4. Extension to four copters:

The same algorithm has been run on each copter. So the approach used is, to achieve the cooperative height control while every individual copter is on range defined intelligent search. During this search every single copter is trying to achieve its local goals which brings out the emergence of swarm behavior where all four copters stay at the same height.

There are the following goals for each copter to consider. First is to oscillate vertically and read enabled sonars after every 83 milliseconds once one sonar reads the obstacle, it is considered as a neighbor due to our controlled environment. This shows two copters have found each other and are expected to maintain the connection. This communication is explained in the Chapter 5, Finite state machine through the variable " check_direction". The next thing to do is, to keep reading the sonars until second obstacle/neighbor is detected too. Once each copter has found two neighbors it should maintain its position, so all copters end up holding the same height.

Issue and fix:

There are total four sonar sensors on each copter mounted at a right angle to each other. To run the process faster only two sonar sensors are read since the local goal is to find two neighbors at maximum while the other two are disabled. Details of the sonars enabled on each copter is as under:
White: Front and right sensor
Lilac: Front and right sensor
Blue: Front and left sensor
Green: Front and left sensor