

MEET 2017 - Y1 - Module 2

Data Types, Errors, Variables



Module 1 Review

In the **terminal**,
we use **Linux**

- `ls`
- `cd Day1`
- `idle3` &

In **IDLE3**, we use
Python

- `print()`
- `4 + 3`
- `x = 5`

Data Types



IDLE3 can do math for you!

Who needs a calculator anyways?

```
>>> 1234 + 567
```

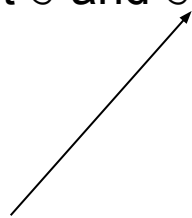
```
1801
```

```
>>> 3.14*3*3
```

```
28.26
```

One important difference between
IDLE3 and a calculator:

IDLE3 thinks about 5 and 5.0
differently. **Why?**



5 is an integer (**int**)

5.0 is a floating point integer
(**float**)

Data Types

Type	Name	Example
<code>int</code>	Integer	5
<code>float</code>	Decimal	1.0

int and float Operations

Symbol	Meaning	Example	Answer
+	Addition	>>> 5 + 3	8
-	Subtraction	>>> 10 - 4	6
*	Multiplication	>>> 2 * 5	10
/	Division	>>> 5 / 2	2.5
//	Integer Division	>>> 5 // 2	2
%	Modulo (Remainder)	>>> 12 % 7	5
**	Exponentiation	>>> 3**2	9

Command: `type()`

How to find out the type of something?

```
>>> type(2)
```

```
<class 'int'>
```

```
>>> type(2.5)
```

```
<class 'float'>
```

Strings (**str**)

Strings are any sequence of characters, written inside quotation marks.

```
>>> "hello world"
```

```
>>> "Hi I am secretly a cat"
```


Data Types

Type	Name	Example
int	Integer	5
float	Decimal	1.0
str	String	'abc'

Booleans (**bool**)

Booleans only have two values: `True`
and `False`

```
>>> 5 == 5
```

```
True
```

```
>>> 1 > 2
```

```
False
```

Data Types

Type	Name	Example
<code>int</code>	Integer	5
<code>float</code>	Decimal	1.0
<code>str</code>	String	'abc'
<code>bool</code>	Boolean	True, False

You Cannot Mix Data Types

If you try:

```
>>> 'orange' + 4
```

You get an error:

```
Traceback (most recent call last):
```

```
  File "<stdin>", line 1, in <module>
```

```
TypeError: must be str, not int
```

Why?

You Cannot Mix Data Types

If you try:

```
>>> 'orange' + 4
```

You get an error:

```
Traceback (most recent call last):
```

```
  File "<stdin>", line 1, in <module>
```

```
TypeError: must be str, not int
```

Why?

You cannot add a string to an integer. They need to be both strings or both integers.

Lab 1: Data Types



Catnap!



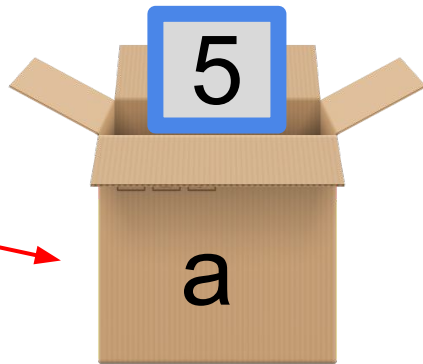
Variables



Variables (**var**)

A variable is a box!

```
>>> a = 5
>>> a
5
>>> type(a)
<class 'int'>
```



It has a *name* a
and a *value* 5.

Variables

Let's do an example:

```
>>> a = 5
```

```
>>> a = a+2
```

```
>>> a
```

?



What does this do?

Variables

Let's do an example:

```
>>> a = 5
```

```
>>> a = a+2
```

```
>>> a
```

? 7



What does this do?

Variables

Here's a tricky one:

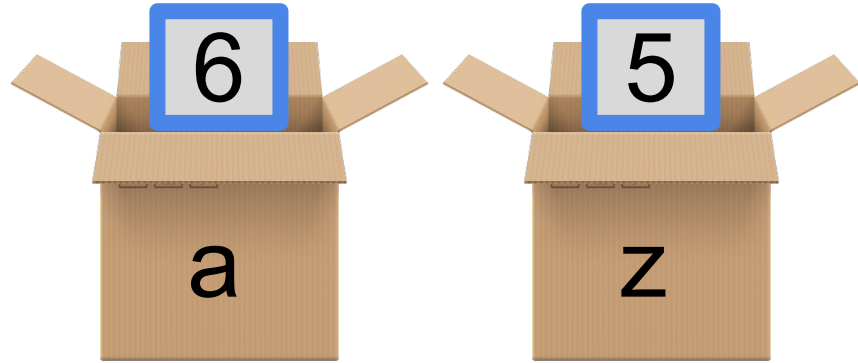
```
>>> a = 5
```

```
>>> z = a
```

```
>>> a = 6
```

```
>>> z
```

?



