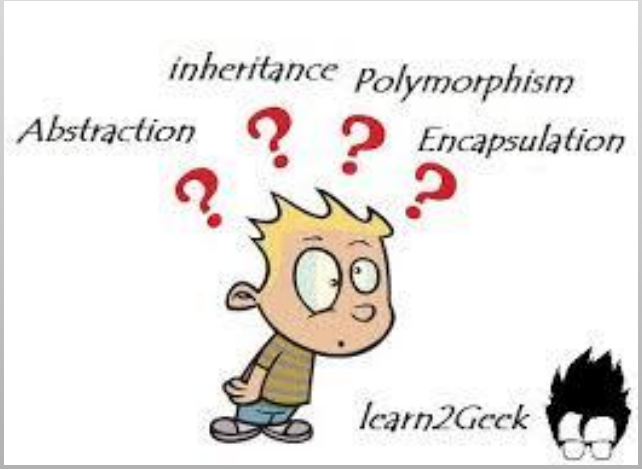
OBJECT ORIENTED PROGRAMMING

MINI PROJECT #2

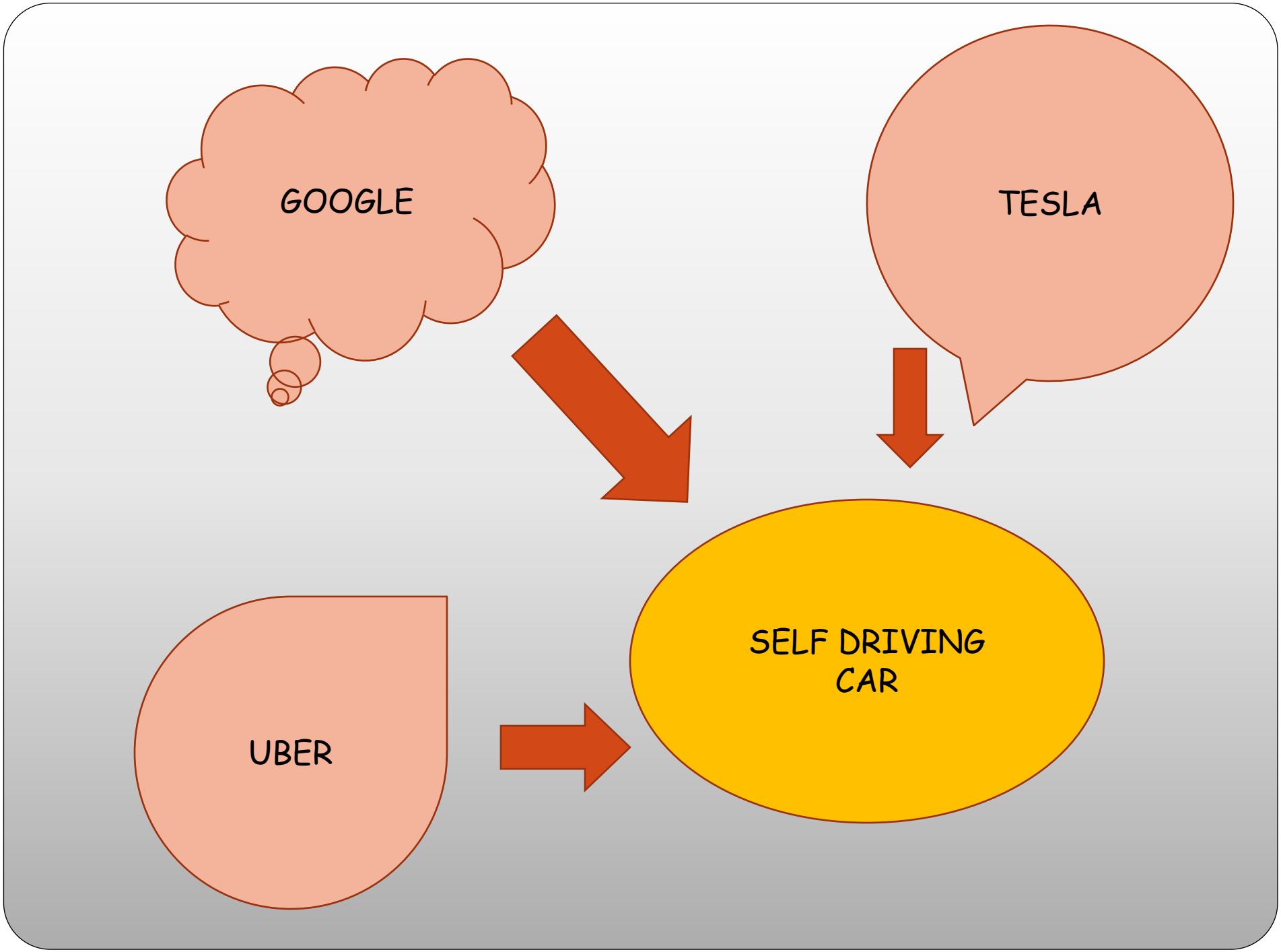
Anjali Nankani



Objectives

- Abstraction
- Encapsulation
- Inheritance
- Polymorphism
- Interface

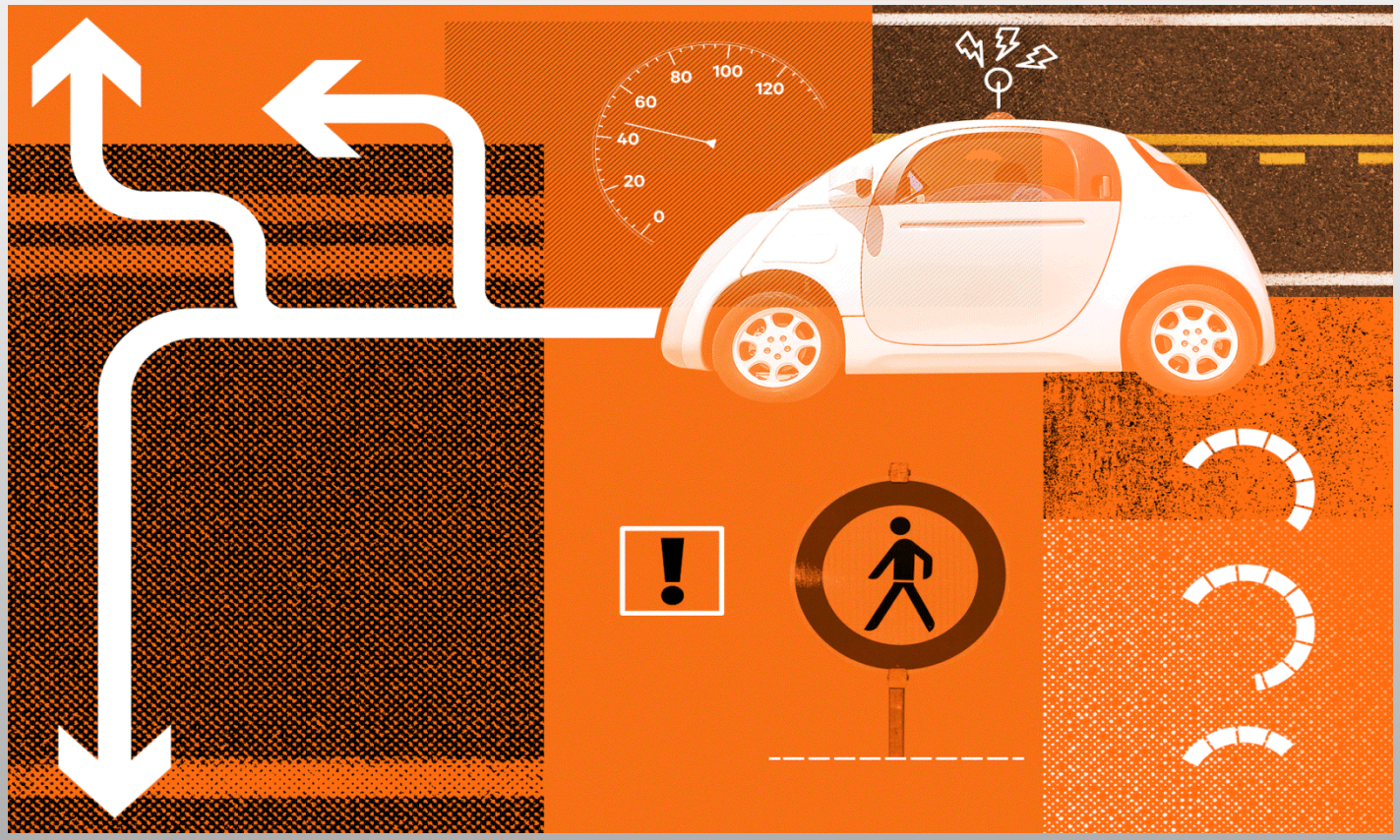
Product – Self-driving Cars


GOOGLE
TESLA
SELF DRIVING CAR
UBER

Abstraction

