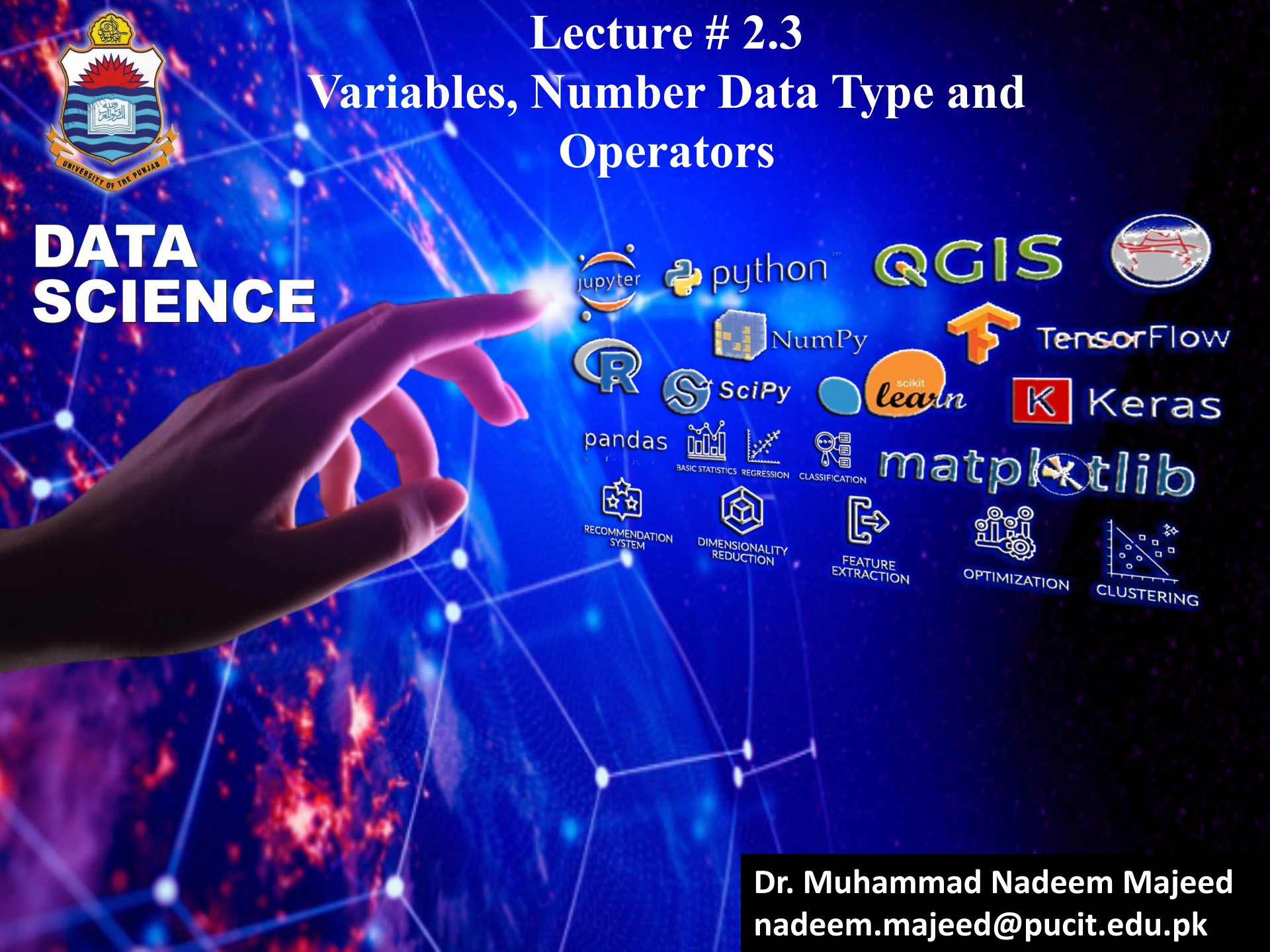
Lecture # 2.3
Variables, Number Data Type and Operators



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Today's Agenda

- Variables in Python
- Demonstration
- Overview of Python Data Types
- Numeric Data Types
- Demonstration
- Operators in Python
- Demonstration