Variables

Here's a tricky one:

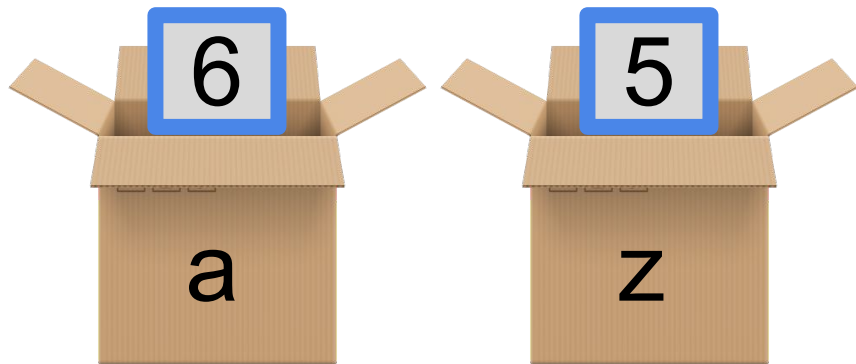
```
>>> a = 5
```

```
>>> z = a
```

```
>>> a = 6
```

```
>>> z
```

? 5



It's important to name variables using a short but descriptive name.

```
public class DrawingWindow extends JFrame implements ActionListener,  
    PluginWindow {  
    private JFrame myFrame1;  
    private JMenuBar myMenuBar;  
    private JMenu File, Edit, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx,  
        brushes, eraser, stamps, shapes;  
    private JMenuItem myMI1, myMI2, myMI3, myMI4;  
    private JMenuItem myMI5;  
    private JMenuItem Stamp1, Stamp2, Stamp3, Stamp4, Stamp5, Stamp6, Stamp7,  
        Stamp8, Stamp9;  
    private JMenuItem myMI10, myMI11, ...
```

Debugging



AHHHH my code isn't working



Demo: Ctrl + C

- To terminate a program in **Python**, you press these two buttons *at the same time*:



Common Errors

Error Name	Meaning	Example
TypeError	Combining two different data types when you are not supposed to	<pre>>>> 'bananas' + 100</pre>
NameError	Forgetting to define variable names	<pre>>>> name</pre>
IndentationError	Not having the correct indentation and blocks in code	<pre>>>> if i < 5: print(i)</pre>
Infinite Loops	Code that never stops running	<pre>>>> while True: print('help')</pre>

Debugging Steps

1. Read the error
2. Think about what is causing the error
3. If you can't figure out what is causing the error, google it
4. Finally, ask a TA

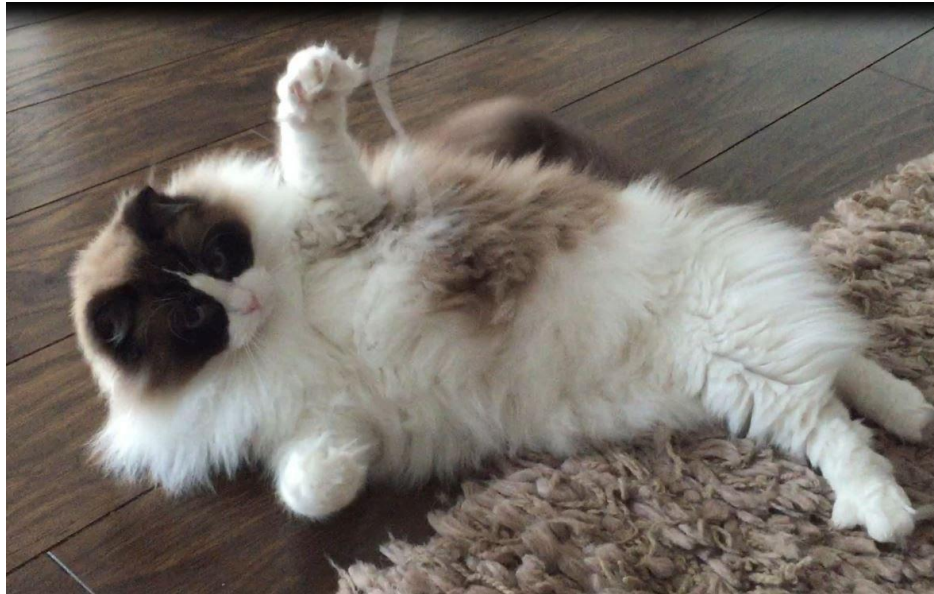
```
>>> 'kat' + 3
Traceback (most recent
call last):
  File "<stdin>", line 1,
    in <module>
TypeError: must be str,
        not int
```

You can't add a string to an integer, it'll be like adding a letter to a number

Lab 2: Variables + Errors



Reminder to run bash endlab

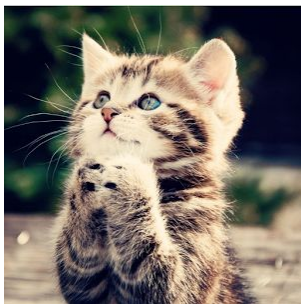


Daily survey



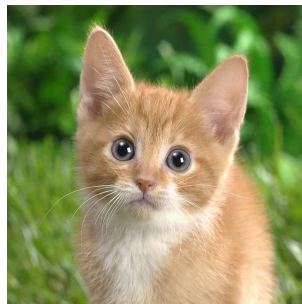
Sunny

I fully understand and am ready to move on.



Partly cloudy

I mostly understand but wouldn't mind a bit more practice.



Cloudy

I'd like the instructors to give more explanation and/or practice on this concept.

