

What's Your Type? (Teacher)

Corresponding Material

User Input

Discussion

Because Python variable types are determined by the values that are stored in the variable, it is up to the programmer to be careful about using the correct types. As a result, the programmer needs to know what he/she should expect a certain variable's type to be when manipulating variables.

When you have a variable of one type, but you need it to be another type, you can *cast* the variable to a different type. You've done this before when you print a string and an int together on the same line. Consider the following bit of code.

```
age = 15
print("Hello! I am " + str(age) + " years old!")
```

The `str(age)` part is casting the `int` variable `age` to a string. This means that Python knows that `age` is an `int`, because it has the value 15. But, in order to print it out, we need it to be a string. So we tell Python, "Hey, I know this variable is not a string, but I need you to pretend it's a string, so can you represent it as a string for this statement?". After the print statement, `age` will still be an `int`. We only needed it to be represented as a string for the print statement.

You can do this with almost any type. To cast to an `int`, use `int(var_name)`. To cast to a `float`, use `float(var_name)`. You can also nest casts, such as `str(float(num))` which will cast `num` to a float, then cast that float to a string.

Further Discussion

Knowing what types students are dealing with in their programs will become more important as they begin working with functions and passing parameters. Programmers should be careful to always document what type of variables a function expects and treat those parameters accordingly. For now, strive to get students to the point where students are not caught off guard by getting unexpected variable types, such as expecting a float from dividing two integers (which will result in an integer).

Class Exercise

Fix each of the following code snippets by adding casts where they are needed.

```
1. num_pounds = input("Enter the number of whole pounds of bananas: ")
   price = input("Enter the price per pound: ")
   print("You owe $" + num_pounds * price)
```

Example output:

```
Enter the number of whole pounds of bananas: 3
Enter the price per pound: 1.3
You owe $3.9
```



```
num_pounds = int(input("Enter the number of whole pounds of bananas: " ))
price = float(input("Enter the price per pound: "))
print("You owe $" + str(num_pounds * price))
```

```
2. word = input("Enter a word: " )
delim = input("Enter the delimiter: ")
count = input("Enter a number: ")
print((word + delim) * count + word)
```

Example output:

```
Enter a word: code
Enter the delimiter: /
Enter a number: 3
code/code/code/code
```

```
word = input("Enter a word: " )
delim = input("Enter the delimiter: ")
count = int(input("Enter a number: "))
print((word + delim) * count + word)
```

```
3. hourly_rate = input("Enter your hourly wage: " )
hours = input("Enter how many whole hours you worked: ")
print("Your wages are $" + hourly_rate * hours)
```

Example output:

```
Enter your hourly wage: 15.50
Enter how many whole hours you worked: 25
Your wages are $387.5
```

```
hourly_rate = float(input("Enter your hourly wage: " ))
hours = int(input("Enter how many whole hours you worked: "))
print("Your wages are $" + str(hourly_rate * hours))
```

```
4. fname = input("Enter your first name: " )
id_num = input("Enter the last three digits of your student ID: " )
print("Your login name is " + fname + id_num)
```

Example output:

```
Enter your first name: Alice
Enter the last three digits of your student ID: 357
Your login name is Alice357
```

```
fname = input("Enter your first name: " )
id_num = int(input("Enter the last three digits of your student ID: " ))
print("Your login name is " + fname + str(id_num))
```

```
5. test_avg = input("Enter your overall test average: " )
hw_avg = input("Enter your overall homework average: ")
weighted_avg = 0.30 * test_avg + 0.70 * hw_avg
print("Your average is: " + weighted_avg)
```



Example output:

```
Enter your overall test average: 80.4
Enter your overall homework average: 70.6
Your average is: 73
```

```
test_avg = float(input("Enter your overall test average: " ))
hw_avg = float(input("Enter your overall homework average: "))
weighted_avg = 0.30 * test_avg + 0.70 * hw_avg
print("Your average is: " + str(int(weighted_avg)))
```