Variables

Variable in Python

- A statement in Python is something that results in an action or execution of a command. An expression, however, always results in a value
- A variable in Python is a reference rather a container (More on notebook)
- Python is dynamically typed (carries out type-checking at runtime.), which means you don't have to associate a type with a variable name
- So we don't have to explicitly declare a variable, rather the variable is created in the same statement, where we assign an object to the variable

```
apple = 200
oranges = 150
banana = 70
total = apple + oranges + banana
print(total)
```

Variable Naming Rules

- An identifier/variable name may only begin with A-Z, a-z, or an underscore(_).
- This may be followed by letters, digits, and underscores- zero or more.
- A number/digit can appear in the name, but not at the beginning.
- Python is case-sensitive. Name and name are two different identifiers.
- Spaces are not allowed. Instead, we must use snake_case to make variable names readable.
- The name of the variable should be something meaningful that describes the value it holds, instead of being random characters.
- Python Keywords:

```
and, def, False, import, not, True, as, del, finally, in, or, try,
assert, elif, for, is, pass, while, break, else, from, lambda,
print, with, class, except, global, None, raise, yield, continue,
exec, if, nonlocal, return
```

Three Properties Associated with every Variable

- **Identity:** It can be considered as the address of the memory where the object is stored. An object's identity never changes after it is created. In Python the `id()` function returns the type of an object.
- **Type:** An object's type defines the possible values and operations that the type support. For example the integer type in Python support arithmetic operations, while string type support concatenation operation. In Python the `type()` function returns the type of an object.
- **Value:** It is the actual data stored in the object on which we perform various operations.

Variables in Python

https://github.com/arifpucit/data-science.git

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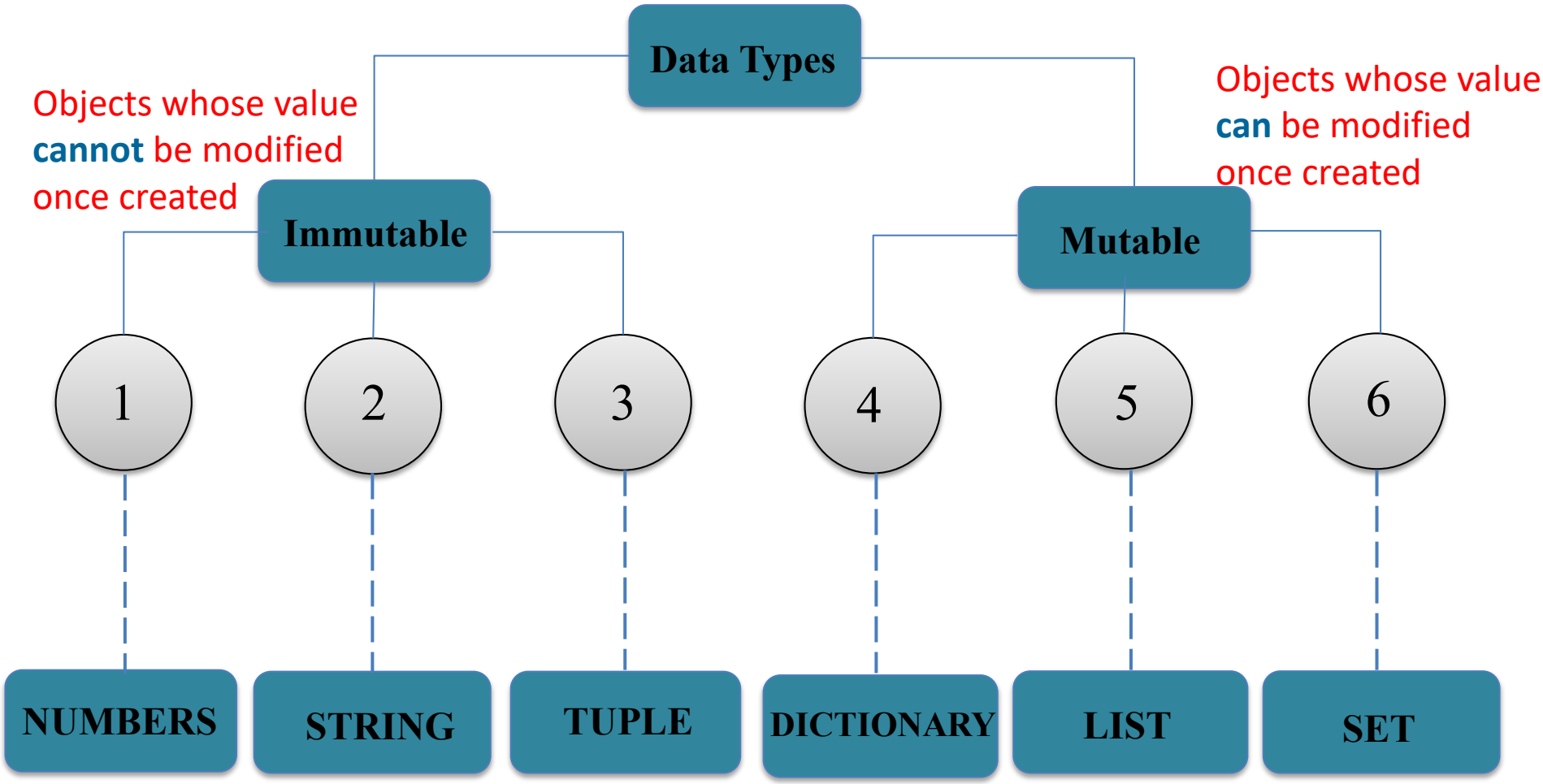
Overview of Data Types

