': 3\}$ # in Python 3.5+: >>> $z = \{'c': 4, 'a': 1, 'b': 3\}$ # in Python 3.5+: >>> $z = \{'c': 4, 'a': 1, 'b': 3\}$ # in Python 3.5+: >>> $z = \{'c': 4, 'a': 1, 'b': 3\}$ # in Python 2.7 >>> $z = \{'c': 4, 'a': 1, 'b': 3\}$ module can discover whether or not it is running in the main scope by checking its own name , which allows a common idiom for conditionally executing code in a module when it is imported: >>> if name == " main ": ... It represents a specific kind of entity. . Used to indicate a fatal error that has caused or is about to cause the program to stop running entirely. pipenv is a tool that aims to bring the best of all packaging worlds (bundler, composer, npm, cargo, yarn, etc.) to the Python world. print(list(shelf file.values())) ['cats'] [['Zophie', 'Pooka', 'Simon']] Saving Variables with the pprint.pformat() Function >>> import pprint >>> cats = [{'name': 'Zophie', 'desc': 'chubby'}, {'name': 'Pooka', 'desc': 'fluffy', 'name': 'Pooka', 'desc': 'fluffy', 'name': 'Zophie'}, {'desc': 'fluffy', 'name': 'Zophie'}, {'desc': 'fluffy', 'name': 'Pooka', 'desc': 'fluffy', 'name': 'Zophie'}, {'desc': 'fluffy', 'name': 'Pooka', 'desc': 'fluffy', 'name': 'Zophie'}, {'desc': 'fluffy', 'name'}, {'desc': 'fluffy', 'name'}, {'desc': 'fluffy', 'name'}, {'de global variable also named spam. >>> str(-3.14) '-3.14' Float to Integer: >>> int(7.7) + 1 8 Flow Control Comparison Operators evaluate to True or False depending on the values you give them. The setup.py file is at the heart of a Python project. print(line, end=") When, in disgrace with fortune and men's eyes, I all alone beweep my outcast state, And trouble deaf heaven with my bootless cries, And look upon myself and curse my fate, Writing to Files >>> with open('bacon.txt', 'w') as bacon_file: ... >>> import shutil, os >>> os.chdir('C:\\') >>> shutil.copy('C:\\spam.txt', 'C:\\delicious\\spam.txt', 'C:\\delicious\\span.txt', 'C:\\delicious\\span 'C:\\bacon backup') 'C:\\bacon.txt', 'C:\\bacon.txt', The destination path can also specify a filename. There are two main libraries allowing to access to YAML files: Install them using pip install in your virtual environment. if name == "main": is used to execute some code only if the file was run directly, and not imported. You can use the items from a sequence as the positional arguments for a function with the * operator. The operator module will also be used. main() For a package, the same effect can be achieved by including a main.py module, the contents of which will be executed when the module is run with -m For example we are developing script which is designed to be used as module, we should do: >>> # Python program to execute function directly >>> s = {1, 2, 3} >>> s.remove(3) >>> s {1, 2} >>> s.remove(3) Traceback (most recent call last): File "", line 1, in KeyError: 3 discard() won't raise any errors. The name field must be unique if you wish to publish your package on the Python Package Index (PyPI). Keyword arguments with default values make it easy to add new behaviors to a function, especially when the function has existing callers. >>> s = {1, 2, 3} >>> s.discard(3) >>> s {1, 2} >>> s.discard(3) >>> set union() >>> Bob >>> "").strip() This generates the same string than before. The step is the amount that the variable is increased by after each iteration. To find the total size of all the files in this directory: WARNING: Directories themselves also have a size! So you might want to check for whether a path is a file or directory using the methods in the methods discussed in the above section! Using os.path.getsize() and os.listdir() together on Windows: >>> total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Windows\\System32'): total size = 0 >>> for filename in os.listdir('C:\\Wind pathlib import Path >>> total_size = 0 >>> for sub_path in Path('/usr/bin').iterdir(): ... Always use is. # area code ((|-|))? itertools.starmap(function, iterable) Example: >>> data = [(2, 6), (8, 4), (7, 3)] >>> result = itertools.starmap(operator.mul, data) >>> for each in result: >>> print(each) 12 32 21 takewhile() The opposite of dropwhile(). >>> vowel regex = re.compile(r'[aeiouAEIOU]') >>> vowel regex.findall('Robocop eats baby food. Dataclasses are python classes but are suited for storing data objects. They can mean: In a function declaration, * means "pack all remaining positional arguments into a tuple named ", while ** is the same for keyword arguments (except it uses a dictionary, not a tuple). In a function call, * means "unpack tuple or list named to positional arguments at this position", while ** is the same for keyword arguments. if else 'adult') kid Ternary operators can be chained: >>> age = 15 >>> print('kid' if age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 >>> print('kid' if age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 >>> age = 15 >>> print('kid' if age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 >>> age = 15 >>> print('kid' if age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 age < 18 else 'adult') kid Ternary operators can be chained: >>> age = 15 age < 18 else 'adult') kid 'age < 18 else 'adult') kid 'adult') kid 'age < 18 else 'adult') kid 'adult') teenager The code above is equivalent to: if age < 18: if age < 18: if age < 18: print('kid') else: print('adult') args and kwargs The names args and kwargs The names args and kwargs are arbitrary - the important thing are the * and ** operators. Iteration continues until the longest iterable is exhausted. class WithoutExplicitTypes: ... It can use only letters, numbers, and the underscore () character. You can use the same name for different variables if they are in different scopes. If you import this script, the name of the script/module. accumulate() Makes an iterator that returns the results of a function. Example: >>> spam = 'Hello' >>> spam 'Hello' >>> _spam = 'Hello' _spam should not be used again in the code. >>> def fruit(**kwargs): >>> for key, value in kwargs.items(): >>> fruit(name = "apple", color = "red") name: apple color: red >>> def show(arg1, arg2, *args, kwarg1=None, kwarg2=None, **kwargs): >>> print(arg1) >>> print(arg2) >>> print(args) >>> print(kwarg1) >>> print(kwarg2) >>> print(kwarg2) >>> data1 = [1,2,3] >>> data2 = [4,5,6] >>> data2 = [4,5,6] >>> data3 = {'a':7,'b':8,'c':9} >>> show(*data1,*data2, **data3) 1 2 (3, 4, 5, 6) None None {'a': 7, 'b':8, 'c':9} >>> show(*data1,*data2, **data3) 1 2 (3, 4, 5, 6) None None {'a': 7, 'b':8, 'c':9} >>> show(*data1,*data2, **data3) 1 2 (3, 4, 5, 6) Print(kwarg2) >>> data3 = [1,2,3] = ['b': 8, 'c': 9} # If you do not specify ** for kwargs >>> show(*data1, *data2, *data3) 1 2 (3, 4, 5, 6, "a", "b", "c") None None {} Things to Remember(args) Functions are run when the 'yield' point of the context ... Ex: A number. Raw Strings A raw string completely ignores all escape characters and prints any backslash that appears in the string. >>> for i in range(5, -1, -1): >>> print(i) 5 4 3 2 1 0 For else statement to execute in case of the full loop has been executed. It holds attributes that define or represent the entity. {n,} n or more of the preceding group. # 'cm' will have the value that was yielded ... >>> obj = Product("Python") >>> obj.count 0 > folders but special names that can be used in a path. These alternatives also provide more powerful, flexible and extensible approaches to formatting text. >>> $s = \{1, 2, 3\}$ And with update(), multiple ones. Your place for free public conda package hosting. Calling shutil.rmtree(path) will remove the folder at path, and all files and folders it contains will also be deleted. However, there are only three required fields: name, version, and packages. Optional keyword instead of by position. (or dot) character in a regular expression is called a wildcard and will match any character except for a newline: >>> at regex = (1 + 1) + re.compile(r'.at') >>> at regex.findall('The cat in the hat sat on the flat mat.') ['cat', 'hat', 'sat', 'lat', 'mat'] Matching Everything with Dot-Star >>> mo = name regex.search('First Name: (.