- Abstraction simplifies the process by showing only relevant information to the user
- In this case:
- Mapping and Localization – It is done through GPS system, where user decide the destination and the car matches its position with the customized maps in order to select the best route to take
- Sensor to detect the obstacles – radars keep track of other vehicles on the road as well as there is camera to read the road signs and maintain the safety zone for passengers and pedestrians

```
public void Drive()
{
    //Write the logic
    Console.WriteLine("Enter the destination");
}
```

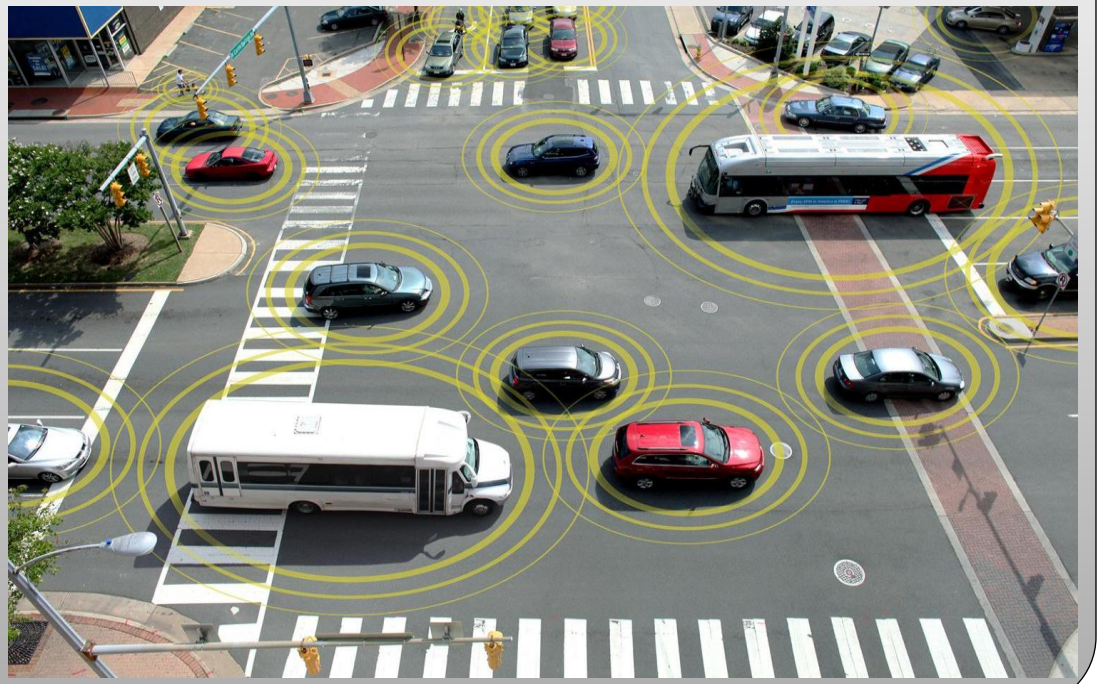


Encapsulation

- Encapsulation provides the level of access right to the user for the protection of the information

