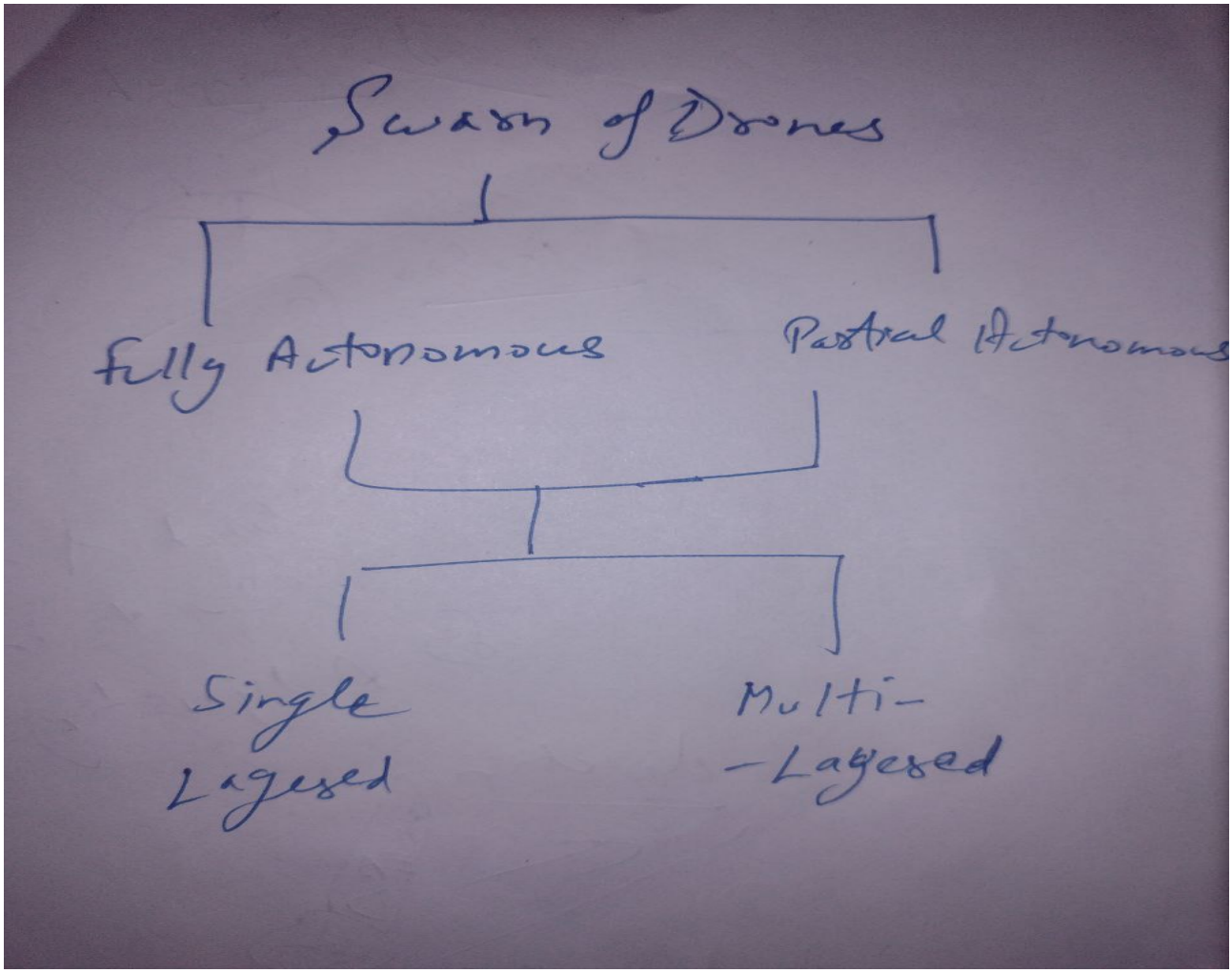
Question (a) : What do you understand by the Swarm Drones.

Answer :

A "swarm" generally refers to a large group of small entities, such as insects, birds, or animals, moving together in a coordinated manner.
You too have seen this in the real world the coordination of species in environment , where they work by coordinating with each other to make it efficient .

Thats why in technology , the sworn of drone is refered to as , a group of autonomous drones operating together as a coordinated unit , assigned to perform some task.

Swarm of drones can be classified in different ways .



One of them like :

a) Fully autonomous : Like everything instrcution is computed inside the drone , no external GSS(Ground Server Station Team) is influencing it , or giving it any actions to do . All decision taken by the drones.

b) Partial autonomous :
These are the system which do requiere some ground instrcutions to go firther or to do an action.

Another way to classify is like :

a) Single Layered Swarm → Here the every drone is like its own leader , or we can say the system is decentralized , where if one drone got out then another one can take its place ,and not affect the whole system.

b)Multi Layered Swarm → Here there is as leader dedicatee to each layer which can result in robustness , but can also affect by not giving any revelaing effect . Like here the work is diviede among all the drones , and if they any of them got down , then aothers too get afected with that . No one can take each other place here .

A ground-based Server Station is always at the top of the heirarchy as the all the result should go to it.

In Swarm each drone can have dedicated data collection and processing task with sufficient computing capcability to execute those task in the real time .

Challenge :

Important One :
I) Picking a powerful yet efficeint source of power , can be utilize for long durations.

Others :

a) Like what topology should we use to establish a connection between the drone with the other drones.

b) As they are may of how them , challenge I to choose how much we require .

c) Maximum and Vertical distance (Horiontal / Vertical ) between any two drone of the Swarm.

d) Self healing : If any of them stop working or been shoot out , then they must be capable of taking its reponsibilities .

e) Should be able to travel and tackle obstacle or environment , without the use of the GPS.

f) Should be equipped with :

I) Sensors , consist of hardware too like cameras , infrared , and Lidar , which can sense the environment and provide data for preocessing and analyzing the state.

2) Target Detection Model , here the Using Lidar and Computer vision algorithm to detect the target.

3) Communication system , here have to establish an protocol to perform iner-UAV communication.

4) Autonomous Navigation System , deciding the algorithm to perform path search.

5) Machine Learning Algorithm to analyse the input from the sensor to the environment.

6) Localization : TO inform others drone too about the discovery of the target and also tell to the Ground Station.