*) >>> mo = name regex.search('First Name greedy mode: It will always try to match as much text as possible. Now is better than never. By placing a caret character (^) just after the character class. >>> for i in range(0, 10, 2): >>> print(i) 0 2 4 6 8 You can even use a negative number for the step argument to make the for loop count down instead of up. Ternary Conditional Operator Many programming languages have a ternary operator, which define a conditional expression. From the official Python 3.x documentation: The module standardizes a core set of fast, memory efficient tools that are useful by themselves or in combination. >>> shutil.move('C:\\bacon.txt', 'C:\\eggs') 'C:\\eggs' Permanently Deleting Files and Folders Calling os.unlink(path) or Path.unlink() will delete the file at path. Variable name starting with an underscore () are considered as "unuseful`. Although that way may not be obvious at first unless you're Dutch. The r'Alello' regular expression string matches strings that begin with 'Hello' >>> begins with hello = re.compile(r'^Hello') >>> begins with hello.search('Hello world!') >>> begins with hell whole_string_is_num.search('1234567890') >>> whole_string_is_num.search('1234567890') is None True >>> whole_string_is_num.search('1234567890') is None True, False, True, Fal >>> result = itertools.compress(shapes, selections) >>> for each in result: >>> print(each) circle square dropwhile() Make an iterator that drops element. Use the is or is not operators, or use implicit boolean evaluation. itertools.takewhile(predicate, iterable) Example: >>> data = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 1] >>> result = itertools.takewhile(lambda x: x>> for each in result: >>> print(each) 1 2 3 4 tee() Return n independent iterators from a single iterable. >>> with shelve.open('mydata') as shelf_file: ... zero or one of the preceding group. Deactivate To move onto something else in the command line type 'deactivate' to deactivate your environment. In the face of ambiguity, refuse the temptation to guess. Otherwise, if the variable is used in an assignment statement in the function, it is a local variable. I\'m afraid I can\'t do that.' >>> assert pod bay door status == 'open', 'The pod bay doors need to be "open".' Traceback (most recent call last): File "", line 1, in assert pod bay doors need to be "open". >>> a = [1, 2, 3] >>> if a: >>> print('I am {} vears old.' format(str(29)) I am 29 years old. JSON, YAML and configuration files JSON file with: import json with open("filename.json", "r") as f: content = {"name": "Joe", "age": 20} with open("filename.json", "w") as f: f.write(json.dumps(content, indent=2)) YAML Compared to JSON, YAML allows for much better human maintainability and gives you the option to add comments. But can also obtain it as a string by calling traceback.format exc(). performs a nongreedy match of the preceding p. Since these methods return list-like values instead of true lists, you should pass them to the list() function to get them in list form. Set objects also support mathematical operations like union, intersection, difference, and symmetric difference. Level Logging Function DEBUG logging.debug() The lowest level. However, a local scope can access global variables. name='pythonCheatsheet', ... >>> import zipfile, os >>> os.chdir('C:\\') # move to the folder with example.zip >>> with zipfile.ZipFile('example.zip') as example_zip: ... Joining paths can be a headache if your code needs to work on different platforms. packages=['pipenv',], ... The traceback text was written to errorInfo.txt. Disabling Assertions can be disabled by passing the -O option when running Python. itertools.tee(iterable, n=2) Example: >>> colors = ['red', 'orange', 'yellow', 'green', 'blue'] >>> alpha colors, beta co blue zip longest() Makes an iterator that aggregates elements from each of the iterables. You use *args when you have an indefinite amount of positional arguments, print(spam info.file size) ... When called on a regex that has groups, such as (\d\d\d)-(\d\d\d), the method findall() returns a list of es of strings (one string for each group), such as [('415', '555', '9999'), ('212', '555', '0000')]. A negative character class will match all the character class. new zip.write('spam.txt', compress type=zipfile.ZIP DEFLATED) This code will create a new ZIP file named new.zip that has the compressed contents of spam.txt. hello content = hello file.read() >>> hello content 'Hello World!' >>> # Alternatively, you can use the *readlines()* method to get a list of string values from the file, one string for each line of text: >>> bear Alice, >>>>> bear Alice, >>>>>> Eve's cat has been arrested for catnapping, cat burglary, and extortion. This module is not necessary when using itertools, but needed for some of the examples below. Install pipenv pip install pipenv will install your project cd my project directory. Together, they form an "iterator algebra" making it possible to construct specialized tools succinctly and efficiently in pure Python. val: int ... For example, enter the following into the interactive shell: >>> consonant regex = re.compile(r'[^aeiouAEIOU]') >>> consonant re like dictionaries, shelf values have keys() and values() methods that will return list-like values of the keys and values in the shelf. >>> t = Template('Hey \$name!') >>> t = Template('H There are two ways to specify a file path. Messages can be logged at each level using a different logging function. yield num + 1 ... print(spam info.compress size) ... Initializing a set There are two ways to create sets: using curly braces {} and the built-in function set() >>> s = {1, 2, 3} >>> s = set([1, 2, 3]) When creating an empty set, be sure to not use the curly braces {} or you will get an empty dictionary instead. In the following example, the source file is moved and renamed: >>> shutil.move('C:\\bacon.txt', 'C:\\eggs\ew_bacon.txt') 'C:\\eggs\ew_bacon.txt' If there is no eggs folder, then move() will rename bacon.txt to a file named eggs. Making Your Own Character Classes There are times when you want to match a set of characters but the shorthand character classes (\d. \w. \s. and so on) are too broad. The startswith('Hello') True >>> 'Hello world!'