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A Byte of
Python

Book version 2.1
for Python version 3.0

Swaroop C H

BYTE Interview

who have been with us for only a few months have something in the Lisa that they can look at and say, "That was my idea; that's my code." It's really a group effort. Even marketing got involved in the design effort in various ways, particularly in user-interface issues, product design, packaging, and the style of the manuals. The whole division really got involved.

BYTE: When did you decide to incorporate all the fundamental applications into the system software?

Daniels: At the very beginning. Some applications weren't decided until later, but the integration, the way it all fit together, was a goal from the very beginning.

Rosing: As a matter of fact, we cut out a few more things because we just didn't feel we could manage a project that large. Then we added a couple things back in as we became more comfortable with the development cycle. But we've basically been operating on the same goal for the past two years, with very little change of direction.

BYTE: What was the sequence in the early days? Did you decide what the project had to look like to the end user, and then what software was required, and then. . .

Daniels: Then hardware. In fact, we spent the first six months hammering out the user-interface docket. We had that completely specified before we really started the applications. I think the key to success here is to know where you're going before you start.

Tesler: The hardware, the operating system, and the applications were all developed somewhat in parallel, but there was a definite cause and effect. The people who designed the hardware had to make decisions, for example, about whether the disk drive should have a door that you flip open or a button to push, that kind of thing. The designers focused on that aspect of the user interface even before the rest of the user interface. They didn't want the user to be able to accidentally pull out a disk when it was being written on or something. So some decisions were made even

before the hardware was designed. There have also been hardware revisions. The first Lisa hardware was here when I came, over two years ago. It's gone through several. . . how many revisions since then?

Rosing: About four. Each one's been an iteration. We discovered a few things in the early hardware that wouldn't work well. We just took them out because we couldn't do them properly. The rest has mostly been a matter of fine-tuning Lisa so that it's very manufacturable and very reliable.

Tesler: Each time they go through a cycle, the people working on user interface get another crack at it — "Since you're going to revise the hardware anyway, why don't you. . . ?" Or the people doing the operating system say, "The memory-management unit needs to be more general, and since you're redesigning the hardware anyway. . . " So we were able to get in some hardware revisions. Also, that keyboard you saw yesterday is not the final one. After user testing, and because of needing to support the European market, we determined that we really needed a couple more keys on the keyboard, so we made a major change in the keyboard layout.

Rosing: One of the things about this project that's different is that, more than any other I've been associated with, there's a continuous loop for dealing with user issues. We've gone to the software and that has implied a lot of different disciplines. The power-off button used to be a traditional button on the back of the machine, but we didn't want to encourage users to turn off their machines that way because if they left a document open, they would lose it.

BYTE: Do you expect to find a little initial resistance to the fact that the machine doesn't actually turn off when you push a button? Do you think people are going to say, "Well, I know I can leave it alone now, but I want to make sure it turns off"?

Rosing: Right. It does feel a little funny at first, but after a few times you
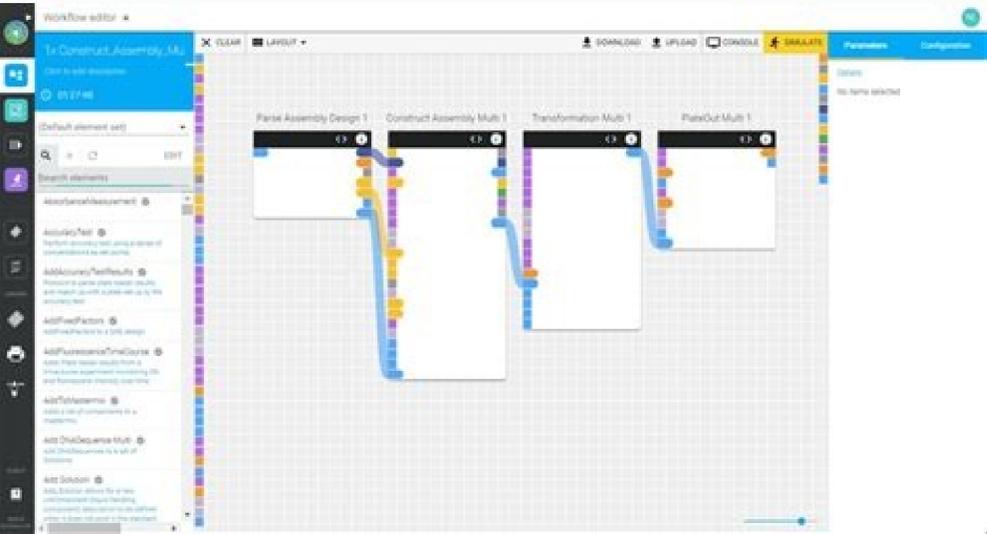
Maxim Svistunov   Marie Doležalová   Stephen Wadeley
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Jana Heves   Petr Kovář   Peter Ondrejka
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Eva Kopalová   Miroslav Svoboda   David O'Brien
Michael Hideo   Don Domingo   John Ha

