

Topics Covered

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Python

Why Python? What is different about Python? Python is currently used in a lot of web development and is a very powerful, higher-level language (higher-level in the sense of abstraction). You'll find that the syntax is much more intuitive and this language is easier to use. I hope you like it (I really like Python and use it for most of my coding projects)

To start writing python code, open up a file with .py as the extension. Also, with python, you don't have to compile your code before running! Now you to run your code, just write:

```
python3 example.py
```

Variables

There are two main differences

1. No type declarations necessary
2. To declare a variable, you need to initialize it.

Let's look at some examples in code!

```
#include <cs50.h>
#include <stdio.h>
```

```
int main(void)
{
    string s = get_string();
    printf("hello, %s\n", s);
}
```

```
import cs50
```

```
s = cs50.get_string()
print("hello, {}".format(s))
```

KEY TAKEAWAYS: No curly braces, no semicolons, no type declarations, variables must be initialized instead of declared alone.

Conditionals

The same conditionals in C exist in python as well! (if/else, loops, etc.) and boolean operators/comparators are different too. So, instead of using `||` like you did in C, you would now just say `"or"`. And instead of `&&`, you just use `"and"`. Same thing with `!` and `"not"`.

Now lets look at some key code examples to help move into the python world.

I can send the code out along with the files if you would find that helpful! Code is in file `python/2-conditions` and `python/3-logical`

KEY TAKEAWAYS: instead of encapsulating code within curly braces, use a colon and indentation. Also, conditions don't have to be in parenthesis

Loops

While loops and for loops exist in python. Lets look at some examples to help us understand/see the key differences.

```
while height > 0:
    # code here
```

```
while (height > 0)
{
    // code here
}
```

Here, notice the differences in comments, strucutre, code. Let's look at some more complex while loop examples in the IDE (I can send these out after too)

```
for i in range(0,height):
    # use i to do something
```

```
for (int i = 0; i < height; i++)
{
    # use i to do something
}
```

Notice again, the changes in syntax. Tabs make a difference, comments are now used with the `#` symbol instead of `//`. Let's look at more complex for loops! **KEY TAKEAWAYS:** Understand how a while loop and a for loop differs between c and python.

Arrays/Lists

Python arrays (more appropriately known as lists) are not fixed in size; they can grow or shrink as needed, and you can always tack extra elements onto your array and splice things in and out easily. Lists in python are a lot better/more powerful than arrays were in C!

Declaring a list:

```
nums = []  
nums = [1,2,3,4]  
nums.append(5)  
What is nums now?
```

```
nums.insert(1, 5)  
What is nums now?
```

```
a = [2,3]  
b = a + nums  
What is b now?
```

KEY TAKEAWAYS: know how to manipulate lists!

Functions

Function declaration is very similar to C. Lets look at a quick example:

```
def square(x):  
    x * x  
  
square(2)  
what is returned?
```

KEY TAKEAWAYS: you don't need to specify return type, use def keyword, and inputs are in the parenthesis

MVC

Model View Controller (MVC) is an important web software paradigm to help us organize our code when developing on the web. Lets take a look at what CS50.study has to say about this!

Cool, fun python examples!

Look at some cool, fun code examples/things you can do with python!