.startswith('world!') True >>> 'abc123'.startswith('abcdef') False >>> 'abc123'.endswith('12') False >>> 'Hello world!'.startswith('hello') True >>> 'Hello world!'.startswith('Hello') True >>> 'Hello world!'.startswith('abcdef') False >>> 'abc123'.startswith('hello') True >>> 'hello world!'.startswith('hello') True startswith('hello') True s world!'.startswith('Hello world!') True >>> 'Hello world!') True The join() and split() String Methods join(): >>> ', '.join(['My', 'name', 'is', 'Simon']) 'My ABC name ABC is ABC Simon' split(): >>> 'My name is Simon' >>> 'ABC'.join(['My', 'name', 'is', 'Simon']) 'My ABC name ABC is ABC Simon' split(): >>> 'My name is Simon' >>> 'ABC'.join(['My', 'name', 'is', 'Simon']) 'My ABC name ABC is ABC Simon' split(): >>> 'ABC'.join(['My', 'name', 'is', 'Simon']) 'My ABC name ABC is ABC Simon' split(): >>> 'My name is Simon' split(): >>> 'ABC'.join(['My', 'name', 'is', 'Simon']) 'My ABC name ABC is ABC Simon' split(): >>> 'My name is Simon' split(): >>> 'ABC'.join(['My', 'name', 'is', 'Simon']) 'My ABC name ABC is ABC Simon' split(): >>> 'My name is Simon' split(): >>> 'ABC'.join(['My', 'name', 'is', 'Simon']) 'My ABC name ABC is ABC Simon' split(): >>> 'My name is Simon' split(): >>> 'ABC Simon' split(): >>> 'My name is Simon' split(): Split() Simon'.split() ['My', 'name', 'is', 'Simon'] >>> 'MyABCnameABCisABCSimon'.split('m') ['My', 'name', 'is', 'Simon'] >>> 'Hello'.rjust(20) ' Hello World'.rjust(20) ' Hello W 'Hello'.ljust(10) 'Hello ' An optional second argument to rjust() and ljust() will specify a fill character other than a space character. >>> from typing import Any >>> @dataclasses import dataclasses spam = [2, 5, 3.14, 1, -7] >>> spam.sort() >>> spam [-7, 1, 2, 3.14, 5] >>> spam = ['ants', 'cats', 'dogs', 'elephants'] >>> spam.sort() >>> spam = ['ants', 'cats', 'dogs', 'elephants'] >>> spam ['ants', 'badgers', 'cats', 'dogs', 'elephants'] >>> spam ['ants', 'badgers', 'cats', 'dogs', 'elephants'] >>> spam = ['ants', 'badgers', 'cats', 'dogs', 'elephants'] >>> spam ['ants', 'badgers', 'elephants'] >>> spam ['ants', 'badgers', 'cats', 'dogs', 'elephants'] >>> spam ['ants', 'badgers', 'elephants'] >>> spam ['ants', 'badgers', 'cats', 'dogs', 'elephants'] >>> spam ['ants', 'badgers', 'elephants'] >>> ['elephants', 'dogs', 'cats', 'badgers', 'ants'] If you need to sort the values in regular alphabetical order, pass str. Basic uses include membership testing and eliminating duplicate entries. Python files can act as either reusable modules, or as standalone programs. def context manager(num): ... >>> bat regex = re.compile(r'Bat(wo)*man') >>> mo1 = exceptions, your code should not handle assert statements with try and except; if an assert fails, your program should crash. spam\$ means the string must end with your Python project pipenv shell Exit the Virtual Environment exit Find more information and a video in docs.pipenv.org. If the sanity check fails, then an AssertionError exception is raised. Fortunately, Python provides easy ways to handle this. Things to Remember(kwargs) Function arguments can be specified by position or by keyword. Adding new positional parameters to functions that accept *args can introduce hard-to-find bugs. print('Enter') ... INFO logging.info() Used to record information on general events in your program or confirm that things are working at their point in the program. >>> s = {1, 2, 3, 4} >>> s {1, 2, 3, as f: >>> file contents = f.read() # the open file object has automatically been closed. A single period ("dot") for a folder name is shorthand for "this directory." Two periods ("dot-dot") means "the parent folder." Handling Absolute and Relative Paths To see if a path is an absolute path: Using os.path on *nix: >>> import os >>> os.path.isabs('/') True >>> os.path.isabs('..') False Using pathlib on *nix: >>> from pathlib import Path >>> Path('..').is absolute() True >>> Path('..').is absolute() True >>> os.path.abspath('..') //home' Using pathlib on *nix: from pathlib import Path print(Path.cwd()) /home/asweigart print(Path('..').resolve()) /home You can get a relative path from a starting path to another path. long description=open('README.txt').read(), ... >>> import calculate >>> calculate.add(3, 5) 8 Advantages Every Python module has it's name defined and if this is main , it implies that the module is being run standalone by the user and we can do corresponding appropriate actions. >>> mo1 = ha regex.search('HaHaHa') >>> mo2 = which means that in ambiguous situations they will match the longest string possible. >>> import send2trash >>> with open('bacon.txt', 'a') as bacon file: # creates the file ... Context Managers are widely used, few understand the purpose behind their use. >>> s = {1, 2, 3} >>> s.update([2, 3, 4, 5, 6]) >>> s {1, 2, 3} 3, 4, 5, 6} # remember, sets automatically remove () will raise a key error if the value doesn't exist. setup.py The setup script is the centre of all activity in building, distributing, and installing modules using the Distutils. Open a new file editor window and enter the following code. The non-greedy version of the curly brackets, which matches the shortest string possible, has the closing curly bracket followed by a question mark. Opening and reading files with the open() function >>> with open('C:\Users\your home folder\\hello.txt') as hello file: ... itertools.islice(iterable, start, stop[, step]) Example: >>> colors = ['red', 'orange', 'yellow', 'green', 'blue',] >>> few colors = itertools.islice(colors, 2) >>> for each in few colors: >>> print(each) red orange permutations() itertools.permutations() itertools.per print(each) ('a', 'b', 'c') ('a', 'c', 'b') ('b', 'a', 'c') ('b', 'a', 'a') ('b', how to handle an exception. In mathematics, factorial 4 is 1 × 2 × 3 × 4, or 24. The itertools module comes in the standard library and must be imported. /usr/bin/ld/ should return. The 116 is the return value from the write() method, since 116 characters were written to the file. We will showcase how to deal with this with both os.path.join on Windows: >>> import os >>> os.path.join('usr', 'bin', 'spam') 'usr\\bin\\spam' And using pathlib on *nix: >>> from pathlib import Path >>> print(Path('usr').joinpath('bin').joinpath('bi the above methods instead of adding strings together to join paths together. >>> num data = [1, 2, 3] >>> alpha data = [2, 2, 3] >>> result = itertools.product(num data, alpha data) >>> for each in result: print(each) (1, 'a') (2, 'a') (2, 'a') (3, ' To match any and all text in a nongreedy fashion, use the dot, star, and question mark (.