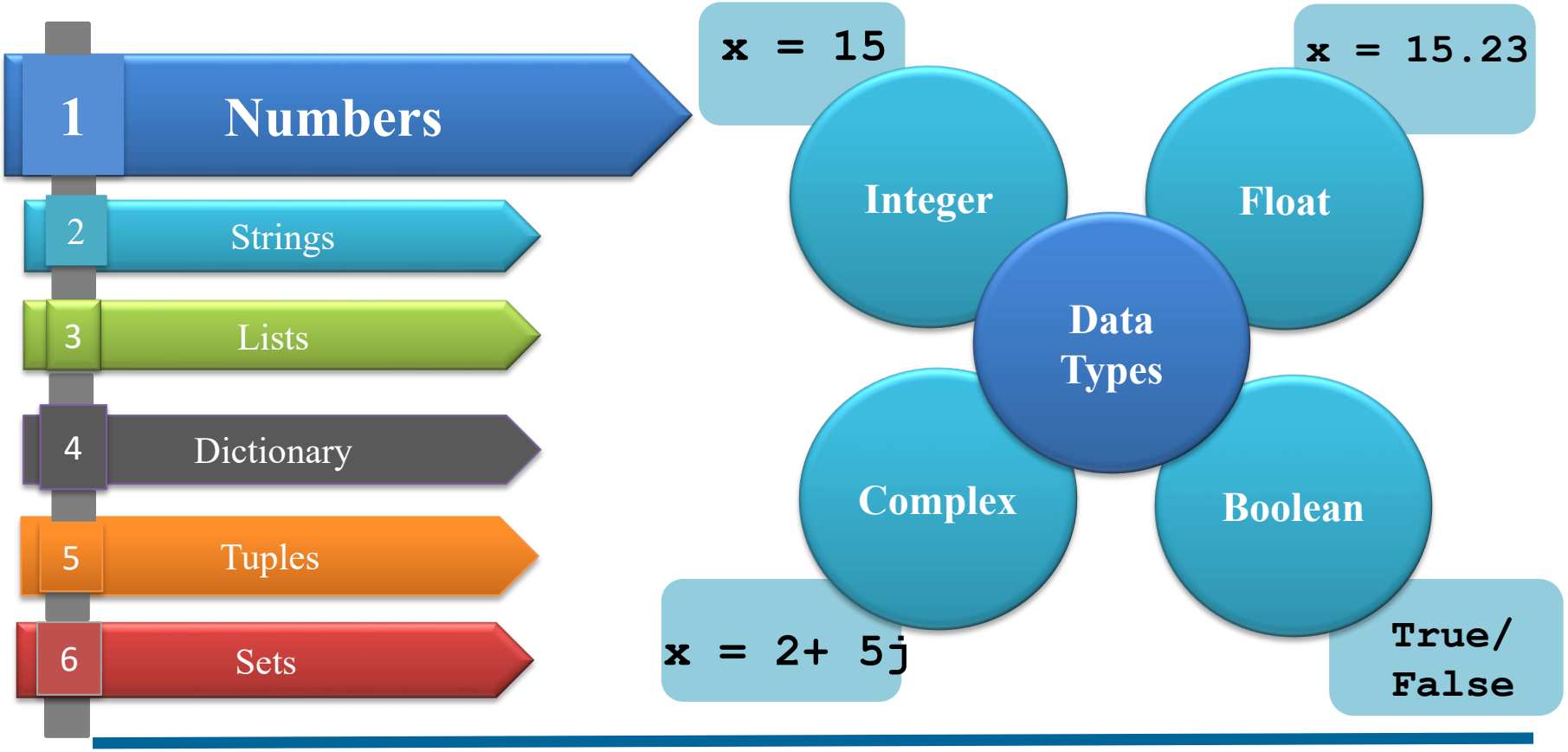
Overview of Data Types



Numeric Data Types

Numeric Data Type or Numbers

- Numeric data types are a broad classification of objects in Python. There are three main types of numeric data types (Integer, Float, Complex). Some