ECS 10

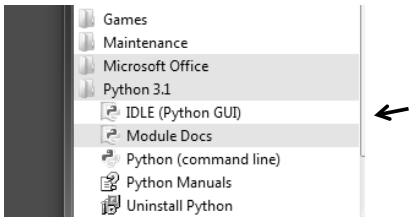
1/9

Homework

- First assignment due tomorrow night.
- Convert Fahrenheit to Celsius (the given program converts Celsius to Fahrenheit).
- Submit as attachment.
- Let's look at the given program, and describe it using computer science jargon.

Running IDLE

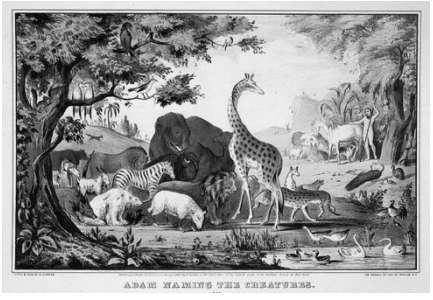
- From START menu, pick "all programs", then Python 3.3
- Pick the "IDLE" option



IDLE

- IDLE is an **interpreter.**
- Responds to input line-by-line.
- IDLE prints the **value** of an **expression.**

Jargon

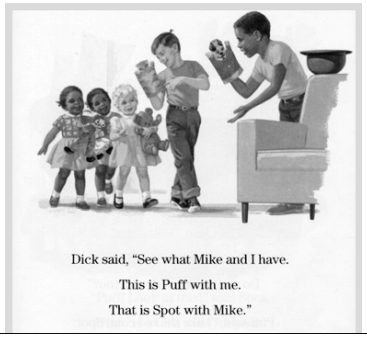


Jargon

```
print("Take me to your leader")
```

- This is a **statement.**
- print is a **function.**
  - Does some computation
- Recognize a function by parentheses.
- "Take me to your leader" is a **string.**
- "9/7" would also be a string.

Strings in English



Expressions

```
print(4+5)
```

- **4+5** is an **arithmetic expressio**n.
- It's **value** is 9.
- 4, 5 and 9 are **integers**.
- + is an **operator**.
  - Does computation, like a function. The only reason there are two ways to do computation is that it is more human-readable.

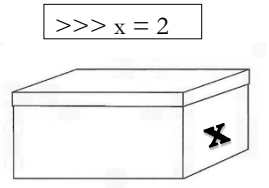
Variables

```
>>> x = 2
>>> x = x+3
>>> print(x)
5
```

- x is a **variable**
- "x = 2" is an **assignment** statement
- Variable on left-hand side gets value on right-hand side.
- Pronounce this "x gets 2" or "x becomes 2"
- **Value** of x is now 2

Variables

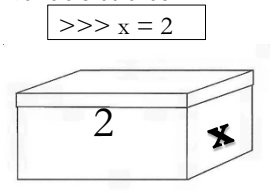
- Think of a variable as a box.



- The name x is the label on the box.

Variables

- Think of a variable as a box.



- The integer 2 is in the box.
- The name of the variable is x, 2 is its value.

Variables in computer memory

```
x = 2
```

- A assignment statement stores data (in this case, the number 2) in the computer's memory
- The program uses the variable name to refer to the particular location in memory where the data is stored (the label on the box where it put it).

Floating point numbers

- 7.0, 2.0, 0.0006, 7.34 – **floating point numbers**
- 7/2 produces the floating point value 3.5
- 6/3 produces the floating point value 2.0
- If either number is floating point, so is the answer – so 7.0 + 3 produces the floating point value 10.0.

Floating point is not exact

```
>>> 8.0/3.0
2.6666666666666665
```

- This is weird…why?
- Computer numbers have a fixed number of decimal places
- Exact results with floating point numbers would have an infinite number of decimal places:

Example: 8.0/3.0 has the value 2.666666…….

Data types

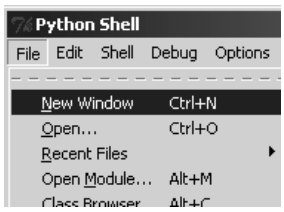
- Strings, integers and floating point numbers are different **data types** in Python
- You can store any data type in a variable.

Program

- To write a whole **program** instead of single lines, we use the **script** window.
- A script is a program that is run by an interpreter.
- The other option is a **compiler** – translating the program into machine-readable form and actually running it are two separate steps.

Making a program

- Remember and repeat a bunch of commands



Type and role

- The variable `celsius` has **type** integer and it's **role** is to store the input temperature in Celsius.
- The type is a data type
- The role is what it is supposed to do in the program
- There are many possible roles, but most variables fall into a few stereotyped roles.

The user

The person running the program.

Getting input from the user

```
celsius = input("Enter temperature in celsius: ")
```

- The input **function** asks the **user** for a data value.
- The data type of the variable on the left is always string.
- We say the input function **returns** a string.

ECS 10 Commenting Rules

- When you first introduce a variable, add a comment
  - What data type is it (integer, string, floating point)?
  - What is it's role?

Tomorrow's assignment

- Does not need to get user input.
- You can if you want to get a move on….which is a good idea!