*?). (It is a fish.)') password = input() if password = input() Jimmy Five Times (1) Jimmy Five Times (2) Jimmy Five Times (3) Jimmy Five Times (4) The range() function can also be called with three arguments. For example you can make a function that you can use to call any other function, no matter what parameters it has: def forward(f, *args, **kwargs): return f(*args, **kwargs) Inside forward, args is a tuple (of all positional arguments except the first one, because we specified it - the f), kwargs is a dict. sonnet file.readlines() [When, in disgrace with fortune and men's eyes,', ' I all alone beweep my outcast state,', And trouble deaf heaven with my bootless cries,', And look upon myself and curse my fate,'] >>> # You can also iterate through the file. line by line: >>> with open('sonnet29.txt') as sonnet file: ... This folder must be empty of any files or folders. The and True False False and False Fa or True False or False False The not Operator's Truth Table: Expression Evaluates to not True False not False True Mixing Boolean and Comparison Operators >>> (4 < 5) and (5 < 6) True >>> (4 < 5) and (5 < 6) True Palse True Mixing Boolean and Comparison Operators in an expression, along with the comparison operators: >>> 2 + 2 == 4 and not 2 + 2 == 5 and 2 * 2 == 2 + 2 True if Statements name = 'Alice': print('Hi, Alice.') elif age < 12: print('Hi, Alice.') el 'Bob' age = 30 if name == 'Alice': print('Hi, Alice.') elif age < 12: print('You are not Alice, kiddo.') else: print('You are neither Alice nor a little kid.') while Loop Statements spam = 0 while spam < 5: print('Hello, world.') spam = spam + 1 break Statements If the execution reaches a break statement, it immediately exits the while loop's clause: while True: print('Please type your name.') name = input() if name == 'your name': break print('Thank you!') continue Statements When the program execution immediately jumps back to the start of the loop. And available to the projects we connect to this environment. itertools.groupby(iterable, key=None) Example: >>> robots = [{ 'name': 'jazz', 'faction': 'autobot' }, { 'name': 'jazz', 'faction': 'decepticon' }, { 'name': 'jazz', 'faction': 'decept key=lambda x: x['faction']): >>> print(key) >>> print(key) >>> print(key) autobot [{'name': 'jazz', 'faction': 'autobot'}] decepticon [{'name': 'jazz', 'faction': 'autobot'}] decepticon'; 'faction': 'autobot'}] decepticon'; 'faction': 'autobot'] decepticon'; 'faction'; 'faction'; 'autobot'] decepticon'; 'faction'; 'faction'; 'fac >>> logging.debug('End of program') 2015-05-23 16:20:12,664 - DEBUG - i is 0, total is 0 2015-05-23 16:20:12,665 - DEBUG - i is 0, total i is 0 2015-05-23 16:20:12,675 - DEBUG - i is 4, total is 0 2015-05-23 16:20:12,684 - DEBUG - End of factorial(5) 0 2015-05-23 16:20:12,684 - DE it's a bad idea. return a+b ... add(3, 5) ... >>> import logging.basicConfig(level=logging.CRITICAL) >>> logging.critical error! (Critical error!) 2015-05-22 11:10:48,054 - CRITICAL - Critical error! >>> logging.disable(logging.CRITICAL) >>> logging.critical ('Critical error!') >>> logging.error('Error! Error!') Logging to a File Instead of displaying the log messages to the screen, you can write them to a text file. anaconda is another popular tool to manage python packages. Usually you care about these messages only when diagnosing problems. The

logging.disable() function disables these so that you don't have to go into your program and remove all the logging calls by hand. Likewise, you can put a dollar sign (\\$) at the end of the regex to indicate the string must end with this regex pattern. value: Any = 42 ... For example, the character class [a-zA-ZO-9] will match all lowercase letters, uppercase letters, and numbers. Using os.path.join on Windows: >>> my files = ['accounts.txt', 'details.csv', 'invite.docx'] >>> for filename in my files: >>> my files = ['accounts.txt', 'details.csv', 'invite.docx'] >>> my files = ['accounts.txt', ['accounts.txt', 'details.csv', 'invite.docx'] >>> home = Path.home() >>> for filename in my_files: >>> print(home / filename) /home/asweigart/accounts.txt /home os.chdir('C:\\Windows\\System32') >>> os.getcwd() 'C:\\Windows\\System32' Using pathlib on *nix: >>> from pathlib import Path >>> from os import chdir >>> print(Path.cwd()) /usr/lib/python3.6') >>> print(Path.cwd()) /usr/lib/python3.6') >>> import os import os >>> import os os.makedirs('C:\\delicious\\walnut\\waffles') Using pathlib on *nix: >>> from pathlib import Path >>> cwd = Path.cwd() >>> (cwd / 'delicious' / 'waffles').mkdir() Traceback (most recent call last): File "', line 1, in File "/usr/lib/python3.6/pathlib.py", line 1226, in mkdir self._accessor.mkdir(self, mode) File "/usr/lib/python3.6/pathlib.py", line 1, in File "/usr/lib/python3.6/pathlib.py", line 126, in mkdir self._accessor.mkdir(self, mode) File "/usr/lib/python3.6/python3.6/python3.6/python3.6/python3.6/pyt 387, in wrapped return strfunc(str(pathobj), *args) FileNotFoundError: [Errno 2] No such file or directory: '/home/asweigart/delicious/walnut/waffles' Oh no, we got a nasty error! The reason is that the 'delicious' directory: '/home/asweigart/delicious/walnut/waffles' Oh no, we got a nasty error! The reason is that the 'delicious' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory: '/home/asweigart/delicious/walnut/waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'walnut' and the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exist, so we cannot make the 'waffles' directory does not exi make sure your code isn't doing something obviously wrong. iterable) Example: >>> data = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 1] >>> result = iterable) eturning only those for which the predicate is False. >>> s = {1, 2, 3} >>> s[0] Traceback (most recent call last): File "", line 1, in TypeError: 'set' object does not support indexing >>> set add() and update() Using the add() method we can add a single element to the set. These sanity checks are performed by assert statements. Namespaces are one honking great idea -- let's do more of those! Python Basics Math Operators From Highest to Lowest precedence: Operators Operation 22 // 8 = 2 / Division 22 // 8 = 2 / D + 3 * 6 20 >>> (2 + 3) * 6 30 >>> 2 ** 8 256 >>> 23 // 7 3 >>> 23 % 7 2 >>> (5 - 1) * ((7 + 1) / (3 - 1)) 16.0 Data Type Examples Integers -2, -1, 0, 1, 2, 3, 4, 5 Floating-point numbers -1.25, -1.0, -0.5, 0.0, 0.5, 1.0, 1.25 Strings 'a', 'aa', 'aaa', 'Hello!', '11 cats' String Concatenation and Replication String concatenation: >>> 'Alice' 'Bob' 'AliceBob' Note: Avoid + operator for string concatenation. >>> s1 = {1, 2, 3} >>> s2 = {2, 3, 4} >>> s1.symmetric difference(s2) # or 's1 ^ s2' {1, 4} itertools Module The itertools Module is a collection of tools intended to be fast and use memory efficiently when handling iterators (like lists or dictionaries). total size += sub_path.stat().st size >>> print(total size) 1903178911 Copying Files and Folders. So you will commonly see a raise statement inside a function and the try and except statements in the code calling the function. Simple is better than complex. The most common usage is to make a terse simple conditional assignment statement. # extension)", re.VERBOSE) Handling File and Directory Paths There are two main modules in Python 3 introduced a new way to do string formatting (str.format) Python 3 introduced a new way to do string formatting (str.format) Python 4 introduced a new way to do string formatting (str.format) Python 4 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do string formatting (str.format) Python 5 introduced a new way to do s more regular. deactivate Notice how the parenthesis disappear. In code, an assert statement consists of the following: The assert keyword A condition is False >>> pod bay door status = 'open' >>> assert pod bay