text also consider Boolean objects as part of Numeric data type



Numeric Data type

https://github.com/arifpucit/data-science.git

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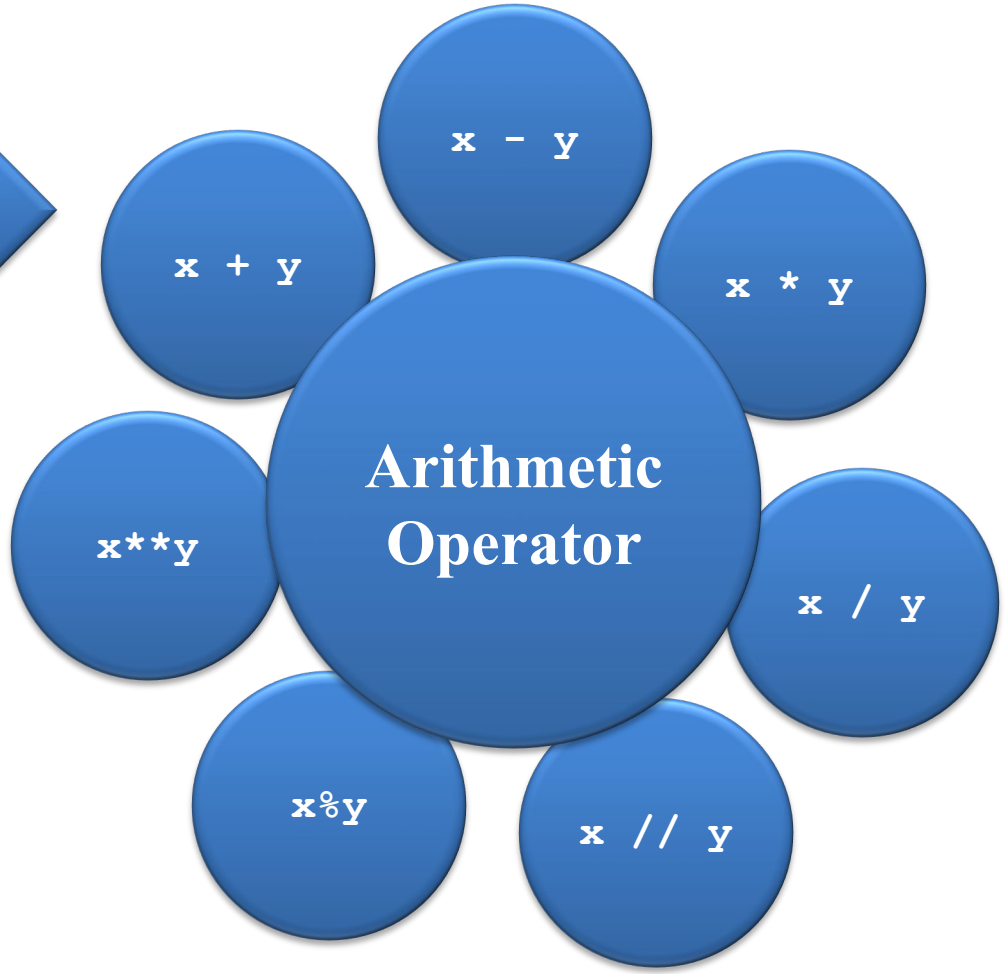
Overview of Operators