print("You're over 18 years old") ... Here's an example of how the while loop works: >>>>>> count = 1 >>> while count < 5: ... MORE FROM LIFE123.COM Are you looking for a place to learn the basics of how to use Python from a beginner's perspective? Linux: You can install several Python versions using your distribution's package manager. Given an integer number or a string representing a number as an argument, float() returns a floating-point number: >>>>>> # integer numbers >>> float(9) 9.0 >>> float(-99999) -99999.0 >>> # Strings representing numbers >>> float("2") 2.0 >>> float("-200") -200.0 >>> float("2.25") 2.25 >>> # Complex numbers >>> float(complex(1, 2)) Traceback (most recent call last): File "", line 1, in float(complex(1, 2)) TypeError: can't convert complex to float With float(), you can convert integer numbers and strings representing numbers into floating-point numbers, but you can't convert a complex number into a floating-point number. Python provides integers, floating-point numbers, and complex numbers. Readability is arguably one of the more attractive features of the language itself. You will also want to consider the student-teacher ratio, graduation rate, financial aid and placement rate.When doing your research and pondering your particular skill set, don't neglect to learn about the salary range for a certificate program in which you may enroll. You'll learn about .join() a little bit later in this tutorial. For example, if you pass a string as an argument to len(), then you'll get the string's length, or the number of characters it contains: >>>>>> len("Happy pything!") 16 When you call len() using a string as an argument, you get the number of characters, including any blank spaces, in the input string. Here's the general syntax for a while loop in Python: while expression: # Repeat this code block until expression is false # Do something... This is convenient for a variety of reasons. That should open a Python interactive session, and your command prompt should look similar to this: >>>Python 3.9.0 (default, Oct 5 2020, 17:52:02) [GCC 9.3.0] on linux Type "help", "copyright", "credits" or "license" for more information. These words are known as keywords. Since lists are sequences just like strings, you can access their individual items using zero-based integer indices: >>>>>> numbers = [1, 2, 3, 200] >>> numbers[0] 1 >>> numbers[1] 2 >>> superheroes = ["batman", "superman", "spiderman"] >>> superheroes[-1] "spiderman" >>> superheroes[-2] "superman" Indexing operations also work with Python lists, so you can retrieve any item in a list by using its positional index. But even so, they can log on from wherever they are.Online Learning for AnyonePeople who want to advance their education and skills can find increasing numbers of online certificate training courses or e-learning opportunities. One final and important note: A frustrated brain is not going to help. Finally, you'll have a chance to evaluate your progress with a quiz that'll give you an idea of how much you've learned. That way, other developers can make an educated guess of what your variables hold. Do some research. if i == number: ... Python provides a built-in function, bool(), that is closely related to Boolean values. Sets are unordered and mutable collections of arbitrary but hashable Python objects. However, it raises a ZeroDivisionError exception when the interpreter tries to actually evaluate the expression. There's another way of getting access to the whole list of Python keywords: >>>>>> import keyword >>> keyword.kwlist ['False', 'None', 'True', 'and', 'as', 'assert', 'async', 'await', 'break', 'class', 'continue', 'def', 'del', 'elif', 'else', 'except', 'finally', 'for', 'from', 'global', 'if', 'import', 'in', 'is', 'lambda', 'nonlocal', 'not', 'or', 'pass', 'raise', 'return', 'try', 'while', 'with', 'yield'] keyword provides a set of functions that allow you to determine if a given string is a keyword. It'll help you make the leap from beginner to intermediate Python developer. You can create them by calling frozenset() with an iterable as an argument. The output will look something like this: 1 2 3 4 5 6 7 8 9 10 Counting complete! That's it! You just wrote your first Python program. Note that you use python3 instead of python because some operating systems still include Python 2 as their default Python installation. The Python Visualizer has examples to help you if needed. Here are some examples of how this works: >>>>>> age = 21 >>> if age >= 18: ... Python developers favor this coding style, known as EAFP (Easier to Ask for Forgiveness than Permission), over the coding style known as LBYL (Look Before You Leap), which is based on using if statements. It simply truncates the input, throwing out anything after the decimal point, and returns the number. If you set number to 6 or any other number that's not in the tuple of numbers, then the loop doesn't hit the break statement and prints Number not found. You can also add two tuples using the concatenation operator: >>>>>> first_tuple = (1, 2) >>> second_tuple = (3, 4) >>> third_tuple = first_tuple + second_tuple >>> third_tuple (1, 2, 3, 4) A concatenation operation with two tuples creates a new tuple containing all the items in the two input tuples. Comments can have many purposes, but for the most part, you use them to either explain the code or summarize a specific approach you took as the developer. It's not so much that students are going to be traveling the world as much as they likely hold down a job and have families. If you forget them, then you won't be calling the function but referencing it as a function object. Sometimes programmers use short variable names, such as x and y. The string on which you call the method plays the role of a separator: >>>>>> " ".join(["Happy", "pythoning!"]) 