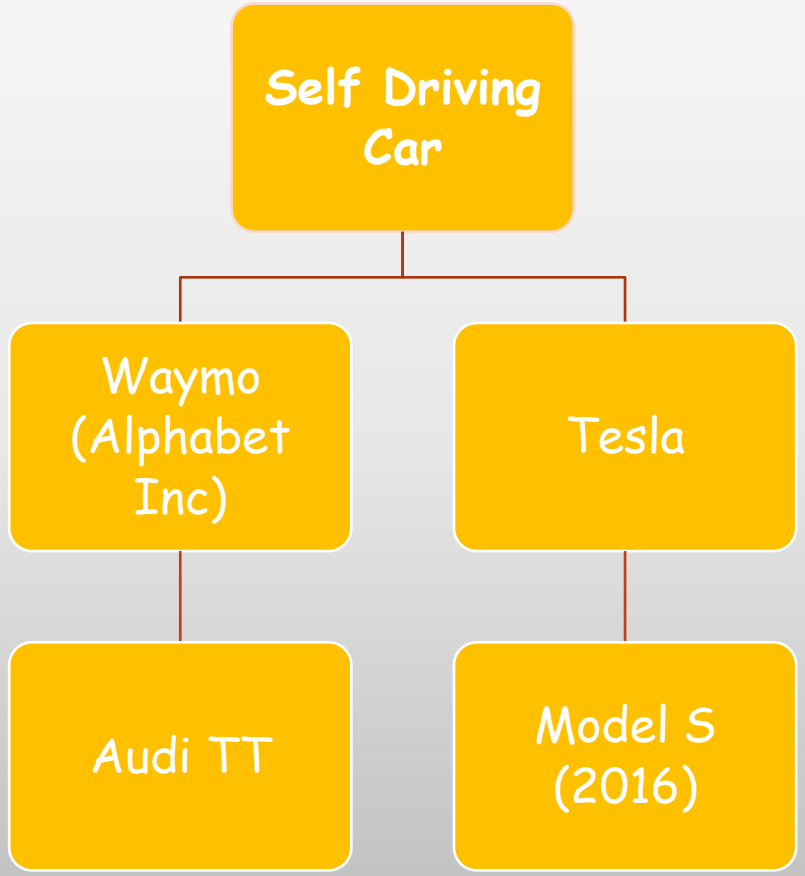
- For Example:
- Connected cars has infotainment system which provide internet access to the user
- Vehicle to vehicle (V2V) and Vehicle to infrastructure (V2I) provides the access to communicate between the car and objects to improve vehicle's efficiency and commute time
- They only connect to share the necessary information which is accessible to users

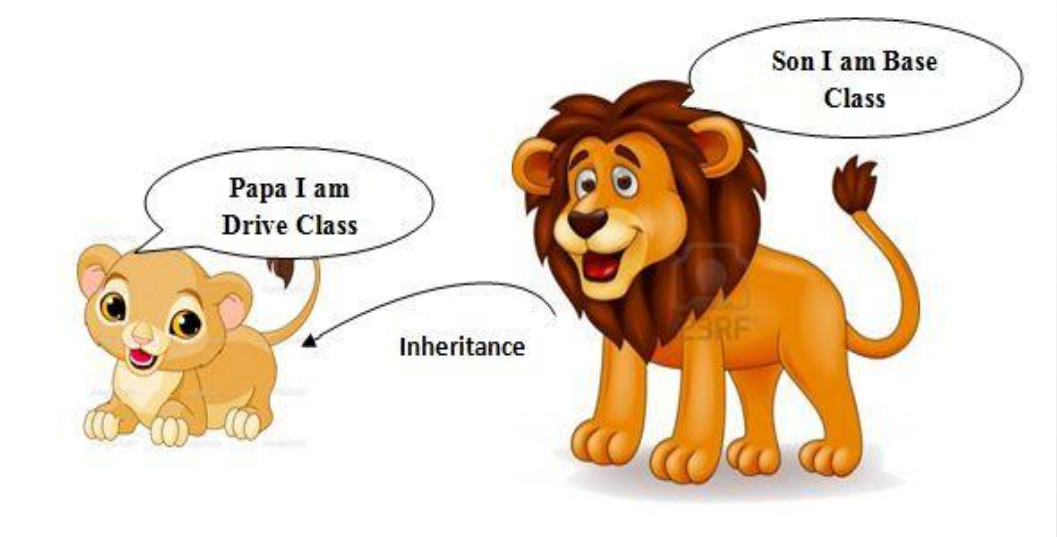

Fees & Charges
Road Usage Charging
"Pay-As-You-Drive" - Insurance
Congestion fees
Vehicle interaction
Remote Diagnostics and SW Updates
Charging support for Electric Cars
Service Calls
Traffic Efficiency
Travel Planning
Traffic Mgmt
Traffic alerts
Eco Driving
Infotainment
In-car entertainment
Personal Information Mgmt
Advertisement and Points Of Interest
Traffic Safety
Traffic Hazard warnings
eCall
Intelligent Speed Adaptation
Alco-lock