Operators


1
Arithmetic Operators
2
Assignment Operators
3
Comparison Operators
4
Logical Operators
5
Bitwise Operators
6
Identity Operators
7
Membership Operators

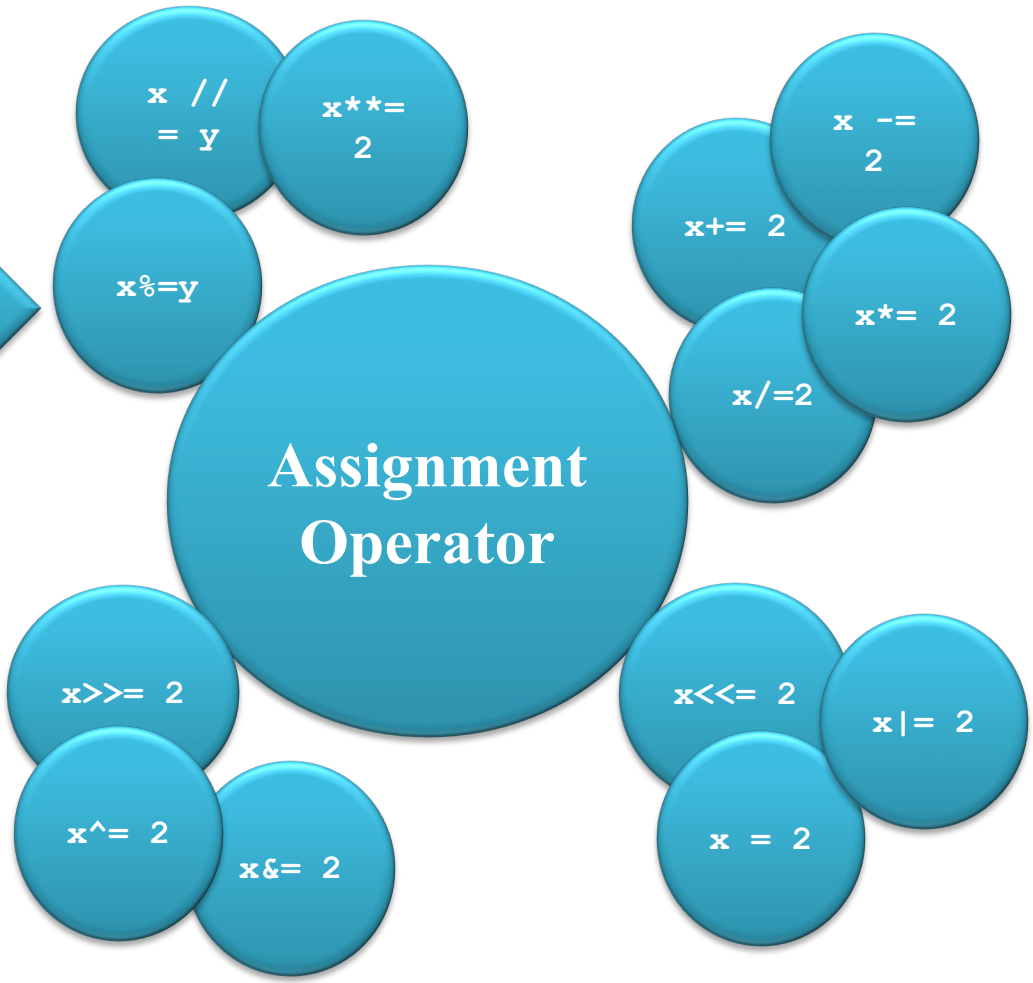
Arithmetic Operators

1. **Arithmetic Operators**
2. Assignment Operators
3. Comparison Operators
4. Logical Operators
5. Bitwise Operators
6. Identity Operators
7. Membership Operators



Assignment Operators

1. Arithmetic Operators
2. **Assignment Operators**
3. Comparison Operators
4. Logical Operators
5. Bitwise Operators
6. Identity Operators
7. Membership Operators



