Dr Roboto has returned from a wonderful break and no body breaks. There are many pieces of paper with scribbles and diagrams. Also a back-log order of $150 for books on python programming.

I grew up in a family that was deeply involved in scouting. How involved? When my parents got married, my father took his two weeks of yearly holidays. The first week was for the honeymoon and the second one was as a leader at a boy scout camp. As I grew up, I was a cub scout and then a boy scout. I did not become a rover scout because my father, ex army drill sergeant, was the leader of the rover pack.

One of the skills I learned was orienteering. For practice, I would be given a start point, destination and a rough map. I would take my compass and staff (not other people, a pole that I had previously cut down and grooved every foot) and head out. The map would identify local points (rock face, creek, stand of particular trees).

You would determine a compass heading to the first point and off you went. If you were lucky, on the way you would find small rocks and build inuksuits pointing in the direction you were walking or a turning point. That would give you an aid to getting back. I use the same technique today when I hike behind our cottage, though the Boss also has me carry a 2-way radio with built-in GPS (being a guy, that does not mean it is turned on).

All of that as background, to the task of how to program the drone to "auto" return home. This drone does not has a GPS, that would have cost $400 more. A good civilian GPS only has approximate 5 m accuracy, even worse indoors. The original idea was to program a grid to track movements.
  – start at 0, 0
  – fly 5 seconds to the right 0, 5
  – fly 7 seconds straight 7, 5
  – etc
  – when you decide to go home, you are at X, Y and just determine the direction and time (using Pythagorean theorem, sine, co-sine, and other mathematics I learned in grade 9) to get back to 0, 0

note: most of my turns are not multiple of 90 degrees (straight, left, back, right), but are rotate clockwise or rotate counter-clockwise X degrees

That coding resulted in the drone crashing into a chair, as I had previously flown around the chair and was now trying to fly back thru it. This drone does not have an ultrasonic sensor on it that I can program for obstacle avoidance. I did that for the pocito robot.

I also remembered, from when I took flying lessons, about service ceiling (max altitude) and no fly zones. The drone equivalent would include walls, ceilings, furniture, etc and most important NOT where the Boss is.

So version two of the task consists of two parts. The first is to record all the commands that I send to the drone, into a list. The second is how to respond to my "home" command. You rotate the drone 180 degrees and then re-read the list from the end backwards. Some commands are easy to re-configure.

If the list command is UP X (increase altitude) then the new command is DOWN X, same with TAKEOFF now becomes LAND, Commands FORWARD X seconds and SPEED Y cm/second stay the same.

However a command like CCW 30 (counter-clock wise) turn 30 degrees now becomes CW 150 (clock wise) turn 150 degrees or CW 30, I think. It works on paper and in theory.

The wonderful thing about a theory is that it does not have to be based on facts.
FACT ONE: it takes longer to turn 150 degrees than 30 degrees.
FACT TWO: a quadcopter has four propellers, two turning clockwise and two turning counter-clockwise and no two motors run exactly the same.
FACT THREE: as battery power decreases, so does the speed.

Note: there is a command that will tell me % battery power remaining

Therefore pause the development of this program, Now to write a new program that sends the drone one command at a time through my wifi link. I will then create, on paper, my list of commands before and after the HOME command and enter them. I then use a timer and observation to determine what to change in the return commands (after the HOME command). The results are then used to develop algorithm(s) to modify the return commands.

To make life "easier" and much more portable, I installed python, the programming language, on my samsung tablet. Of course, it is not the same version of python. It is like going into a paint store and asking for a can of white paint. They will say "what shade of white? We have 100." I would respond "white: the opposite to black" to which they would respond "opposite to which shade of black? We have 80."