OOP Introduction

Agenda

- What is an Object?
- Properties of an Object
- Object in software
- Object oriented approach
- Object Oriented Analysis (OOA)
- Object Oriented Design (OOD)
- Object Oriented Programming (OOP)
- Building blocks of OOP

What is an Object?

- In real world, an object is something we see around ourselves
- Tangible ones like car, toaster, a dog, television, bike, etc.
- Can touch, feel, handle or control such objects
- Includes intangible objects like apps, music on devices, etc.
- We learn about objects since childhood
  - A car that takes us to places
  - A toaster that toasts a bread
  - A dog is a pet that barks

Properties an Object

- **Identity**
  - Each object has its own identity.
  - Distinguishes objects
  - Like, name of a dog, serial number of bike, car or toaster

- **State**
  - Characteristics or properties
  - Like - *TV* - size, model, brand. *Dog* - name, color, breed, owner etc.

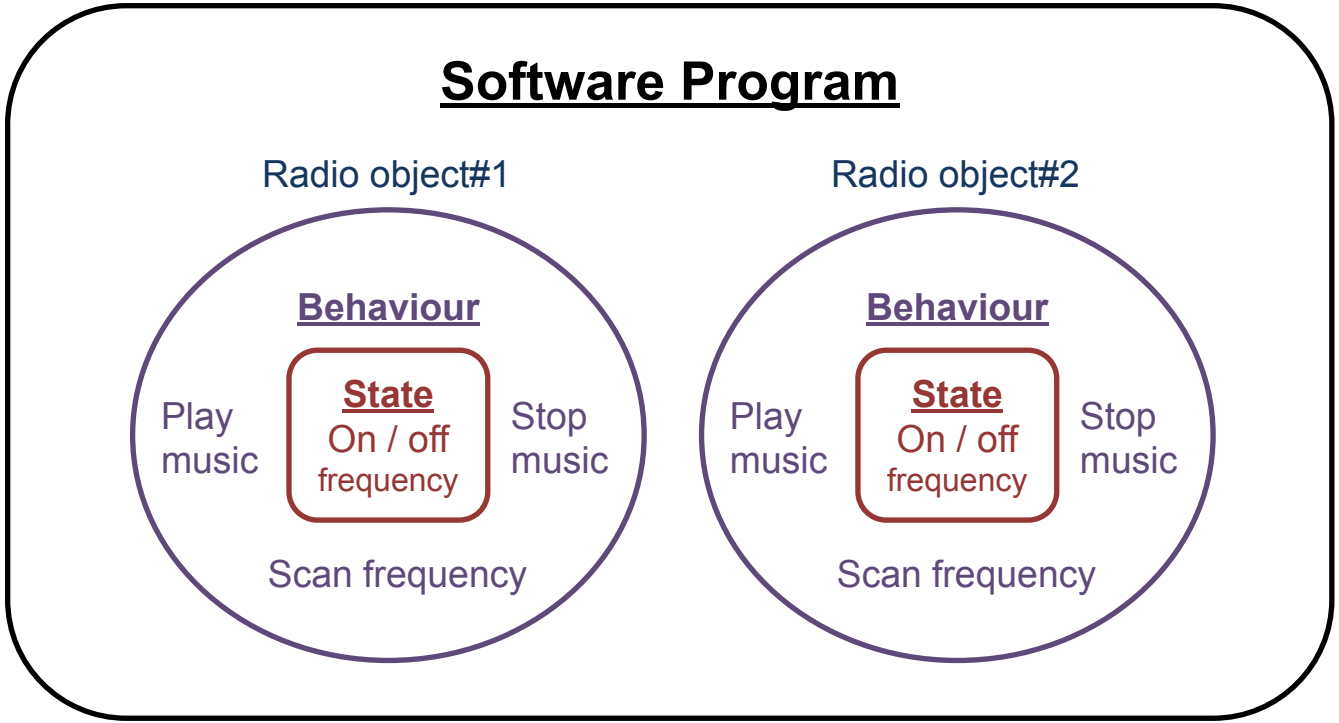
- **Behaviour**
  - How an object behaves when state of the object changes
  - Like - radio, **state** is **on**; radio is playing. When **state** is **off**; radio is not playing

Object in software

- In software, program object is a real-world representation of an object
- Not tangible like any real world object
- Maintains the properties of a real world object
  - **Identity** – Can be the memory reference of an object
  - **State** – Maintained in the variables called **attributes**
  - **Behavior** – are the **methods** implemented for an object

- Example, radio object, in software program, has a state ***on*** or ***off***. When ***on***, behavior defined as, scan for frequency and play music

Object in software



Object oriented approach

- In software, programmer(s) using this approach
- Analyzes, designs and models different objects of a software program
- Define interactions among these objects with respective methods and attributes

Object oriented analysis (OOA)

- A process of looking at a work at hand which should run as a software program.
- Identifies various objects in the given work.
- Identifies interactions among the identified objects.
- This step defines “**what needs to be done**” .
- Output is the **set of requirements** of a software program.
- This process is done by observing / exploring existing system, interacting with users of a system, understanding the present processes.

Object oriented design (OOD)

- Converts identified requirements into implementation specification.
- Based on a requirement
  - Objects are identified
  - Attributes and behaviour is defined
  - Interaction among objects are defined
- This step defines “**how it will be done**”
- Output is “**implementation specification**”
- Set of classes and interfaces to implement in an object oriented programming language.

Object oriented programming (OOP)

- It is the process of converting the implementation specifications to a workable software program.
- Python is one of the language that supports OOP.

Building blocks of OOP

- Class
  - Defines structure or blueprint of an object. A user defined data type
- Object
  - Instance of class
- Methods - (functions)
  - Define the behavior of an object. Are part of class structure
- Attributes - (variables)
  - Define the state of an object. Are part of class structure

Summary

- We learned about what an object and object oriented approach is.
- Learned about Object oriented - Analysis (OOA), Design (OOD) and Programming(OOP)
- How OOA, OOD and OOP complement each other.
- Got introduced to building blocks of OOP.

Thank You