Progress Report 1

Progress summary:

The first step of our project is to initialize an effective and reliable communication link between two nRF24L01 Nordic devices. We need a communication link between the host and the tank so that the user can send commands to the tank which will navigate the tank to travel in a particular direction and the tank can communicate back to the user.

We checked the communication link by mounting two nRF24L01 Nordic devices on the same STM32 board. We connected the devices on two different SPI ports so as to emulate the functionality of the communication between the host and the tank. The Nordic on SPI2 was set to transmit the data and the other Nordic which was setup on SPI3 was the receiver. We needed a compass for showing the heading which helps the tank to move in the specified direction. For doing this, we wanted to relay the current heading to be displayed to the user. Currently, we can send the data packets at a rate of 100 Hz which will update the heading in real time and will relay the information back to the user. This communication has to be set up at a rate of 100 Hz so that the user can check whether the tank is rotating in the right way.

Weekly goal:

We decided to break the project timeline into major milestones that we think are the important stages that need to be achieved. This will help us to achieve the goal in a weighed manner and will help us to track our progress accurately.

As discussed above, we are in the first week of our project implementation and we have already established the wireless communication link which is our first milestone. We are using two Nordic devices which will be used for wireless transmission. We setup the transmission rate to 100 Hz which will relay the real time data to the user. This will frequently send the compass data to the user to check the current angle of rotation. We can now turn towards developing other components of the project.

Milestone 1 challenges:

While we were setting up the communication link, we faced a lot of difficulties right from connecting the Nordics to the hardware correctly and making the Nordics work in the way we want. Professor Bryce helped us and gave us the initialization code for setting up the Nordic and we were able to setup the Nordic. The next challenge that we faced was to make this code to behave the way we wanted in our project. We needed to integrate the compass and we wanted to transmit float data between the Nordics. After carefully reviewing the code, we came to know that Nordic is sending 32 bytes of char data. We then tried to change the function definitions to suit our applications. However, certain functions needed to be in the same definition, otherwise the Nordic could not be initialize. We then tried to change the float value into characters and then sent it for communication.

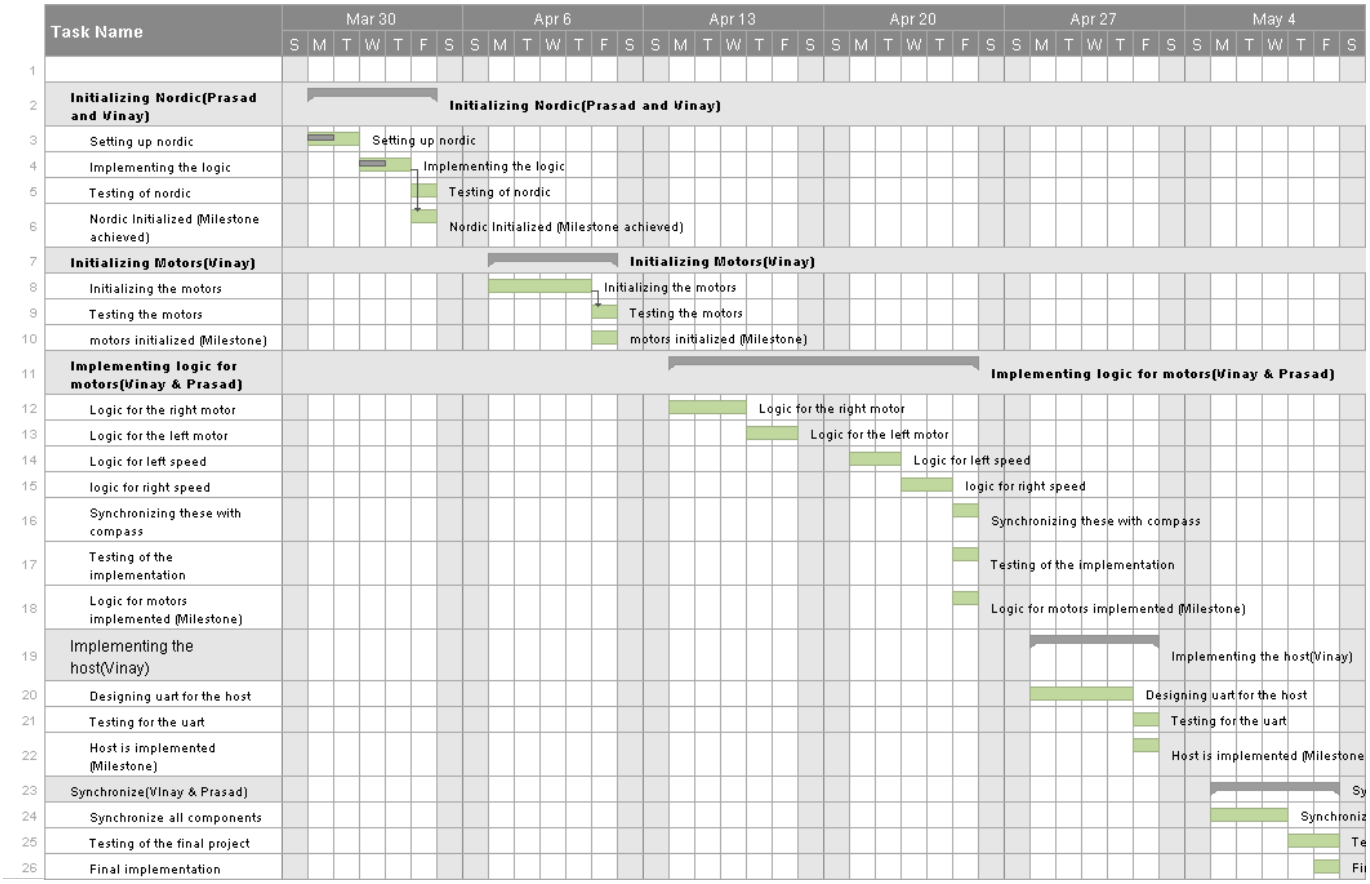
Next week's goal:

