Summary of tests run with the provided code

In order to try the code, I wanted to run a considerable number of simulations in order to account for the randomness. I chose to run 20 simulations + as many extra simulations needed to account for the failures and then calculate 3 parameters:

1. The total average of all the tests (automatically calculated by the program);
2. The average of all passed tests (i.e.: tests that got to the finish line);
3. The average failure rate (number of tests that got a "failed" mark divided by the total number of tests.

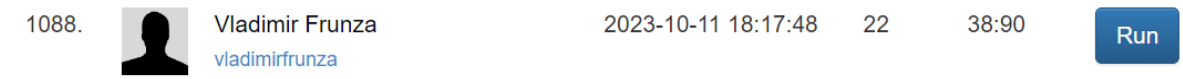
These are the numbers with 22 tests run (20 scheduled + 2 additional tests):

TOTAL AVERAGE FROM 22 TESTS: 38:90

AVERAGE WITHOUT FAILURES FROM 20 TESTS: 34:78

AVERAGE FAILURE RATE: 9.09%

Proof of tests on the robotbenchmark.net website:



Other observations:

1. From the 2 failures, one was a "Major Failure", meaning a block was pushed over a long distance, not just touched or barely scraped, and in the other one the robot got stuck in a block and stayed there until the end of the simulation;
2. For most paths, the robot consistently get a under 35s time;
3. From all the tests, 2 of them were marked as a "Big Success", because in those 2 tests the robot managed to get out of difficult situations, like the forming of a cul-de-sac (dead end road);
4. Since the robot is pretty tall and the sensors are at the half-way point of its height, some of the shapes with not all straight edges (especially the cup) may sometimes challenge the sensitivity level I hard-coded for the sensors;
5. The robot has one visible glitch: if there is an object at a very specific angle on its right-front, probably because of the sensitivity value, it starts to rapidly oscillate between the "InFront" and "OnTheRightFront" states (see code) and it does not manage to advance past that obstacle, ending the test with a "Fail", exactly what happened in Test 18 (see below).

We will now look at all the individual tests. Green means “Passed”, light blue means “Big Success”, bright red means “Major Failure” and dark red means “Robot Has Stopped”.

For each test, the order is: Conclusion of the test, Time, Observations.

Scheduled Tests:

Test 1: PASSED, 33:63, decently hard path, passed with ease

Test 2: MAJOR FAILURE, 1:20:00, pushed a block with its corner

Test 3: PASSED, 34:91, good, solid path

Test 4: PASSED, 31:51, easy path

Test 5: PASSED, 31:72, easy path

Test 6: PASSED, 45:29, took a more complicated route than needed

Test 7: BIG SUCCESS, 40:68, found his way through a very difficult scenario

Test 8: PASSED, 33:26, good, solid path

Test 9: PASSED, 31:82, easy path

Test 10: PASSED, 32:06, easy path

Test 11: PASSED, 31:29, easy path

Test 12: PASSED, 35:56, nice way of handling a pretty hard path

Test 13: PASSED, 36:03, another nice way of handling a difficult path

Test 14: PASSED, 39:92, took longer because it didn't risk a very narrow pass between 2 blocks

Test 15: PASSED, 31:29, very easy path

Test 16: PASSED, 32:86, nice handling of a narrow gap

Test 17: PASSED, 33:00, pretty easy path

Test 18: ROBOT HAS STOPPED, 1:20:00, got stuck in a block

Test 19: PASSED, 45:55, took longer because it didn't risk a very narrow pass between 2 blocks again

Test 20: PASSED, 31:23, very easy path

Additional Tests:

Additional Test 1: PASSED, 31:84, very easy path

Additional Test 2: BIG SUCCESS, 32:33, perfectly executed a tight maneuver between 4 blocks