'Happy pythoning!' str.upper() returns a copy of the underlying string with all the letters converted to uppercase: >>>>>> "Happy Developer!".upper() 'HAPPY PYTHONING!' str.lower() returns a copy of the underlying string with all the letters converted to lowercase: >>>>>> "HAPPY PYTHONING!".lower() 'happy pythoning!' str.format() performs a string formatting operation. After that, the execution jumps to the statement directly below the if statement. Can you tell what the statement evaluates to in each iteration? But by now, you should have a better idea of why Python is so popular and why you should consider learning to program with it. That's why online certificate training courses can be so convenient. An index is a zero-based integer number associated with a specific position in a sequence: >>>>>> welcome = "Welcome to Real Python!" >>> welcome[0] 'W' >>> welcome[11] 'R' >>> welcome[-1] '!' An indexing operation retrieves the character at the position indicated by the given index. Use the Python Visualizer if you're still stumped. If you've read through this tutorial up to this point, then you might want to answer some Python-related questions and test what you've learned. What is a dictionary? Multiparadigm: It lets you write code in different styles, including object-oriented, imperative, and functional style. Don't use a try and except block until your code is working. print("Number not found") ... If you get stuck on a problem, then try these suggestions: Stop coding! Get a piece of paper and map out how to solve the problem using plain words. You can watch people to learn how it's done and sometimes you can get a push, but in the end, it's a solo event. You can also create new lists from an existing list using a slicing operation: >>>>>> numbers = [1, 2, 3, 200] >>> new_list = numbers[0:3] >>> new_list [1, 2, 3] If you next a list, a string, or any other sequence within another list, then you can access the inner items using multiple indices: >>>>>> mixed_types = ["Hello World", [4, 5, 6], False] >>> mixed_types[1][2] 6 >>> mixed_types[0][6] 'W' In this case, the first index gets the item from the container list, and the second index retrieves an item from the inner sequence. In this tutorial, you learned essential concepts about Python and started to apply them to your Python code. Take advantage of them to bring leverage to your own educational plans and career track. Now open your text editor and create a new file called exercise.py. Python provides convenient built-in exceptions that allow you to catch and handle errors in your code. Coding is like riding a bike. Note that the list of arguments is optional, but the parentheses are syntactically required. Now run the following command: You may need to replace python with python3 depending on your setup. To check what Python version has been installed globally in your operating system, open the terminal or command line and run the following command: This command prints the version of your system's default Python 3 installation. In this case, the return statement is also optional and is the statement that you use if you need to send a return value back to the caller code. print("Number found.", i) ... If you get an error message, then typing in the exact error message into Google will often bring up a result on the first page that might solve the problem. Of course, there are many other courses, tutorials, and resources about Python available online. Lists are usually called arrays in nearly every other programming language. Dynamically typed: It checks variable types at runtime, so you don't need to declare them explicitly. You can manipulate them with several tools: Operators Built-in functions Data type methods In the next few sections, you'll learn the basics of incorporating Python's built-in data types into your programs. Benefits of Online LearningOne of the benefits of online learning is that students can be almost anywhere in the world where they have access to a reasonably good Wi-Fi connection, and still be in class. if break_condition: break # Leave the loop if continue_condition: continue # Resume the loop without running the remaining code # Remaining code... Can you explain what each line of code use the Anaconda distribution to install Python along with a rich set of packages and libraries, or you can use Miniconda if you want to install only the packages you need. In any case, a certificate can showcase abilities and help you earn more money. Dictionaries are a type of associative array containing a collection of key-value pairs in which each key is a hashable object that maps to an arbitrary object, the value. Consult sources like the U.S. Bureau of Labor Statistics to track where jobs are, and are not. You may also wish to research job market trends for any job you may be interested in. They hold a reference, or pointer, to the memory address at which an object is stored. Can you retrieve the value associated with a given key using the following syntax: >>>>>> person1 = {"name": "John Doe", "age": 25, "job": "Python Developer"} >>> person1["name"] 'John Doe' >>> person1["age"] 25 This is quite similar to an indexing operation, but this time you use a key instead of an index. Can you tell what the final value of count would be? Some of them are totally free, others cost a modest fee supports the site and allows us to continue creating and updating content for you. The string class (str) provides a rich set of methods that are useful for manipulating and processing strings. They let students learn at their own time and at their own pace. ... Complex numbers have a real part and an imaginary part, which are both floating-point numbers. So, an input of 10.6 returns 10 instead of 11. In other words, if exprO is true, then only its associated code block will run. You can also use the backslash character () to escape characters with special meaning, such as the quotes themselves. This tutorial focuses on the essentials you need to know to start programming with Python. Otherwise, the application would continue running forever. They also provide methods to modify or update the underlying set. Why should you use comments in your code? What are Python's built-in data types? if i == 3: ... Like with lists and strings, you can use some built-in functions to manipulate tuples. Do you want to get up and running with Python but don't know where to start? At some point, though, you'll need guidance. Like a good friend, Python is always there to help. For example, str.join() takes an iterable of strings and joins them together in a new string. Save the file as count_to_ten.py in the folder you created, then exit the editor. To leave the help utility, you can type quit and hit Enter. You might find the solution to your problems in the process. They're string literals with an f at the beginning, outside the quotes. Exceptions are raised by syntactically correct code at runtime to signal a problem during program execution. You can also concatenate your lists using the plus operator: >>>>>> fruits = ["apples", "grapes", "oranges"] >>> veggies = ["corn", "kale", "mushrooms"] >>> grocery_list = fruits + veggies >>> grocery_list ['apples', 'grapes', 'oranges', 'corn', 'kale', 'mushrooms'] Since lists are sequences of objects, you can use the same functions you use on any other sequence, such as strings. You can also use help() with the name of an object as an argument to get information about that object: >>>>>> help() Help on built-in function dir in module builtins: dir(...) dir([object]) -> list of strings ... Accessible: People of all ages, from school children to retirees, have learned Python, and so can you. To use a function, you need to call it. It comes preinstalled on macOS and on most Linux distributions. This means that you can retrieve individual characters from a string using their positional index. Have fun coding! Many programmers get overwhelmed when they start to solve a problem. Luckily, you don't need to memorize PEP 8 to give your Python code a Pythonic style. You use Boolean values to express the truth value of an expression. That'll take you directly to Python's help utility: >>>>>> help() Welcome to Python 3.9's help utility! If this is your first time using Python, you should definitely check out the tutorial on the Internet at . Once you define your string objects, you can use the plus operator (+) to concatenate them in a new string: >>>>>> "Happy" + " " + "pythoning!" 'Happy pythoning!' When used on strings, the plus operator (+) concatenates them into a single string. What's the difference between a variable name and a variable value? What's the difference between errors and exceptions? You commonly use an else clause in loops that have a break statement in their code block. To get the complete list of keywords available in your current Python installation, you can run the following code in an interactive session: >>>>>> help("keywords") Here is a list of the Python keywords. You can also take advantage of code linters, such as Flake8, Pylint, and pycodestyle. Compared to other programming languages, Python has the following features: Interpreted: It's portable and quicker to experiment with than compiled languages. With Python, you can write basic programs and scripts and also to create complex and large-scale enterprise solutions. print("The loop wasn't interrupted") ... Just be aware that the material can be less reader-friendly than what you'll find at Real Python. What's the difference between an integer and a floating-point number? This tool allows you to step through your code as it executes. The variable name should provide some indication as to what the values assigned to it are. That's why you don't use the number 0 in the output. Like any other programming language, Python has a set of special words that are part of its syntax. Here's the syntax: variable_name = variable_value You should use a naming scheme that makes your variables intuitive and readable. This means that you can't change them after creation. This type of application of technology to the educational arena has become increasingly widespread, and has come to include a real range of certificate training and e-learning courses, all online. A step of 2, for example, will return every other element between start and stop. Python has a bunch of features that make it attractive as your first programming language: Free: Python is available free of charge, even for commercial purposes. What does the % operator do? Understanding slice notation and Manually raising (throwing) an exception in Python are just two truly excellent examples. What's the difference between a list and a tuple? The first elif clause evaluates expr1 only if exprO is false. Typically, students need a high school diploma to enroll in an undergraduate certificate program. In other contexts, you should avoid single-character names and use something more descriptive. print(count) ... If the object isn't in the tuple, then .index() raises a ValueError: >>>>>> letters.index("a", "b", "c", "a") >>> letters.index("c") 3 >>> letters.index("d") Traceback (most recent call last): File "", line 1, in letters.index("d") ValueError: tuple.index(x): x not in tuple Tuples are quite useful data structures. There are several ways to create a dictionary. elif expr2: # Run if expr2 is true # Your code goes here... Note: In Python, you'll commonly rely on exceptions to control the flow of a program. Besides operators, Python provides you with a bunch of built-in functions for manipulating tuples. For example, if you want to be up to date, then you probably need to download and install the latest version. Although it's not required to write workable Python code, studying PEP 8 and applying it consistently in your Python code will make your programs more readable and maintainable. This will help you consistently improve the style of your code and will also reinforce PEP 8's recommendations in your mind. There's a lot more to learn about Python. Go ahead and test your knowledge: What does it mean that Python is a strong, dynamically typed language? On the other hand, int() takes a Boolean value and returns 0 for False or 1 for True: >>>>>> int(False) 0 >>> int(True) 1 This is because Python implements its Boolean values as a subclass of int, as you saw before. The Python syntax is clear, concise, and focused on readability. How do you define a variable? Booleans are implemented as a subclass of integers with only two possible values in Python: True or False. Each time the count increments, you want to display its value. In the conditional statement if count == 11:, the == compares the value of count with 11, returning a Boolean True or False according to the result of the operation. Graduate certificate programs meet very requirements that can include a completed bachelor's degree and/or graduate test scores, professional experience, or a combination of items and circumstances. Strings are pieces of text or sequences of characters that you can define using single, double, or triple quotes: >>>>>> # Use single quotes >>> greeting = 'Hello there!' >>> # Use double quotes >>> welcome = "Welcome to Real Python!" >>> welcome 'Welcome to Real Python!' >>> # Use triple quotes >>> message = """Thanks for joining us!""" >>> message 'Thanks for joining us!' >>> # Escape characters >>> escaped = 'can\'t' >>> escaped "can't" >>> not_escaped = "can't" >>> not_escaped "can't" Note that you can use different types of quotes to create string objects in Python. In