

Data Types and Variables

Data Types

- Define each data type, and give an example.
 - Integer
 - Floating point
 - String
- What data type is each value? Use the `type` function to verify.
 - 3
 - 4.5
 - 6.0
 - "hello"
 - "3.14159"
 - `math.pi`
- Use the `type` function to identify the data type of each result. Are there any that do not work?
 - `3 + 7`
 - `5 + 6.0`
 - `6 / 3.0`
 - `6.0 // 3.0`
 - `"Py" + "thon"`
 - `"High" + 5`

Variables

- Which variable names are acceptable, and which are not? If a variable name is unacceptable, explain why.
 - `num`
 - `AGE`
 - `FiRsTnAmE`
 - `_count`
 - `2nd_card`
 - `card_2`
 - `card 2`
 - `lambda`
- Choose a meaningful variable name to represent each scenario.
 - The number of cards dealt to a player.
 - An employee's monthly salary.
 - The sum of the values rolled by two dice.
 - The temperature on a hot summer day.
- Assign the values `x="house"`, `y="boat"` and `z="ha"`. What is the result of each statement? Which do not work, and why?
 - `x+y`
 - `y+x`
 - `z*3`
 - `z*x`
 - `x+2`
 - `y+"2"`
- Assign the values `base=10` and `height=5`. Calculate the area of a triangle using the formula $A_t = \frac{1}{2}(b)(h)$, and assign the value to the variable `area`. Echo this value.
- Execute the following sequence of commands in the shell, then state the final value of `k`.


```
k = 7
k += 3
k *= 2
k -= 5
k //= 6
```
- Explain why the following run-time error occurs.


```
>>> number = 8
>>> Number += 1
Traceback (most recent call last):
  File "<pyshell>", line 1, in <module>
NameError: name 'Number' is not defined
```
- Python is a dynamically-typed language: a variable's data *type* can change as necessary. Assign the value `x=4`, then use `check` its type using the `type` function. What data type is it? Increment `x` by 1, using the `+=` operator, then check its type again. Did it change? If so, what data type is it? Increment `x` by 1.0, then check its type. Did it change? If so, what data type is it?