**The Algorithm:**

**This is a step-by-step explanation of how our algorithm works:**

1. Start from a predetermined started point (just before room 2209).
2. Follow the right wall using the wall sensor and bump sensors.
3. Continuously check the image stream for ‘Checkpoints’ (tape on the wall) using the findTape function.
4. (This step is explained in more detail below) If we find a checkpoint, stop the robot, determine which checkpoint we are at, call the function to perform the hard-coded steps from that specific checkpoint (eg. Enter room 2209 and process the windows, then leave room 2209). Once we have completed the task for the checkpoint, increment the checkpoint counter and go back to step 2 and continue.
5. If we have finished all the checkpoints (this will be some constant depending on where the tape is set up) we send out the stored information about the windows via email and terminate the program.

**Better explanation of Step 4:**

**For Room checkpoints:**  
-Need to enter the room by turning a bit away from the wall, going straight and then turning into the doorway (the little bump makes you have to go at max speed or else the robot will get stuck)

-Once inside, we need to orient the robot such that the camera is facing all of the windows in the room (the height of the camera and the vertical angle is fixed beforehand), to do this, we turn the robot slowly while continuously calling the findOpenWindows function on the image in the stream. We keep panning until the function gives us the appropriate number of outputs, (for example, room 2209 has 4 windows, so we keep panning till we get 4 outputs (this will always happen, given that the camera has the correct vertical orientation)). Also, while panning we need to record how much we have turned using the angle sensor, so that we can retrace our steps in order to leave the room.  
Once we have the appropriate window information, we redo the pan by turning back as much as we panned and then executing the commands that got us into room in reverse order and reverse directions. Once outside, make sure we skip any obstacles such as the fire extinguisher which would break our camera without triggering the bump sensors, and once we skip the obstacle(s), we go back to the wall following.  
**For Hallway Checkpoints:**

**-** This will differ depending on which checkpoint it is, it is usually to skip over a passageway or some break in the wall that would cause us to go off in the wrong direction (the stairwell for example). To perform the skip, we just turn a little away from the wall and then go forward however many meters we think is necessary and then continue wall finding until the next checkpoint.

- There is one special case for this, where we turn around for the other side of the hallway which could be achieved by just turning 90 degrees, going straight till the opposite wall, turning 90 degrees and then continuing wall finding