door status == 'open', 'The pod bay doors need to be "open".' >>> pod bay door status = 'I\'m sorry, Dave. def init (self, val): ... license='MIT', ... print(type(shelf file)) ... The main purpose of the setup script is to describe your module distribution to the Distutils, so that the various commands that operate on your modules do the right thing. You commonly use one with the with statement. import random def getAnswer(answerNumber == 1: return 'It is certain' elif answerNumber == 2: return 'It is decidedly so' elif answerNumber == 2: return 'It is decidedly so' elif answerNumber == 4: return 'It is decidedly so' elif answerNumber == 5: return 'It is decidedly so' elif answerNumber == 6: return 'It is decidedly so' elif answerNumber == 1: return 'It is dec ask again' elif answerNumber == 7: return 'My reply is no' elif answerNumber == 8: return 'Outlook not so good' elif answer(r) print(fortune) The None Value >>> spam = print('Hello!') Hello! >>> spam is None True Note: never compare to None with the == operator. It takes care of the notifying.) Find more information visit. Python 3.7 provides a decorator dataclass that is used to convert a class into a dataclass. It is a convenient choice for configuration files where humans will have to edit it. So instead of doing this: >>> cat = ['fat', 'orange', 'loud'] >>> color = cat[1] color = c disposition = cat[2] You could type this line of code: >>> cat = ['fat', 'orange', 'loud'] >>> a, b = b, a >>> print(a) 'Bob' >>> a, b = b, a >>> print(a) 'Bob' >>> a, b = b, a >>> print(b) 'Alice' Augmented Assignment Operators Operator Equivalent spam += 1 spam = spam + 1 spam -= 1 spam = spam - 1 spam = spam / 1 spam /= 1 spam = spam / 1 spam / 1 spam / 1 spam / 1 spam = spam / 1 spam = spam / 1 spam spam = ['Cophie', 'Pooka', 'Fat-tail', 'Pooka'] >> spam.index('Pooka') 1 Adding Values to Lists with the append() and insert() vertor () vertor'bat'] Removing Values from Lists with remove() >>> spam = ['cat', 'bat', 'rat', 'elephant'] >>> spam.remove('bat') >>> spam ['cat', 'rat', 'elephant'] If the value appears multiple times in the list, only the first instance of the value appears multiple times in the list, only the first instance of the value will be removed. NO (even if they are valid Python): >>> True == True True >>> True != False True YES (even if they are valid Python): and not. If the iterables are of uneven length, missing values are filled-in with fillvalue. spam info = example zip.getinfo('spam.txt') isdecimal() returns True if the string consists only of letters and is not blank. Used for small details. An absolute path, which always begins with the root folder A relative path, which is relative to the program's current working directory There are also the dot (..) and dot-dot (..) folders. {,m} 0 to m of the preceding group. If there is a global statement for that caused the program to fail to do something. itertools.accumulate(iterable[, func]) Example: >>> data = [1, 2, 3, 4, 5] >>> result = itertools.accumulate(iterable[, func]) Example: >>> for each in result: >>> print(each) 1 2 6 24 120 The operator.mul(2, 3) 6 operator.mul(2, 3) 6 operator.mul(6, 4) 24 operator.mul(24, 5) 120 Passing a function is optional: >>> data = [5, 2, 6, 4, 5, 9, 1] >>> result = itertools.accumulate(data) >>> for each in result: >>> print(each) 5 7 13 17 22 31 32 If no function is designated the items will be summed: 5 5 + 2 = 77 + 6 = 1313 + 4 = 1717 + 5 = 2222 + 9 = 3131 + 1 = 32 combinations() Takes an iterable and a integer. >>> import this The Zen of Python, by Tim Peters Beautiful is better than ugly. version='0.1', ... For people familiar with ORMs, a model instance is a data object. And you can use the ^ and \\$ together to indicate that the entire string must match the regex—that is, it's not enough for a match to be made on some subset of the string. Due to their reduced complexity template strings are a safer choice. Al It is good to meet you, Al The len() Function Evaluates to the integer value of the number of characters in a string: >>> len('hello') 5 Note: test of emptiness of strings, lists, dictionary, etc, should not use len, but prefer direct boolean evaluation. >>> s1 = {1, 2, 3} >>> s2 = {2, 2, 3} 3, 4} >>> s1.difference(s2) # or 's1 - s2' {1} >>> s2.difference(s1) # or 's2 - s1' {4} set symetric difference or ^ will return all the elements that are not common between them. CRITICAL logging.critical() The highest level. >>> add(10, 20) # we can test it by calling the function save it as calculate.py 30 >>> # Now if we want Agent Bob.') 'CENSORED gave the secret documents to CENSORED.' Another example: >>> agent names regex.sub(r'\1****', 'Agent Alice told Agent Carol that Agent Eve knew Agent Bob was a double agent.' Managing Complex Regexes To tell the re.compile() function to ignore whitespace and comments inside the regular expression string, "verbose mode" can be enabled by passing the variable re.VERBOSE as the second argument to re.compile(). itertools.cycle(iterable) Example: >>> colors = ['red', 'orange', 'yellow', 'green', 'blue', 'violet'] >>> for color in itertools.cycle(colors): >>> print(color) red orange yellow green blue violet red orange When reached the end of the iterable it start over again from the beginning. Save the program as factorialLog.py. The packages field describes where you've put the Python source code within your project. any character, except newline characters. >>> s1 = {1, 2, 3} >>> s2 = {2, 3, 4} >>> s3 = {3, 4, 5} >>> s1.intersection(s2, s3) # or 's1 & s2 & s3' {3} set difference or - will return only used with reading and writing files, assist the application in conserving system memory and improve resource management by ensuring specific resources are only in use for certain processes. Although practicality beats purity. {n,m} at least n and at most m of the preceding p. with statement A context (a block of code) starts and ends. Windows is a first-class citizen, in our world. It describes all of the metadata about your project. Our initial setup.py will also include information about the license and will re-use the README.txt file for the long_description field. Keywords make it clear what the purpose of each argument is when it would be confusing with only positional arguments. There should be one-- and preferably only one -- obvious way to do it. In code, a raise statement consists of the following: The raise keyword A call to the Exception() function A string with a helpful error message.') Traceback (most recent call last): File "", line 1, in raise Exception() function >>> raise Exception: This is the error message.') Traceback (most recent call last): File "", line 1, in raise Exception() function A string with a helpful error message.') Exception: This is the error message.') error message. character flags the group that precedes it as an optional part of the pattern. All the regex functions in Python are in the re module: >>> mo = phone_num_regex.search('My number is 415-555-4242.') >>> print('Phone number found $\{ \frac{15-555-4242'}{>>} mo.group(1) = 0 \ regex. search('My number is 415-555-4242') >> mo.group(2) \ \frac{15-555-4242'}{>>} mo.group(2) \ \frac{15-55-4242'}{>>} mo.group(2) \ \frac{15$ retrieve all the groups at once: use the groups() method—note the plural form for the name. itertools.chain(*iterables) Example: >>> colors = ['red', 'orange', 'yellow', 'green', 'blue'] >>> shapes = ['circle', 'triangle', 'square', 'pentagon'] >>> result = itertools.chain(colors, shapes) >>> for each in result: >>> print(each) red orange yellow green blue circle triangle square pentagon compress() Filters one iterable with another. One is the os.path module. It has a bug in it, but you will also enter several log messages to help yourself figure out what is going wrong. Using os.path on *nix: >>> import os >>> os.path.relpath('/etc/passwd', '/') 'etc/passwd' Using pathlib on *nix: >>> from pathlib import Path >>> print(Path('/etc/passwd').relative to('/')) etc/passwd Checking Path Validity Checking if a file/directory exists: Using os.path.exists('/etc') True >>> os.path.exists('/etc') True >>>> os.path.exists('/etc') True >>> os.path.exists('/e *nix: from pathlib import Path >>> Path('.').exists() True >>> Path('setup.py') True >>> Path('setup.py') True >>> Path('nonexistentfile').exists() True >>> Path('nonexistentfile').exists() True >>> Path('setup.py') True >>> Path('nonexistentfile').exists() True >>> Path('nonexiste pathlib on *nix: >>> from pathlib import Path >>> Path('setup.py').is file() True >>> Path('home').is file() False >>> Path('nonexistentfile').is_file() False >>> Path('nonexistentfile').is_file() False >>> os.path.isdir('/') True >>> os.path.isdir('/') True >>> os.path.isdir('/') True >>> os.path.isdir('/') False >>> os.path.isdir('/') False >>> os.path.isdir('/') True >>> os.path.isdir('/') True >>> os.path.isdir('/') True >>> os.path.isdir('/') False >>> os.path.isdir(') F from pathlib import Path >>> Path('/').is_dir() True >>> Path('/setup.py').is_dir() False >>> Path('/spam').is_dir() False Finding File Sizes and Folder Contents Getting a file's size in bytes: Using os.path on Windows: >>> import os >>> os.path.getsize('C:\\Windows\\System32\\calc.exe') 776192 Using pathlib on *nix: >>> from pathlib import Path >>> stat = Path('/bin/python3.6').stat() >>> print(stat) # stat contains some other information about the file as well os.stat result(st mode=33261, st atime=1517725562, st mtime=1517725562, st mti Listing directory contents using os.listdir on Windows: >>> import os >>> import os >>> from pathlib import Path >>> for f in finance of financ Path('/usr/bin').iterdir(): >>> print(f) ... What is the password? print(example_zip.extract('spam.txt')) ... \$ poetry add pendulum For more information, check the documentation. >>> obj = Number(2) >>> obj.val 2 Default values It is easy to add default values to the fields of your data class. The global Statement If you need to modify a global variable from within a function, use the global statement: >>> eggs = 'global' eggs >>> eggs = 'global' eggs >>> eggs = 'global' eggs = 'global scope or global scope: If a variable is being used in the global scope (that is, outside of all functions), then it is always a global variable. WARNING logging.warning() Used to indicate a potential problem that doesn't prevent the program from working but might do so in the future. or *? It allows to load a Python dictionary from JSON, YAML, TOML and so on. You can define your own character class using square brackets. For example, the regex (Ha){3,5} will match 'HaHaHaHa', 'HaHaHa', 'HaHaH 10 groupby() Simply put, this function groups things together. Indexing and Slicing Strings H e l l o w o r l d ! 0 1 2 3 4 5 6 7 8 9 10 11 >>> spam[0:5] 'Hello' >>> spam[0:5] spam[::-1] '!dlrow olleH' >>> fizz = spam[0:5] >>> 'Hello' in 'Hello World' True >>> 'Hello' in 'Hello World' True >>> 'Hello' in 'Hello World' True >>> 'Hello' in 'Hello World' False >>> 'Hello' in 'Hello World' False >>> 'Hello' in 'Hello World' True >>> 'Hello' in 'Hello World' False >>> 'Hel >>> 5 in a False >>> 2 in a True The upper(), lower(), isupper(), and islower() String Methods upper() and lower(): >>> spam = 'Hello world!' >>> sp spam.isupper() False >>> 'HELLO'.isupper() True >>> 'abc12345'.islower() True >>> '12345'.islower() True >>> '12345'.islower() False The isX String Methods isalpha() returns True if the string consists only of letters and is not blank. By passing re.DOTALL as the second argument to re.compile(), you can make the dot character match all characters, including the newline character: >>> no_newline_regex = re.compile('.*') >>> no_newline_regex.search('Serve the public trust.Protect the innocent.Uphold the law.').group() 'Serve the publi law.').group() 'Serve the public trust.Protect the innocent.Uphold the law.' Review of Regex Symbols Symbol Matches ? Sincerely, Bob To keep a nicer flow in your code, you can use the dedent function from the textwrap standard package. Logging To enable the logging module to display log messages on your screen as your program runs, copy the following to the top of your program (but under the #! python shebang line): import logging.basicConfig(level=logging.DEBUG, format=' %(asctime)s - %(levelname)s- %(message)s') Say you wrote a function to calculate the factorial of a number. count: int = 0 ... Although never is often better than *right* now. # separator \d{3} # first 3 digits (\s|-|\.) # separator \d{4} # last 4 digits (\s*(ext|x|ext.)\s*\d{2,5})? Calling os.rmdir(path) or Path.rmdir() will delete the folder at path. # manager is reached. Set Project Directory We simply enter: setprojectdir . Using the newer formatted string literals or the str.format() interface helps 'HaHaHaHaHa' >>> nongreedy_ha_regex = re.compile(r'(Ha){3,5}?') >>> mo2 = nongreedy_ha_regex.search('HaHaHaHaHa') >>> mo2.group() 'HaHaHa' The findall() Method. bacon_file.write('Hello world!') 13 >>> with open('bacon.txt', 'a') as bacon_file: ... ^spam means the string must begin with spam. The group preceding a plus must appear at least once. Flat is better than nested. >>> mo1 = hero_regex.search('Batman | Tina Fey') >>> mo1 = hero_regex.search('Batman and Tina Fey') >>> mo1 = hero_regex.search('Batman and Tina Fey') >>> mo1 = hero_regex.search('Batman | Tina Fey') >>> mo1 = hero_regex.search('Batman and Ti also use the pipe to match one of several patterns as part of your regex: >>> bat regex = re.compile(r'Bat(man|mobile|copter|bat)') >>> mo.group() 'Batmobile' >>> mo.group() 'Batmobile lost a wheel') >>> mo.group() 'Batmobile lost a wheel') >>> mo.group() 'Batmobile' >>> mo.group() 'Batmobile' >>> mo.group() 'Batmobile lost a wheel') >>> mo.group() 'Batmobile' >>> mo.gr Dollar Sign Characters You can also use the caret symbol (^) at the start of a regex to indicate that a match must occur at the beginning of the searched text. The version field keeps track of different releases of the project. [abc] any character between the brackets (such as a, b,). Call the Match object's group() method to return a string of the actual matched text. Virtual Environment The use of a Virtual Environment is to test python code in encapsulated environments and to also avoid filling the base Python installation with libraries we might use for only one project. file obj.write('cats = {}'.format(print.pformat(cats))) 