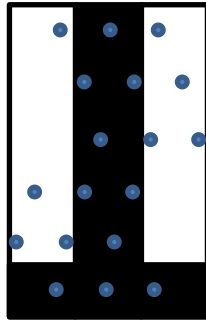


Sensor Input			% Speed of Motors	
FL	FM	FR	LM	RM
0	1	0	100	100
1	1	0	75	100
1	0	0	50	100
0	1	1	100	75
0	0	1	100	50
1	1	1	**	**



Key

FL Front Left Sensor

FM Front Middle Sensor

FR Front Right Sensor

RM Right Motor

LM Left Motor

** Count incremented

Figure No.3.9: Sensor Logic for Motor Control. The blue dots show the position of sensor on the black and white reflective tapes (the route).

The above figure shows the truth table for the logic used in motor control. When the AGV is in the middle of the track, it is run at maximum speed. When it moves slightly away from the middle of the path, the inner motor is reduced speed to make a turn and bring back the AGV to the center. When the AGV moves further away from the middle, the speed of the inner motor is further reduced to make a sharper turn and hence get back into the route.

Since GX Developer does not allow for programming using functions, the above logic was implemented as a macro (a set of codes that can be copy-pasted into any program). The macro was called when the AGV has to move.

The second phase of the programming is the main program that dealt with the user inputs and determines the position to move etc. The flowchart shown in Figure 3.9 depicts the program flow.