this case, conditional statements are ally. Use the rubber duck debugging technique. When you start to get annoyed because something isn't working, take a break to clear your mind. Otherwise, there's no need for it. In this tutorial, you learned: What Python is and why you should consider using it What basic Python syntax you should learn to start coding How you can handle errors in Python How you can get help in Python quickly What code style you should use in your code Where to get extra functionalities without reinventing the wheel Where to get quality Python content and grow your skills You also created your first Python program and ran it on your computer. If the object isn't in the tuple, then .count() returns 0: >>>>>> letters = ("a", "b", "c", "a") >>> letters.count("a") 2 >>> letters.count("c") 1 >>> letters.count("d") 0 tuple.index() takes an object as an argument and returns the index of the first instance of that object in the tuple at hand. CCOmohamed_hassan/Pixabay Traditional classroom learning has started increasingly incorporate technology, with more courses offered online, and the virtual classroom becoming a common experience. 1 2 4 5 This time, the continue statement restarts the loop when i == 3. Booleans are handy when you're writing predicate functions or when you're using comparison operators, such as greater than (>), lower than (>=>>>> 2 < 5 True >>> 4 >> 3 >>> 3 >> 5 >>> 5 == 6 False >>> 6 != 9 True Comparison operators evaluate to Boolean values, True or False. break ... Online certificate programs boast the same job focus and specialized skill components as in-person classes, also offering real class flexibility and accelerated programs. The break and continue statements are also optional. Otherwise, the loop will always break when it hits break and continue when it hits continue. Here's a set of special words that are part of its syntax. Here's the syntax: variable value You should use a naming scheme Number Description Examples Python Data Type Integer Whole numbers 1, 2, 42, 476, -99999 int Floating-point Numbers with decimal points 1.0, 2.2, 42.09, 476.1, -99999.9 float Complex Numbers with a real part and an imaginary part's complex(1-1, 7), complex(1+2)) complex Integer numbers have unlimited precision. Normally, you use each iteration to perform a given operation on the value of var. Note that you can also retrieve slices from a tuple with slicing operation. Go there and grab the appropriate 32-bit or 64-bit version for your operating system and processor. else: # Run this code block if no break statement in run # Next statement This loop works similarly to a for loop, but it'll keep iterating until expression is false. For example, consider the following math expression: >>>>>> 12 / 0 Traceback (most recent call last): File "", line 1, in ZeroDivisionError: integer division or modulo by zero The expression 12 / 0 is syntactically correct in the eyes of the Python parser. You still have more to do and learn! You'll start by writing code with the Python syntax. When you're done, run the code from your terminal to test using the python exercise.py command. var1 = var2 = var3 = var4 = var5 = var6 = # Don't edit anything below this comment # Numbers print(isinstance(var1, int)) print(isinstance(var6, float)) print(var1 < 35) print(var1 >>>>>> employee = ("Jane", "Doe", 31, "Software Developer") >>> employee[0] 'Jane' >>> employee[1:3] ('Doe', 31) Since tuples are sequences, you can use indices to retrieve specific items in the tuples. The Python parser returns 0: >>>>>> letters = ("a", "b", "b", "c", "a") >>> letters.count("a") 2 >>> letters.count("c") 1 >>> letters.count("d") 0 tuple.index() takes an object as an argument and returns the number of times the item appears in the underlying tuple. One of the most common use cases of sets is to use them for removing duplicate objects from an existing iterable: >>>>>> set([1, 2, 3, 4, 5, 3]) {1, 2, 3, 4, 5} Since sets are collections of unique objects, when you create a set using set() and an argument, the class constructor removes any duplicate objects and keeps only one instance of each in the resulting set. Sometimes, times are set for classes, and students have to log on at the designated time. Sometimes you need to run() or not run a given code block depending on whether certain conditions are met. Do your research before making a decision. If not, then improve them or even remove them. Given a floating-point number or a string as an argument, int() returns an integer. These errors can be difficult to find, debug, and fix because the runtime engine is generated. help>> Once there, you can type in the name of a Python object to get helpful information about it: >>>>>> help() ... Points to ResearchMany programs are accredited by the U.S. Department of Education, which is a significant and important point in lending viability to both the program and to the degree you will receive from it. Look at historical trends and include projections for your selected field.Leverage Free TrainingSometimes, you can find free training or vocational courses in your city. count = count + 1 ... Traceback (most recent call last): File "", line 1, in ZeroDivisionError: integer division or modulo by zero The expression 12 / 0 is syntactically correct in the eyes of the Python parser. You still have more to do and learn! You'll start anything below this comment # Numbers print(isinstance(var1, int)) quite a short time. For example, len() returns the length of the type, or the number of items it contains: >>>>>> numbers = (1, 2, 3) >>> len(numbers) 3 With a tuple as an argument, list() returns a list with all the items in the input tuple: >>>>>> numbers = (1, 2, 3) >>> list(numbers) [1, 2, 3] Because tuples are immutable sequences, many of the methods that are available for lists. When you combine them with numbers, they form expressions that Python can evaluate: >>>>>> # Addition >>> 5 + 3 8 >>> # Subtraction >>> 5 - 3 2 >>> # Multiplication >>> 5 * 3 15 >>> # Division >>> 5 / 3 1.6666666666666667 >>> # Floor division >>> 5 // 3 1 >>> # Modulus (returns the remainder from division) >>> 5 % 3 2 >>> # Power >>> 5 ** 3 125 These operators work with two operands and are commonly known as arithmetic operators. Then you need the name of the function and a list of arguments in parentheses. You will be amazed just how effective this can be. Finally, if you want to create an empty set, then you need to use set() without