Since we have initialized the wireless communication, we now need to program the motors. Once the motors have been programmed, we will be able to put our project to a field test. The main objective will be to make the tank move in a straight direction. Then we will try to turn the tank to a specific angle given

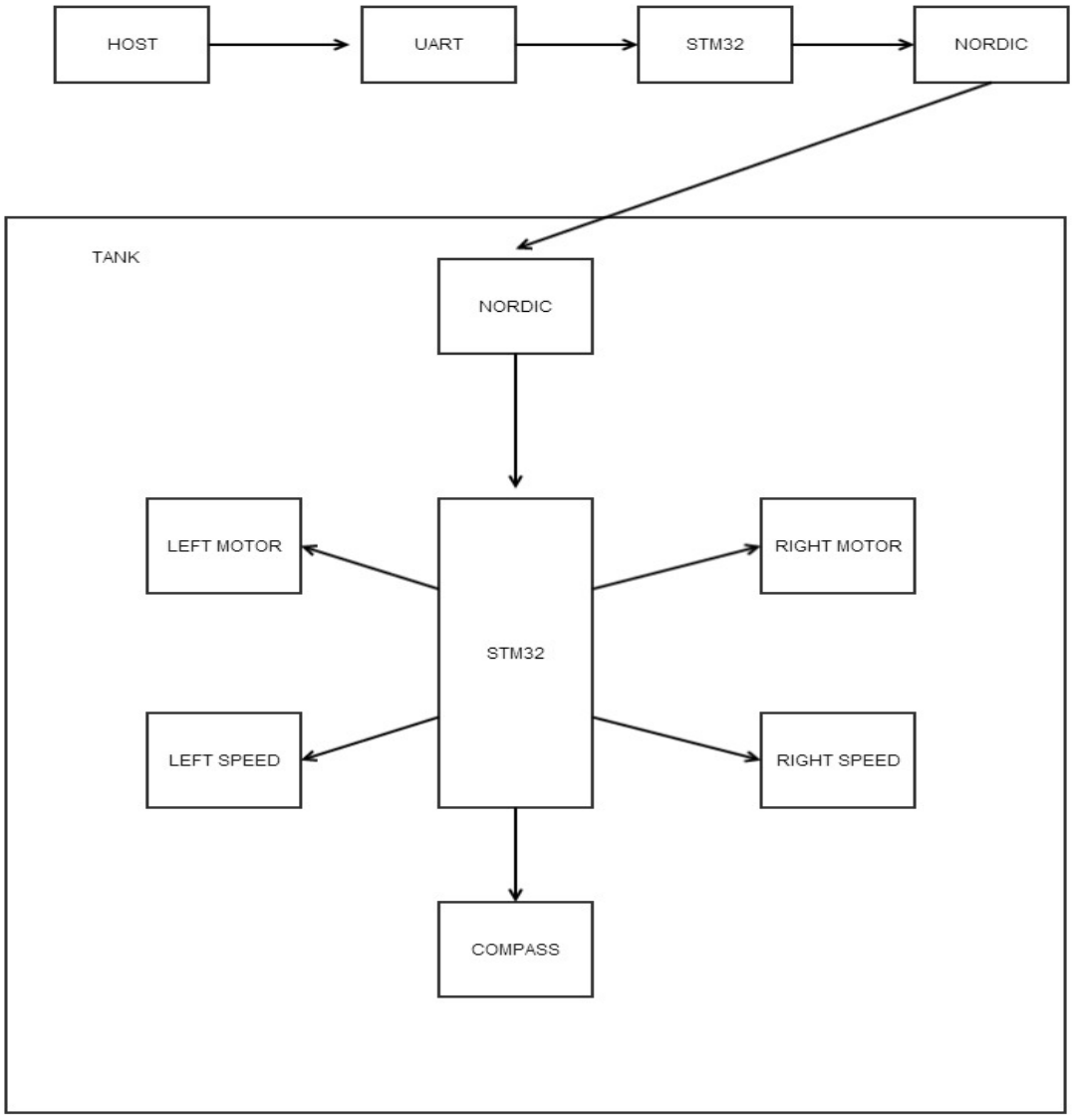
by the user. For this we will have to program the timer registers of the STM32 and program the PWM to control the power pulse of each motor.

Updated Milestones:

As we have completed the first milestone, these are the updated milestones:



Block diagram:



Technical Profile:

Category	Design Objective	Deliverable	Status
Power	Battery life	Based on the usage	
Power	Battery availability	Uses commercially available AA batteries or any other batteries	
Communication	Wireless Link	The wireless modules should communicate with each other	Completed
Communication	Tank movement	Device and the host should reliably communicate	
User Interface	Command line access	An interface that will help user to communicate with the device	
User interface	Device updates and information	Relays the status to the user	
Mechanical	Environmental	Device should be run under suitable condition	