Mechatronics: Lab 1 - Serial Control

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Introduction:

For this lab our group set out with the goal of establishing serial communication between the raspberry pi and the Zumo car. The first step towards this goal was to establish our ring buffer functionality along with functionality that allowed us to read and write to the serial monitor in a echo format. From there we were able to implement message handling functionalities. This resulted in our final state which allowed the car to work as a basic calculator able to do simple addition, subtraction, multiplication and division problems.

Important information:

For this lab we did not utilize any registers as these functions were done in memory that did not require memory. Similarly, We did utilize and circuit diagrams. Circuit diagrams were not used because all of the functionality of the serial monitor was built into the USB connections and pi already.

Additional Features:

One of the major benefits of this form of serial communication is that it can easily be expanded upon for other functions and Labs. Looking ahead, One of the features that we have to implement in feature labs is the ability to input movement or acceleration commands into the Zumo car. A change of this sort would be relatively easy because of the structure that we already have set up for serial communication. In the switch case statement the operator could easily be replaced by a 'a' or 'm' for acceleration or movement. This would be convenient because it wouldn't require the program to be rewritten from scratch. Additionally, the two following numbers could be used to control the speed of each of the cars tracks or identify a heading in the x-y plane. Along, with this serial communication will allow us to debug future and more advanced programs easier, as it would allow to see the values that are being passed around with greater ease.