arguments. They include courses through the city's Department of Education, Office of Adult and Continuing Education. To create a list, you use an assignment with a sequence of comma-separated objects in square brackets ([]) on its right side: >>>>>> # Define an empty list >>> empty = [] >>> empty [] >>> # Define a list of numbers >>> numbers = [1, 2, 3, 100] >>> numbers [1, 2, 3, 100] >>> # Define a list of strings >>> superheroes = ["batman", "superman", "spiderman"] >>> superheroes ['batman', 'superman', 'spiderman'] >>> # Define a list of objects with different data types >>> mixed_types = ["Hello World", [4, 5, 6], False] >>> mixed_types ['Hello World', [4, 5, 6], False] Lists can contain objects of different data types, including other lists. There are also professional certificates in areas like project management, accounting and information technology.Programs range from about four to eight programs a year that can be completed in a few months to a year. print("You're a legal adult") ... They are reserved words that have specific meanings and purposes in the language, so you shouldn't use them for anything but those specific purposes. A good source of free learning materials is the official Python documentation, which you should keep handy as a reliable and quick reference. You also have the choice of using different Python versions in different projects if you want to. If the loop hits a continue condition, then the continue statement resumes the loop without running the rest of the statements in the loop's code block: >>>>>> for i in (1, 2, 3, 4, 5): ... These functions are always available to you. However, there are some OS-specific alternatives: macOS: You have the option of installing Python from Homebrew. This method provides a lot of flexibility for string formatting and interpolation: >>>>>> name = "John Doe" >>> age = 25 >>> "My name is {0} and I'm {1} years old".format(name, age) "My name is John Doe and I'm 25 years old" You can also use an f-string to format your strings without using .format(): >>>>>> name = "John Doe" >>> age = 25 >>> f"My name is {name} and I'm {age} years old" "My name is John Doe and I'm 25 years old" Python's f-strings are an improved string formatting syntax. Courses of study include plumbing, welding, culinary arts/food preparation, medical billing and coding, nursing assistant, solar installation and others.The range of online opportunities is only poised to grow. With all this knowledge, you can dive deeper into Python and learn a lot more of the language. In Python, lists are mutable sequences that group various objects together. print("You're NOT an adult") ... There several places to get help, including code forums, Facebook groups, and the IRC channel #python, to name a few. This interrupts the loop, and execution jumps to the line below the loop without running the else clause. What are Boolean values? If you need to repeat a piece of several times to get a final result, then you might need to use a loop. You can do a quick test to ensure Python is installed correctly. They can also be empty. Tuples are similar to lists, but they're immutable sequences. So, here's how it works: In the statement count = count + 1, the = assigns the value of 1 to the variable count. Python, named after the British comedy group Monty Python, is a high-level, interpreted, interactive, and object-oriented programming language. The else clause is optional and runs when the loop finishes. elif age == 18: ... Explain your code, line by line, to the duck. If there's an error, then include that information as well. Powerful: You can code small scripts to automate repetitive tasks, and you can also create complex and large-scale enterprise solutions with Python. It makes Python ideal for people who are learning to program. Once a variable is assigned an object, you can access the object using the variable name. # Next statement The if statement runs only one code block. For example, if the statement below is missing a colon at the end of the statement's header, and prints The loop points out the error: >>>>>> if x < 9 File "", line 1 if x < 9 ^ SyntaxError: invalid syntax The missing colon at the end of the if statement is invalid Python syntax. This is an effective quick-and-dirty problem solver. Strongly typed: It won't let unsafe operations on incompatible types go unnoticed. Python provides two types of loops: for loops for definite iteration, or performing a set number or repetitions while loops for indefinite iteration, or repeating until a given condition is met Here's the general syntax to create a for loop: for loop_var in iterable: # Repeat this code block until iterable is exhausted # Do something with loop_var... The try can suppress valuable error messages that help identify problems in your code. When you combine them with numbers, they form expressions that Python can evaluate: >>>>>> # Addition >>> 5 + 3 8 >>> # Subtraction >>> 5 - 3 2 >>> # Multiplication >>> 5 * 3 15 >>> # Division >>> 5 / 3 125 These operators work with two operands and are commonly known as arithmetic operators. Then you need the name of the function and a list of arguments in parentheses. You will be amazed just how effective this can be. Finally, if you want to create an empty set, then without arguments. This include courses through the city's Department of Education, Office of Adult and Continuing Education. To create a list, you use an assignment with a sequence of comma-separated objects in square brackets ([]) on its right side: >>>>>> employees = ["John", "Jane", "Linda"] {'John', 'Jane', 'Linda'} >>> employees2 = set([David", "Mark", "Marie"]) {'David', 'Mark', 'Marie'} >>> empty = set() >>> empty set() In this first example, you use curly brackets and a list of comma-separated objects to create a set. print(i) ... Fire up your terminal or command line and run the python3 command. else: # Run if all expressions are false # Your code goes here... In the final example, the first expression, age > 18, is false, so the execution jumps to the elif clause. In the case of integer numbers, to access their methods through a literal, you need to use a pair of parentheses. They automatically stop the execution of your programs. You can access them using attribute reference, also known as dot notation: >>>>>> 10.0.is_integer() True >>> 10.2.is_integer() False >>> (10).bit_length() 4 >>> (10).bit_length() File "", line 1 10.bit_length() ^ SyntaxError: invalid