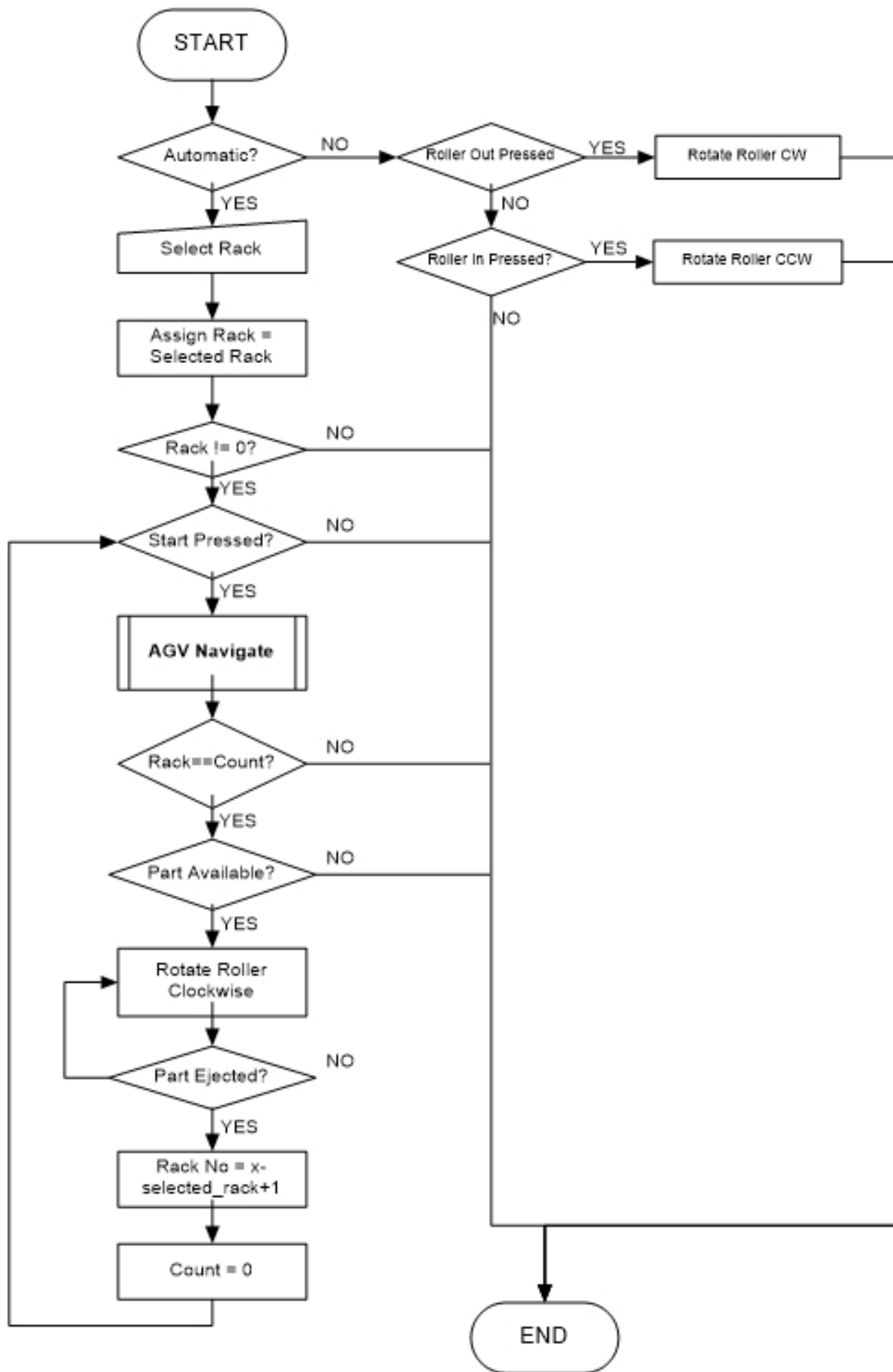


Figure No.3.10: Flow Chart for main program

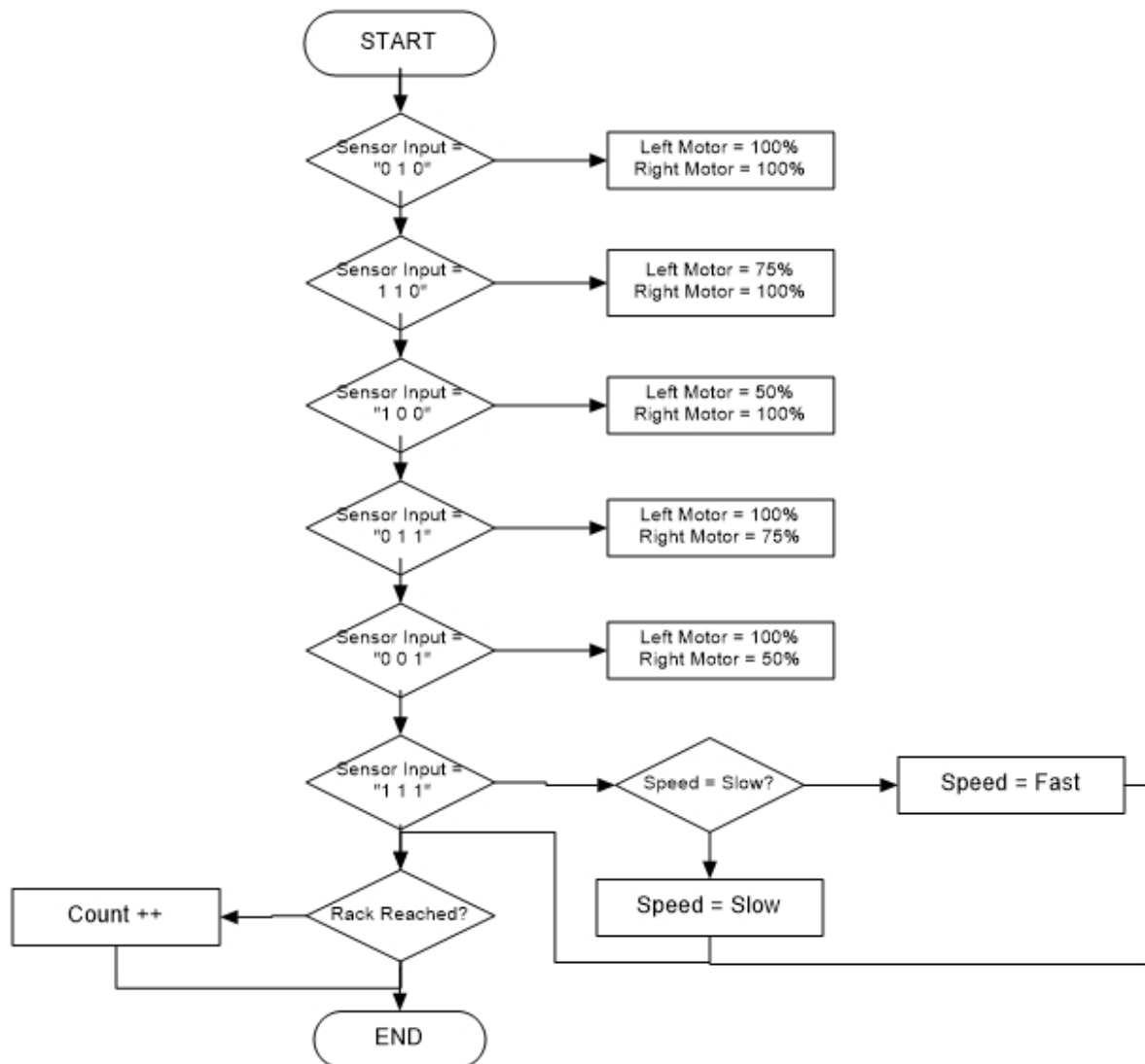


Figure No.3.11: Flowchart for the “AGV Navigate” Subroutine

The AGV-Trolley system works in two modes. In manual mode, the rollers of the trolley can be rotated in both directions with the press of buttons. This way, the trolley can be loaded or unloaded manually which is necessary at the dispatch center of the machine line where a worker would manually load the trolley with a machined part.

The worker could then switch to automatic mode, select the rack and press start. The trolley will record the selected rack and using the ‘AGV Navigate’ subroutine (‘AGV Navigate’ subroutine includes the macro depicted in Figure 3.8 above) navigates to the appropriate rack and delivers the part. It then returns to the home rack and stops. The complete program is attached in Appendix D.