Assignment No. 01  
Autonomous Drone Delivery System

# Question No. 01

# Extract the main objects (entities) of the above system?

The main objects (entities) extracted from the given scenario of the Autonomous Drone Delivery System are:  
- Client  
- Delivery  
- Package  
- Drone  
- DeliveryDrone (specialized subclass)  
- SurveillanceDrone (specialized subclass)  
- FlightPath  
- ChargingStation

# Question No. 02

# Find the necessary attributes and functions that need to be associated with each object?

1. Client  
Attributes: clientID, name, contactInfo  
Functions: createDeliveryRequest()  
  
2. Delivery  
Attributes: deliveryID, dispatchTime, ETA, status  
Functions: assignDrone(), updateStatus()  
  
3. Package  
Attributes: packageID, weight, destination  
Functions: validatePackage()  
  
4. Drone (abstract class)  
Attributes: droneID, batteryLevel, status  
Functions: checkBattery(), assignToDelivery(), returnToCharging()  
  
4.1. DeliveryDrone  
Functions: carryPackage()  
  
4.2. SurveillanceDrone  
Functions: monitorAirspace()  
  
5. FlightPath  
Attributes: pathID, startPoint, endPoint, waypoints, status  
Functions: calculateETA(), updatePathStatus()  
  
6. ChargingStation  
Attributes: stationID, location  
Functions: chargeDrone(), trackDroneAvailability()

# Question No. 03

# Identify the relationships among identified objects?

- One Client can make multiple Delivery requests.  
- Each Delivery involves exactly one Package, one Drone, and one FlightPath.  
- DeliveryDrone is a type of Drone used for deliveries.  
- SurveillanceDrone is another type of Drone used for airspace monitoring.  
- Each Drone may return to a ChargingStation for recharging.  
- One ChargingStation can serve multiple Drones.

# Question No. 04

# Construct a final comprehensive Class diagram showing all objects and their relationships along with their attributes and functions?

Below is the class diagram illustrating the relationships:

