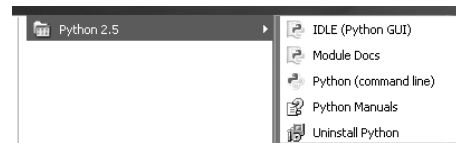


# ECS 10

09/29

## Starting up Python

- From START menu, pick “all programs”, then Python
- Pick the “IDLE” option



## IDLE

*Important vocabulary word ←*

- IDLE is an **interpreter** ←
- Responds to input line-by-line
- If you input data, it tells you back what it thinks it is.
- So with numbers, it acts like a calculator

## Remainder

- 0,1,2,3... and -1,-2,-3... are **integers**
- $7/3$  is **integer division**
- $7\%2 = 1$
- $\%$  gives the **remainder** when 7 is divided by 2
- $(7/2)*2 + (7\%2) = 7$

## Floating point numbers

- 7.0, 2.0, 0.0006, 7.34 – **floating point numbers**
- $7.0/2.0 = 3.5$  – **floating point division**
- If either number is floating point, so is the answer – so  $7.0/3$  produces the value 3.5

## 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.....

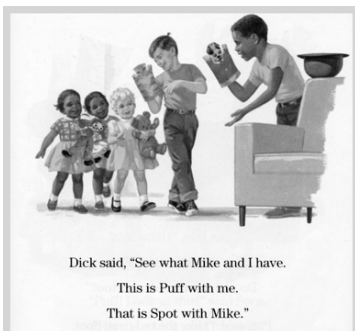
## Data types

- Integers and floating point numbers are two different **data types** in Python
- Can do different things with them.
- $3/2$  is different from  $3.0/2$
- $3.0$  is different from  $3$

## Strings

- Another data type – for text.
- ‘A rose is a rose.’ is a **string**.
- “9.0/7.0” is also a string, because it’s in quotes
- Without the quotes, Python does not understand that it is a string.

## Strings in English



## Errors

- Lots of things you do will cause errors
- Something Python doesn't understand
- It tries to tell you what it doesn't like, but in this case it is more like, 'huh?'
- It didn't understand that we meant to type a string and forgot the quotes.
- I thinks we were trying to type Python commands.

## Python commands

- IDLE does Python commands immediately
- **print** is a Python command

```
>>> print 'A rose is a rose.'  
A rose is a rose.
```

...Printing out the text in the string.

```
>>> 'A rose is a rose.'  
'A rose is a rose.'
```

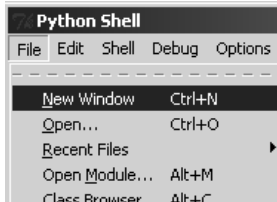
...Responding to data (a string).

## Print

- Can print out any type of data (integer, floating point number, string).
- Can put multiple things in the same print command.

## Making a program

- Do something more complicated
- Remember and repeat a bunch of commands



## A program

- A program is a list of statements in a file
- Python executes the statements one by one, just as if you had typed them in.
- It does them in the order in which they appear in the file.

## Your program

- Uses print
- Uses some arithmetic?

## Variables

```
>>> x = 2.0
>>> x = x+3.0
>>> x
5.0
```

- x is a **variable**
- "x = 2.0" is called an **assignment** statement
- Variable on left-hand side gets value on right-hand side.
- Pronounce this "x gets 2.0" or "x becomes 2.0"

## Variables

```
>>> x = 2.0
>>> x = x+3.0
>>> x
5.0
```

- Assignment statement puts a data value into variable x, it is not itself a data value or an expression.
- IDLE does not type a value back after an assignment statement the way it does after an expression.