Python: Some Basics
Syntax and Semantics

• Syntax
  Rules of the programming language
  a=5+4
  print a
  print (a) (syntactically correct)

• Semantics
  Meaning or the logic of the program
  Above the program adds two values and prints, if it were to multiply then semantics is wrong.

• Debugging
  Correcting the syntax and semantics
Python

- A high level programming language
- Interpreted
- Two modes of operations
  - Interactive
  - Script
Variables and Constants

• Variables
  – Can hold any value
  – a, x2, myname, ..

• Constant
  – Hold a fixed value
  – 5, 1.5, ‘hello’
Data (Object) Types

• `int`
  – Integer valued numbers

• `float`
  – Floating point numbers

• `str`
  – Characters, string

• `bool`
  – `{true, false}`
Data (Object) Types

• >>>>> a=3
• >>>>> type(a)
• >>>>> <type, ‘int’>
  • Indicates that the type is ‘int’
• >>>>> float(a)
  – will convert a into floating point
Operators

- >>>>> 2+3
- >>>>> 5
- >>>>> 5 * 7
- >>>>> 35
- >>>>> 8/5
- >>>>> 1.6
- >>>>> 8%5
- >>>>> 3
- >>>>>2**3
- >>>>>8
Operators

- \( i+j \) → the **sum**
- \( i-j \) → the **difference**
- \( i\times j \) → the **product**
- \( i/j \) → **division**

If both are ints, result is int
If either or both are floats, result is float

Result is float
Operators

• Precedence order
  • **
  • *
  • /
  • + and -

• Use of brackets
  • >>>>>>(5*6)+(4/2)
Assignment

• >>>>> n = 2+3
• >>>>> print (n)
• >>>>> 5
• >>>>> a = 2
• >>>>> b =3
• >>>>> c = a + b
• >>>>> print (c)
• >>>>> 5
Comparison Operators

- >, <, <=, >=, ==, !=
- Return ‘True’ or ‘False’
- >>> a = 4
- >>> a == 4
- >>> True
Conditionals

- Defined over Boolean variables
- if <condition> :
  - <code>
- else :
  - <code>

Indentation is important
Input

- >>>>> n = input('Please input a number:')
- Please input a number:5
- >>>>> print (n)
- >>>>> '5'
- >>>>> n = int (input('Please input a number:'))
- Please input a number:5
- >>>>> print (n)
- >>>>> 5
Sample program

```python
a=int(input('Please input a number:'))
print(a)
if (a==5):
    print('a is equal to 5')
else:
    print('a is not equal to 5')
```