83 Reading ZIP Files >>> os.chdir('C:\\') # move to create -n HelloWorld To use the Virtual Environment, activate it by: conda activate HelloWorld Anything installed now will be specific to the project HelloWorld Exit the Virtual Environment, activate it by: conda activate HelloWorld Exit the Virtual Environment conda deactivate There are five logging levels, described in Table 10-1 from least to most important. A module's name is set equal to ______ when read from standard input, a script, or from an interactive prompt. class Number: ... Special cases aren't special enough to break the rules. Explicit is better than implicit. + one or more of the preceding group. Unless, there is a times argument. print('Exit') >>> with context_manager(2) as cm: ... itertools.combinations_with_replacement(iterable, r) Example: >>> shapes = ['circle', 'triangle', 'square'] >>> result = itertools.combinations_with_replacement(shapes, 2) >>> for each in result: >>> print(each) ('circle', 'criangle') ('triangle') ('triangle', 'square') ('triangle', 'square') ('triangle', 'square') ('triangle', 'square') ('triangle', 'square') ('triangle', 'square') ('triangle') ('triangle', 'square') ('trian start. itertools.combinations(iterable, r) Example: >>> for each in result: started in r than once. Comments Inline comment: # This is a comment Multiline comment: # This is a # multiline comment Code with a comment code with a comment a = 1 # initialization Please note the two spaces in front of the comment code with a comment code with a comment man error causes you to prematurely exit from an open file or connection Exception Handling Basic exception handling >>> try: >>> try: >>> try: >>> return 42 / divideBy): >>> try: >>> print(spam(1)) >>> print(spam(2)) >>> print(spam(2)) >>> print(spam(1)) 21.0 3.5 Error: Invalid argument: {}'.format(e)) >>> print(spam(2)) >>>>> print(spam(2)) >>> pri code in exception handling Code inside the finally section is always executed, no matter if an exception has been raised or not, and even if an exception has been raised or not. greedy regex = re.compile(r'') >>> mo = greedy regex.search(' for dinner.>') >>> mo.group() ' for dinner.>' Matching Newlines with the Dot Character The dot-star will match everything except a newline. Prefer string formatting. print(list(shelf_file.keys())) ... Keyword Arguments and print() >>> print('Hello', end='') >>> print('World') HelloWorld >>> print('cats', 'dogs', 'mice') cats dogs mice >>> print('cats', 'dogs', 'mice', sep=',') cats,dogs,mice Local and Global Scope Code in the global scope cannot use any local variables. The pathlib module was added in Python 3.4, offering an object-oriented way to handle file system paths. \D, \W, and \S anything except a digit, word, or space, respectively. Unless explicitly silenced. The second is the string for the regular expression. Only useful when a break condition can occur in the loop: >>> for i in [1, 2, 3, 4, 5]: >>> if i == 3: >>> break >>> break >>> else: >>> print("only executed when no item of the list is equal to 3") Importing Modules import random for i in range(5): >>> hello('Bob') Hello Alice Hello Bob Return Values and return Statements When creating a function using the def statement, you can specify what the return value should be with a return statement. Often it's enough to write: python setup.py install and module will install itself. Note: mostly used for regular expression definition (see re package) comments like this: phone regex = re.compile(r'''((\d{3}\))?>>> obj = Number(2) >>> obj.val 2 with dataclass ... # execute only if run as a script ... Then we call f and unpack them so they become normal arguments to f. Writing your own contextmanager using generator syntax It is also possible to writ a context manager using generator syntax thanks to the contextlib.contextmanager decorator: >>> import contextlib.contextmanager ... For example, the regex (Ha){3} will match the string 'HaHaHa', but it will not match 'HaHa', since the latter has only two repeats of the (Ha) group. Code in a function's local scope cannot use variables in any other local scope. For example, the regular expression r'Batman|Tina Fey' will match either 'Batman' or 'Tina Fey'. While searched string, the findall() method will return a Match object of the first matched text in the searched string.) Pass the string you want to search into the Regex object's search() method. print('Compressed file is %sx smaller!' % (round(spam_info.file size / spam_info.compress_size, 2))) ['spam.txt', 'cats/catnames.txt', 'ca files and folders from a ZIP file into the current working directory. Examples: >>> 42 == 42 True >>> 40 == 42 False >>> 'hello' == 'hello' True >>> 42 == 42.0 True > execution of the block causes the context manager's exit method to be called. lower for the key keyword argument in the sort() method call: >>> spam = ['a', 'z', 'A', 'Z'] >>> spam = ['a', 'Z', 'Z'] >>> spam = ['a', 'Z', 'A', 'Z'] >>> spam = ['a', 'Z', 'Z'] >>> spam = ['a', 'Z', 'Z'] >>> spam = ['a', 'Z', 'Z'] >>> spam = ['a', 'Z'] >> spam = ['a', sorted(spam) ['ants', 'badgers', 'cats', 'dogs', 'elephants'] Tuple Data Type >>> eggs = ('hello', 42, 0.5) >>> len(eggs) 3 The main way that tuples, like strings, are immutable. By failing fast like this, you shorten the time between the original cause of the bug and when you first notice the bug. Install Poetry pip install --user poetry Create a new project poetry new my-project This will create a my-project and its dependencies: [tool.poetry] name = "my-project" version = "0.1.0" description = "" authors = ["your name "] [tool.poetry.dependencies] pytest = "^3.4" Packages To add dependencies to your project, you can specify them in the tool.poetry.dependencies section: [tool.poetry.dependencies] pytest = "^3.4" Packages To add dependencies] pytest = "^3 "^1.4" Also, instead of modifying the pyproject.toml file by hand, you can use the add command and it will automatically find a suitable version constraint. \d, \w, and \s a digit, word, or space character, respectively. I'm doing fine. This module provides a decorator and functions for automatically adding generated special methods such as __init__() and repr () to user-defined classes. >>> print(r'That is Carol\'s cat.') That is Carol\'s cat.') That is Carol\'s cat.') Walking a Directory Tree >>> >>> print(") The current folder is C:\delicious\cats FILE INSIDE C C:\delicious\walnut: waffles The current folder is C:\delicious\walnut\waffles: butter.txt pathlib provides a lot more functionality than the ones listed above, like getting file extension, reading/writing a file without manually opening it, etc. The first two arguments will be the start and stop values, and the third will be the step argument. for line in sonnet file: # note the new line character will be included in the line ... Backslash on Windows, paths are written using backslashes (\) as the separator between folder names. Create a Regex object with the re.compile() function. Safe Deletes with the send2trash Module You can install this module by running pip install send2trash from a Terminal window. Instead of one number, you can specify a range by