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uP Vehicle Report

Results:

To find the binary values for turning right and left for the servo motor, we started from values 5 to 15 in binary to find the correct values. By using this method, we were able to narrow down the binary values for the different turning positions on the servo motor. We used the binary value 7 for the servo motor to turn a little to the right; and we used the binary value 8 for the servo motor to turn a little to the left. These values are so close together because we didn’t want the car to “zig-zag” by the servo motor turning to hard. For these pulses, we need a 20ms delay between the high pulses in order these to work. We do this by creating the variable “ledoff” to make this delay. We used 197 for the binary value for the variable “ledoff” which creates a 20ms pulse delay. For the high pulse time, it is determine by what value we want to use for the actions we want. For the ultrasound sensors, the high pulse time that we use is how far away we want the car to be from the wall. We wanted the car to be roughly 2 feet away from the wall by using a pulse time of 4ms. To make this pulse time, we created the variable “delay4ms”. We used the binary value 36 which gave us a high pulse time of 4ms. Another high pulse time we used to put the motor in neutral is 1.5ms. In order to put the motor in neutral, we created the variable “neutral” with a binary value 15; which gave us a pulse time of 1.5ms. For the motor to complete the neutral state, we need to loop the neutral subroutine for 5 seconds. In order to do this, we needed to create the variable “delay5s”. We used the binary value 250 which will loop the subroutine for 5 seconds. After completing the neutral state of the motor, we needed to create a higher pulse time then neutral in order for the motor to go forward. We created the variable “go” having a binary value of 31 which gives us a high pulse value with a 1.55ms pulse time. With this pulse time, the motor will have just enough revolutions to move forward. This is all showed in the “Variable Cart” below, giving the purpose, binary, decimal value, and pulse time of the variable. Also the pulse value vs. pulse time for the ultrasound sensors and motor states is showed below in the graphs.