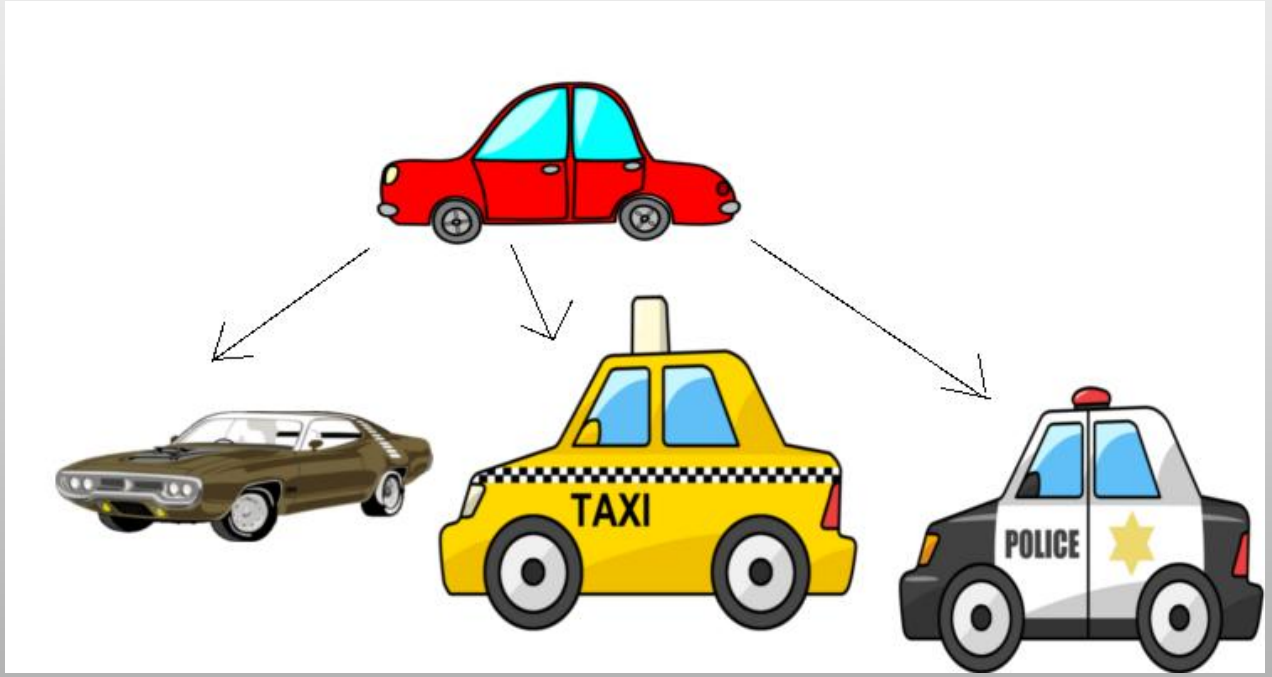


Inheritance

- Inheritance is the passing on the data from parent class to the child class which makes child class slightly different from the parent class
- Audi (Waymo) and Tesla self driving cars are inherited from the same base class. They have similar sensors, mapping technology & software systems
- However, both car brands have unique features that set them apart. For example, Tesla cars are electric, Audi's is not

