Understanding Class, Object, and Private vs Public Members

Class:

A **class** is like a blueprint for something, and in this case, it's the **Human class**. Just like how humans share common traits (like having a name, age, and abilities), a class defines the basic structure and behavior for creating "human objects."

- **In simple terms**:
  - Think of a **Human class** as a blueprint that defines what every person should have. For example, every person has a name, age, and height.
  - The class is the shared blueprint that says every human will have these traits (properties) and actions (methods) like walking, talking, or sleeping.
- **Technical term**:
  - A class defines the structure (traits) and behavior (actions) for objects that belong to that class.
- **Example**:
  - If "Human" is a class, it defines that every human will have a name, age, and some abilities. All humans share this structure.

Object:

An **object** is like a specific person that’s created from the **Human class**. Every person is unique, but they all follow the basic blueprint laid out by the Human class.

- **In simple terms**:
  - The **Human class** defines what a human should look like and do, but the **object** is the actual person.
  - Every person you meet is an **object** of the **Human class**. While everyone shares basic traits (like having a name and age), each person has their own specific details (like "John" is 30 years old, "Jane" is 25 years old).
- **Technical term**:

    - An object is an instance of a class, with its own set of data, but following the structure defined by the class.
- **Example**:
    - If you create a person named John from the Human class, John is an **object** of the **Human class**, with his own specific name, age, and abilities.

Private vs Public:

Private members (like a person's thoughts or medical records):

- These are personal details that a person doesn't share with everyone. Only the person themselves (or in programming terms, the **class**) can access or change these private details.
- **In simple terms**:
    - Just like a person's private thoughts or medical records, some information is private and can only be accessed by that person. No one else should be able to change or view it without permission.
- **Technical term**:
    - Private members are hidden from the outside world and can only be accessed within the class. This ensures privacy and data protection.

Public members (like a person's name, or their ability to talk):

- These are traits or actions that anyone can see or interact with. For example, you can know someone's name, or see them talk or walk.
- **In simple terms**:
    - Just like how you can know a person's name or see them perform actions like talking or walking, public members in a class are the parts of the object that anyone can interact with.
- **Technical term**:
    - Public members are accessible from outside the class, meaning others can use or see them.

Why Classes and Objects are Useful:

1. **Encapsulation**:
    - The **Human class** bundles important traits (like name and age) and abilities (like talking and walking) into one organized structure.
2. **Data Protection**:

- Private details (like a person's medical records) are kept safe and can't be accessed by others without permission.

3. **Organization**:
   - The **Human class** provides a clear and logical way to define what it means to be a human, making things organized and easy to work with.
4. **Reusability**:
   - Once the **Human class** is defined, we can create as many different people (objects) as we want, just like how every new person born follows the same basic blueprint of being human.
5. **Abstraction**:
   - The **Human class** helps us represent real-life people with their basic traits and actions, while hiding unnecessary details (like thoughts or internal processes).

Putting It All Together (Using Our Example):

- The **Human class** is like a blueprint for defining what it means to be human, with traits like name and age, and actions like walking and talking.
- **Private members** (like thoughts or medical records) are hidden to protect personal information. This prevents others from changing or accessing this private data without permission.
- **Public members** (like name or the ability to speak) are accessible to everyone and allow interaction between humans (objects).
- You can create multiple **human objects** (John, Jane, Bob) from the same **Human class**, just like every individual person is a unique version of the human blueprint.

In Everyday Terms:

Think of the **Human class** as the general idea of a person, and each individual (John, Jane, etc.) is an **object** or instance of that class. Some information about a person is **private** (thoughts, medical info), while other information is **public** (name, ability to talk), helping control how others interact with or see that person.