writing a minimum, a comma, and a maximum in between the curly brackets. Lazy string formatting You would only use %s string formatting on functions that can do lazy parameters evaluation, the most common being logging: Prefer: >>> logging.debug("User name: {}".format(name)) Or: >>> logging.debug(" possible to do inline arithmetic with it: >>> a = 5 >>> b = 10 >>> f Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$ and not $\{2 * (a + b)\}$.' Five plus ten is $\{a + b\}$.' Five plus 5} >>> s1.union(s2) # or 's1 | s2' {1, 2, 3, 4, 5} set intersection intersection or & will return a set containing only the elements that are common to all of them. A return statement consists of the following: The return keyword. Case-Insensitive Matching To make your regex case-insensitive, you can pass re.IGNORECASE or re.I as a second argument to re.compile(): >>> robocop = re.compile(r'robocop', re.I) >>> robocop.search('ROBOCOP' >>> robocop.se Strings with the sub() Method The sub() method for Regex objects is passed two arguments: The first argument is a string to replace any matches. istitle() returns True if the string consists only of words that begin with an uppercase letters. itertools.count(10,3): >>> print(i) >>> if i > 20: >>> break 10 13 16 19 22 cycle() This function cycles through an iterator endlessly. class Product: ... print('Right in the middle with cm = 3 Exit >>> main Top-level script environment main is the name of the scope in which top-level code executes. >>> @dataclass ... Function docstring: def foo(): """ This is a function docstring You can also use: "' Function Docstring You can >>> print('It is good to meet you, {}'.format(myName)) What is your name? It can't begin with a number. virtualenv Install virtualenv pip install virtualenv pip install virtualenv rapper-win (Windows) pip install virtualenv rapper-win (Windows) pip install virtualenv rapper-win Usage: Make a Virtual Environment mkvirtualenv HelloWold Anything we install now will be specific to this project. The first one it easier to use but the second one, Ruamel, implements much better the YAML specification, and allow for example to modify a YAML content without altering comments. This returns a Match object. while True: print('Who are you?') name = input() if name != 'Joe': continue print('Hello, Joe. From the PEP 20 -- The Zen of Python: Long time 'A', 'O', 'O'] You can also include ranges of letters or numbers by using a hyphen. Exiting a script without properly closing files/connections is a bad idea, that may cause data loss or other problems. Features They store data and represent a certain data type. >>> name = 'John' >>> age = 20' >>> "Hello I'm {}, my age is {}".format(name, age) "Hello I'm John, my age is 20" >>> "Hello I'm {0}, my age is {1}".format(name, age) "Hello I'm John, my age is 20" The official Python 3.x documentation recommend str.format over the % operator: The formating operations described here exhibit a variety of guirks that lead to a number of common errors (such as failing to display tuples and dictionaries correctly). The Pipfile is used to track which dependencies your project needs in case you need to re-install them. isspace() returns True if the string consists only of spaces, tabs, and new-lines and is not blank. {n,m}? name: Any ... Saving Variables with the shelve Module To save variables: >>> import shelve >>> cats = ['Zophie', lstrip() >>> spam = 'Hello World' >>> spam.strip() 'Hello Worl pyperclip.copy('Hello world!') >>> pyperclip.paste() 'Hello world!' String Formatting % operator >>> name = 'Pete' >>> 'Hello %s' % name "Hello Pete" We can use the %x format specifier to convert an int value to a string: >>> num = 5 >>> 'I have %x apples' % num "I have 5 apples" Note: For new code, using str.format or f-strings (Python 3.6+) is strongly recommended over the % operator. Converting Types with the list() and tuple() Functions >>> list('cat', 'dog', 5) >>> list('cat', 'dog', 5) >>> list('hello') ['h', 'e', 'l', 'd'] Dictionaries and Structuring Data Example Dictionary: myCat = {'size': 'fat', 'color': 'gray', 'disposition': 'loud'} The keys(), values(); and items() Methods values(): >>> for v in spam.values(): spaw.values(): spaw.values(key-value pairs in a dictionary, respectively. Makes an iterator and returns elements from the iterable as long as the predicate is true. >>> except: >>> with open('errorInfo.txt', 'w') as error file: >>> error file: error message.') >>> error message.') >>> error file: error message.') >>> error message.') >>> error file: error message.') >>> error mess info was written to errorInfo.txt.') 116 The traceback info was written to errorInfo.txt. For example, file objects are context management and move into your root project folder workon HelloWold poetry is a tool for dependency management and packaging in Python. This allows you to easily install Python packages. >>> bat regex.search('The Adventures of Batwoman') >>> mo1 = bat regex.search('The Adventures star or asterisk) means "match zero or more"—the group that precedes the star can occur any number of times in the text. This will look like: >>> from distutils.core import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup(... The logging.basicConfig() function takes a filename keyword argument, like so: import setup >>> setup keyword argument, like so: import setup keyword argument, like setup keyword ar level=logging.DEBUG, format='%(asctime)s - %(levelname)s - %(levelname)s - %(levelname)s - %(asctime)s - %(asct functions, lambdas also work as lexical closures: >>> def make adder(3) >>> plus 3 = make adder(3) >>> plus 5 = make adder(3) = ma a variable anything as long as it obeys the following rules: It can be only one word. Using the * operator with a generator may cause your program to run out of memory and crash. Open a YAML () yaml.load(f) Anyconfig is a very handy package allowing to abstract completely the underlying configuration file format. >>> s = {} >>> type(s) sets: unordered collections of unique elements A set automatically remove all the duplicate values. * zero or more of the preceding group. There a quite a few fields you can add to a project to give it a rich set of metadata describing the project. Continue the interactive shell example: >>> with zipfile.ZipFile('example.zip') as example zip: ... >>> mo.groups() ('415', '555-4242') >>> area code, main number = mo.groups() >>> print(area code) 415 >>> pri >>> cwd = Path.cwd() >>> (cwd / 'delicious' / 'walnut' / 'waffles').mkdir(parents=True) And all is good :) Absolute vs. print(example zip.extract('spam.txt' 'C:\\some\ew\\folders')) 'C:\\spam.txt' 'C:\\some\ew\\folders') 'C:\\spam.txt' ' official documentation if you want to know more! Reading/Writing Files The File Reading/Writing Process To read/write to a file in Python, you will want to use the with statement, which will close the file for you after you are done. >>> def fruits(*args): >>> for fruit in args: provide the file for you after you are done. "bananas" "grapes" Similarly, you use **kwargs when you have an indefinite number of keyword arguments. {n} exactly n of the preceding group.

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