syntax These methods can be a useful tool to learn about. Finally, step is an optional integer representing the number of items to jump over while extracting the items from the original string. The condition in this clause is true, so Python runs the associated code block and prints You're exactly 18 years old. You can even use code formatters, such as Black and isort, to consistently format your code. These are handy when you need to manipulate keywords programmatically in your Python programs. For example, GUI applications run in an infinite loop that manages the user's events. Copy and paste the following code into it: # Modify the variables so that all of the statements evaluate to True. Make it easy for others to help you by explaining the problem and what you've tried. When you type the name len at the help> prompt and hit Enter, you get help content related to that built-in function. In this case, most operators represent typical set operations like union (|), intersection (&), difference (-), and so on: >>>>>> primes = {2, 3, 5, 7} >>> evens = {2, 4, 6, 8} >>> # Union >>> primes | evens {2, 3, 4, 5, 6, 7, 8} >>> # Intersection >>> primes & evens {2} >>> # Difference >>> primes - evens {3, 5, 7} Sets provide a bunch of methods, including methods that perform set operations like those in the above example. Such classes are available whether someone is just starting out in school or has worked as a professional for many years and wants to amplify their skill set.With some research, you may find a real variety of online learning opportunities that appeal to you and that are appropriate. continue ... What does help() do, and when is it useful? You can find salary ranges listed online in a variety of sources. else: # Next statement This type of loop performs as many iterations as items in iterable. You normally use a while loop when you don't know beforehand how many iterations you need to complete a given operation. This loop needs a break statement to terminate the loop when, for example, the user exits the application. What does dir() do, and when is it useful? In Python, a function is a named code block that performs actions and optionally computes the result, which is then returned to the calling code. If so, then this tutorial is for you. The final step is to define the function's code block, which will begin one level of indentation to the right. If expr0 is false and expr1 is true, then only the code block associated with expr1 will run, and so on. Python has a handful of built-in data types, such as numbers (integers, floats, complex numbers), Booleans, strings, lists, tuples, dictionaries, and sets. They can also be used as dictionary keys, which you'll learn about in the next section. In this tutorial, you'll learn: What Python is and why you should use it What basic Python syntax you should learn to start coding How to handle errors in Python How to get help quickly in Python What code style you should apply in your code Where to get extra functionalities without reinventing the wheel Where to find quality Python content and grow your skills You'll also have the opportunity to create your first Python program and run it on your computer. You can also retrieve a part of a string by slicing it: >>>>>> welcome = "Welcome to Real Python!" >>> welcome[0:7] 'Welcome' >>> welcome[11:22] 'Real Python' Slicing operations take the element in the form [start:end:step]. For an in-depth resource on this topic, check out Defining Your Own Python Function. Otherwise, you get a SyntaxError. Above all, it's important that you don't fall into trying to find the best book or video ever and get lost in the process. How do you run the Python interpreter? Python is a popular, productive, and powerful high-level programming language that is in high demand. list.append() takes an object as an argument and adds it to the end of the underlying list: >>>>>> fruits = ["apples", "grapes", "oranges"] >>> fruits.append("blueberries") >>> fruits ['apples', 'grapes', 'oranges', 'blueberries'] list.sort() sorts the underlying list in place: >>>>>> fruits.sort() >>> fruits ['apples', 'blueberries', 'grapes', 'oranges'] list.pop() takes an integer index as an argument, then removes and returns the item at that index in the underlying list: >>>>>> numbers = [1, 2, 3, 200] >>> numbers_list.pop(2) 3 >>> numbers_list [1, 2, 200] Lists are quite common and versatile data structures in Python. Feel free to play with them in your Python interactive session. For example, New York City offers several free vocational training programs. Errors are something that irritates and frustrates programmers at every level of experience. Here's a sampling of its uses: You can find Python everywhere in the world of computer programming. For example, set.add() takes an object and adds it to the set: >>>>>> primes = {2, 3, 5, 7} >>> primes.add(11) >>> primes {2, 3, 5, 7, 11} set.remove() takes an object and removes it from the set: >>>>>> primes = {2, 3, 5, 7, 11} >>> primes.remove(11) >>> primes {2, 3, 5, 7} Python sets are quite useful data structures that are an important addition to the Python developer's tool kit. For example, Python is the foundation of some of the world's most popular websites, including Reddit, Dropbox, and YouTube, to name a few. Negative indices retrieve items in reverse order, starting from the last item. In Python, variables are names attached to a particular object. If you're just beginning with Python, then check out the book Python Basics: A Practical Introduction to Python 3. You'll be able to create your own programs in almost no time. For example, you shouldn't use them as variable names in your code. You need to define your variables in advance. You're exactly 18 years old In the first example, age is equal to 21, so the condition is true, and Python prints You're a legal adult to your screen. Did you notice that the examples use both a single equals sign (=) and a double equals sign (==)? Learning how to use Python and get your programming skills to the next level is a worthwhile endeavor. Coders expect other coders, even beginners, to try and resolve the issue by themselves. Note that you need to include a blank space (" ") between words to have proper spacing in your resulting string. This function doesn't round the input up to the nearest integer. These statements control the execution of a group of statements based on the truth value of an expression. Selecting and downloading a Python binary from the language's official site is often a good choice. Here are some examples of valid and invalid variable names in Python: >>>>>> numbers = [1, 2, 3, 4, 5] >>> numbers [1, 2, 3, 4, 5] >>> first_num = 1 >>> first_num 1 >>> 1rst_num = 1 File "", line 1 1rst_num = 1 ^ SyntaxError: invalid syntax >>> π = 3.141592653589793 >>> π 3.141592653589793 Your variable names can be any length and can consist of uppercase and lowercase letters (A-Z, a-z), digits (0-9), and also the underscore character (_). You're a legal adult >>> age = 16 >>> if age >= 18: ... Good luck! Now that you know the basics of Python programming, be sure to check out the wide range of Python tutorials, video courses, and resources here at Real Python to continue building your skills. The arrow (^) indicates where the parser found the problem. In other words, you don't have to import them to be able to use them in your programs. >>> While you're here, you might as well run your first line of code: >>>>>> print("Python is fun!") Python is fun! That's it! You've just written