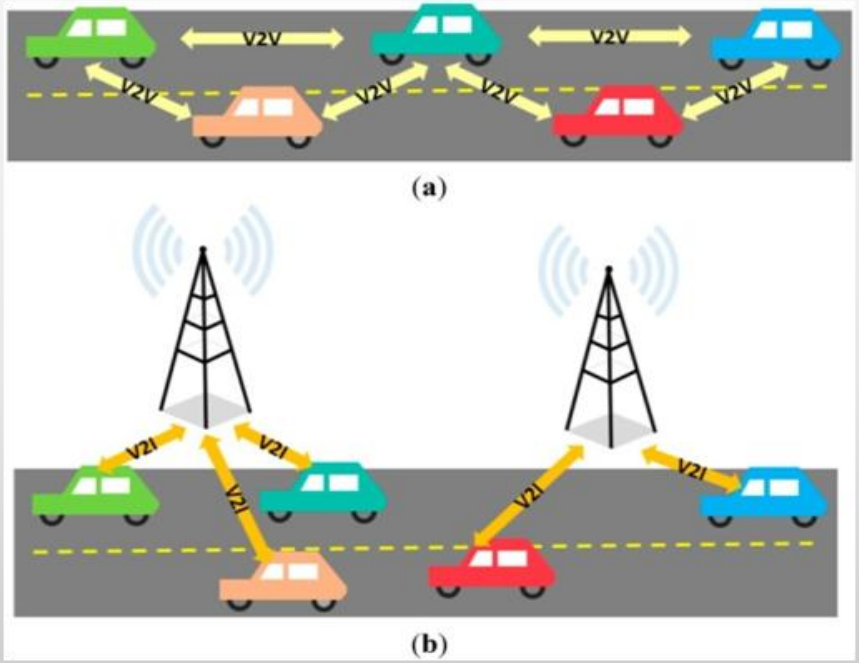



Son I am Base Class
Papa I am Drive Class
Inheritance


TAXI
POLICE

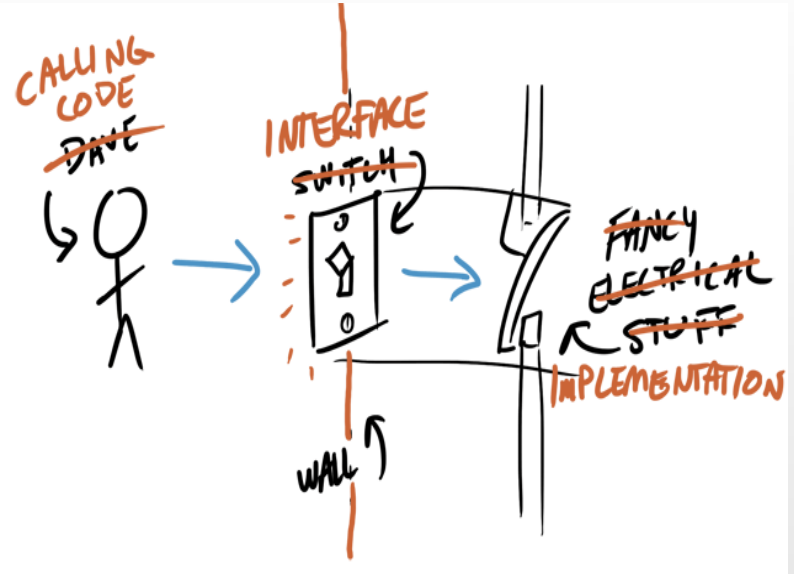
Polymorphism

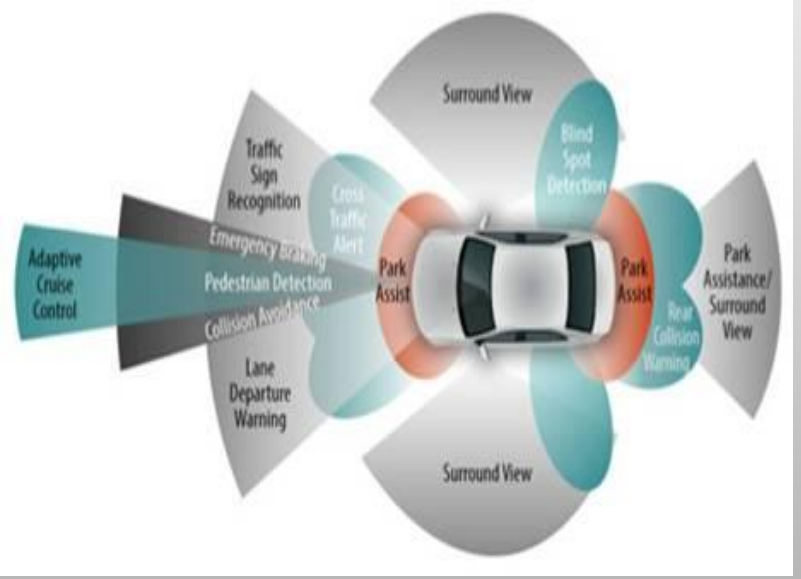
- Different behavior of the derived class inheriting common functionality from the base class.
- V2V - Vehicle to vehicle system allows to receive signals and sending it to other vehicles for communication.
- V2I - Vehicle to infrastructure system allows to receive signals from objects around the vehicle. However, it does not send signals to other object instead the car makes the decision according to the situation.
- These two systems have different behavior.



Interface

- Interface is a shared partition which allows the exchange of information across the boundaries.
- For example:
- Google self driving car uses LIDAR. LIDAR sensors throw laser on the object to determine the distance between car and its surrounding.
- Tesla have ultrasonic sensors and RADAR autopilot system which includes forward facing camera with advanced software to detect distance, pedestrians and read signs.






THE END