Comparison Operators

1. Arithmetic Operators
2. Assignment Operators
3. **Comparison Operators**
4. Logical Operators
5. Bitwise Operators
6. Identity Operators
7. Membership Operators

x > y
True if x is greater than y

x < y
True if x is less than y

x == y
True if both are equal

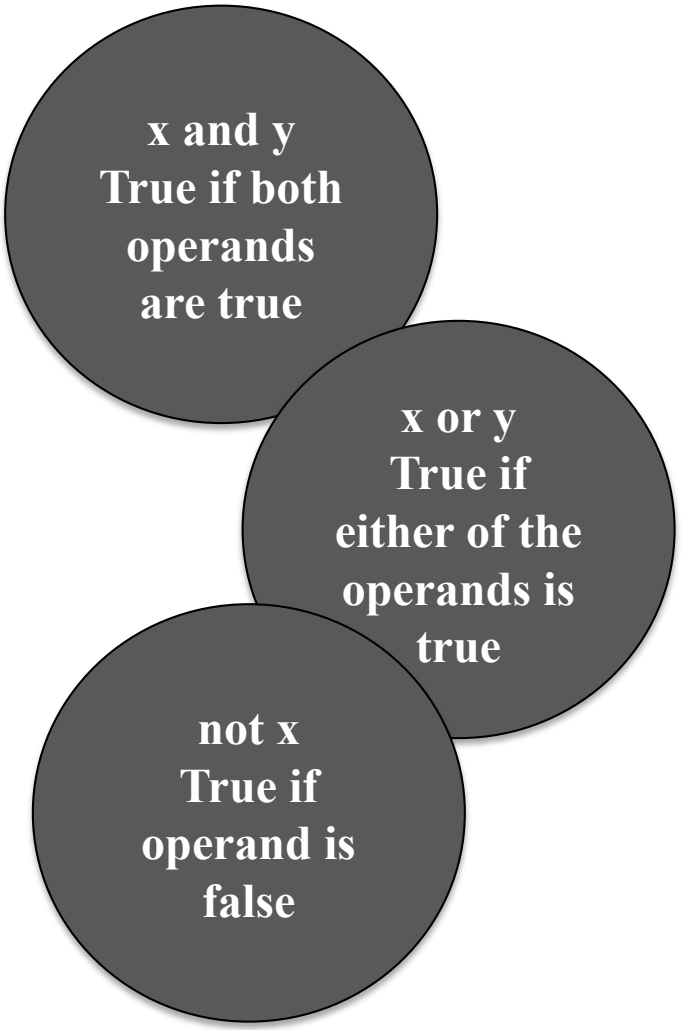
x != y
True if both are not equal

x >= y
True if x is greater than or to equal to y

x <= y
True if x is less than or to equal to y

Logical Operators

1. Arithmetic Operators
2. Assignment Operators
3. Comparison Operators
4. **Logical Operators**
5. Bitwise Operators
6. Identity Operators
7. Membership Operators



Bitwise Operators

x & y
Bitwise AND

x | y
Bitwise OR

~ x
Bitwise NOT

x ^ y
Bitwise XOR

x << y
Bitwise left shift

x >> y
Bitwise right shift

Identity Operators

1. Arithmetic Operators
2. Assignment Operators
3. Comparison Operators
4. Logical Operators
5. Bitwise Operators
6. **Identity Operators**
7. Membership Operators

"Is"
True if operands are identical

"Is not"
True if operands are not identical

Membership Operators

1. Arithmetic Operators
2. Assignment Operators
3. Comparison Operators
4. Logical Operators
5. Bitwise Operators
6. Identity Operators
7. **Membership Operators**

"In"
True if value is found in sequence

"not in"
True if value is not found in sequence

Operators in Python

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Operator Precedence

Operator	
( )	Parentheses
**	Exponent
~ + -	Bitwise NOT, Unary plus, Unary minus
* / % //	Multiplication, Division, Modulus Floor division
+ -	Addition, Subtraction
>> <<	Bitwise shift operators
&	Bitwise AND
^ |	Bitwise XOR, Bitwise OR
<= >=	Comparisons Operator
== !=	Comparisons Operator
= %= /= //= -= += *= **=	Comparisons Operator
is is not	Identity
in not in	Membership operators
OR NOT AND	Logical Operator

Things To Do

- Play around with the basic data types of Python discussed in class. Do check out the mentioned links in the practice notebooks files to learn at your own pace.
- Practice code to have a clear understanding of different operators discussed in class
- This practice will of course help you in later part of the course

Coming to office hours does NOT mean you are academically weak!