your first Python program! When you're done, you can use exit() or quit() to leave the interactive session, or you can use the following key combinations: macOS and Linux: Ctrl+D Windows: Ctrl+D and then press Enter Keep your terminal or command line open. Finally, Python now offers full Unicode support, so you can also use Unicode characters in your variable names like you saw above with the variable π. Alternatively, you can import a function directly from the module using from module import function_name. The Python web framework Django powers both Instagram and Pinterest. Once you've tried everything you can think of and have truly hit the wall, ask for help before you smash your keyboard or another inanimate object. else: ... Stack Overflow is another fundamental place to go when you're looking for answers. An effective approach to help you solve a problem, regardless of size, is to logically divide the problem into smaller parts. You can create sets in several ways. Often, you'll come back with fresh eyes and see a simple typo, a misspelled keyword, or something similar. Strings are sequences of characters. That's why this loop is used to perform indefinite iterations. A classic example of a semantic error would be an infinite loop, which most programmers experience at least once in their coding lifetime. Floating-point numbers' precision information is available in sys.float_info. They're so popular that developers sometimes tend to overuse them, which can make the code inefficient. Note: There are modules available in the Python standard library, such as math, that also provide you with functions to manipulate numbers. That's because your loop wasn't interrupted by a break statement. For example, say you need to code a program that counts from 1 to 10. To create a tuple object, can use an assignment operation with a sequence of a comma-separated items on its right side. Similarly, 3.25 returns 3: >>>>>> # Floating-point numbers >>> int(10.6) 10 >>> int(3.25) 3 >>> # Strings representing numbers >>> int("2") 2 >>> int("2.3") Traceback (most recent call last): File "", line 1, in int("2.3") ValueError: invalid literal for int() with base 10: '2.3' >>> # Complex numbers >>> int(complex(1, 2)) Traceback (most recent call last): File "", line 1, in int(complex(1, 2)) TypeError: can't convert complex to int Note that you can pass a string representing an integer to int(), but you can't pass a string representing a floating-point number. Its flexibility allows you to do many things, both big and small. In the second example, the expression age >= 18 evaluates to False, so Python runs the code block of the else clause and prints You're NOT an adult on your screen. For example, if you pass a set as an argument to len(), then you get the number of items in the set: >>>>>> employees1 = {"John", "Jane", "Linda"} >>> len(employees1) 3 You can also use operators to manage sets in Python. Note: The lower_case_with_underscores naming convention, also known as snake_case, is commonly used in Python. In Python, there are two types of code-based errors: syntax errors and exceptions. You commonly use parentheses to delimit a tuple, but they're not mandatory: >>>>>> employee = ("Jane", "Doe", 31, "Software Developer") >>> employee[0] = "John" Traceback (most recent call last): File "", line 1, in employee[0] = "John" TypeError: 'tuple' object does not support item assignment If you try to change a tuple in place, then you get a TypeError indicating that tuples don't support in-place modifications. Some of these tools are conveniently integrated into some of the currently available code editors and IDEs. If you want to learn more about how you can improve the quality of your code using PEP 8 and other code style best practices, then check out How to Write Beautiful Python Code With PEP 8 and Python Code Quality: Tools & Best Practices. Loops are a common way of iterating multiple times and performing some actions in each iteration. The number of online opportunities for each varies, but with some research, you can likely find an online course that suits your schedule, your finances and your ultimate goals. Besides these built-in functions, there are a few methods associated with each type of number. What is pip? Don't just copy and paste the code! Typing it yourself will be much more beneficial to your learning: 1count = 1 2 3# Code block 1 4while count < 11: 5 print(count) 6 count = count + 1 7 8# Code block 2 9if count == 11: 10 print("Counting complete!") Note that lines 3 and 8 start with a hash character (#) followed by a space and then an explanation. Integers and floating-point numbers are the most commonly used numeric types in day-to-day programming, while complex numbers have specific use cases in math and science. To leave the content and get back to the help> prompt, you can press Q. Speaking of dir(), you can use this function to inspect the methods and attributes that are available in a particular object: >>>>>> dir(str) ['__add__', '__class__', ..., 'title', 'translate', 'upper', 'zfill'] >>> dir(tuple) ['__add__', '__class__', ..., 'count', 'index'] When you call dir() with the name of a Python object as an argument, the function attempts to return a list of valid attributes for that specific object. Versatile: Python can help you solve problems in many fields, including scripting, data science, web development, GUI development, and more. Complex numbers don't work either. Having the ability to identify and handle them is a core skill for programmers. You can use some built-in functions with sets like you've done with other built-in data structures. Take a minute to read any rules or guidelines for any of the groups that you use. The most-researched certificate programs include physical therapy, healthcare, occupational therapy assistant, veterinary technician and dental assistant.Tuition for each of these programs ranges from about $25,000 to about $34,000. You can create a conditional statement in Python with the if keyword and the following general syntax: if expr0: # Run if expr0 is true # Your code goes here... You're NOT an adult >>> age = 18 >>> if age > 18: ... Expressions that appear in embedded curly braces ({}) are replaced with their values in the formatted string. In this case, the loop will iterate forever. There are situations in which you need an infinite loop. Most code editors and IDEs that support Python internally implement automatic checks to find and point out PEP 8 violations. Use a flowchart if necessary. If you call frozenset() without arguments, then you'll get an empty frozenset. Since lists are mutable sequences, you can modify them in place using index notation and an assignment operation. 1 2 3 4 The loop wasn't interrupted Again, the else clause is optional, and you'll commonly use it with a break statement in the loop's code block. They're memory efficient, immutable, and have a lot of potential for managing data that shouldn't be modified by the user. Semantic errors happen as a result of one or more problems in the logic of a program. One approach to solve the problem in the development of a workflow is to use pseudocode: Since you'll be more productive on an organized machine, first create a folder named something like python_code where you'll store the example files. If you use set(), then you need to provide an iterable with the objects you want to include in the set. elif expr1: # Run if expr1 is true # Your code goes here...

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