**Course: C339 Data Fundamentals**

**Date: February 27, 2023**

**Title: Python and Object-oriented programming**

**Object-oriented programming (OOP)- What is it?**

OOP is a computer programming model that organizes software design around data, or objects, rather than functions and logic. An object can be defined as a data field that has unique attributes and behavior.

An object is like an entity that has its own columns. For example, a person (an object or entity) can have information organised into columns such as person ID, Name, Address, etc.

When an object needs to interact with another object, we can write functions to do so. However, the functions need a context. How objects interact with other objects depends on a set of rules defined (i.e. how the function is written)

**Types of Programming Languages**

Assembly language, procedural language, Functional language

| Assembly language |  |
| --- | --- |
| Procedural language |  |
| Functional language |  |
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**Python 3**

Python is an expressive language because it is understandable. It is also an interpreted language

In python, a list can be stored in square brackets []. Numbers and strings can be stored in lists.

**Python applications**

1. Web Apps: Django, pyramid, flask, bottle, phone
2. PyQT, PySide
3. Console
4. Scientific - SciPy, NumPy, Pandas, Matplotlib,
5. Audio/Video - Pygled, QT phonon
6. 3D drawing - camrox, Aycad
7. Image processing - OpenCV
8. Enterprise Resource Planning (ERP) - Open ERP

Objects, Values, and Types

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**Mutable and Immutable objects**

Mutable object is an object that can change its state. For example, an electricity meter. The different machines will interact with the electricity meter to obtain an electric current. After some time, someone is going to wonder how much electricity has been consumed. The results will vary from time to time because the state of the object (in this case the electricity meter) has changed.

Some mutable data types in Python: sets, lists, dictionary, and user-defined classes.

Immutable object is an object that never changes (i.e. a constant). Some mutable data types in Python are int, float, decimal, bool, string, tuple, and range.