Robot Intention Communication

(Software Development Project)

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Introduction

The purpose of intention communication.

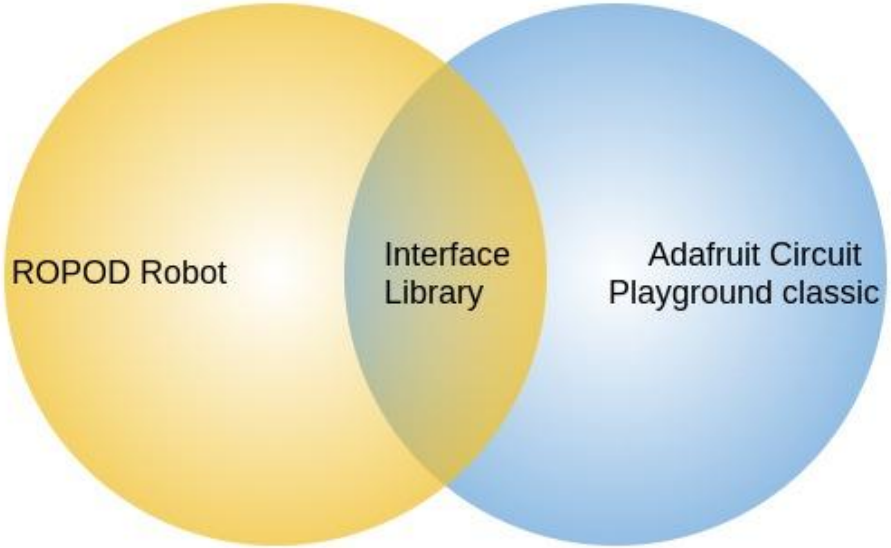
- Prepare the pedestrian about the next movement made by the robopod.
- Communicate the future trajectory to be held by the Robopod.
  1. Moving Forward
  2. Moving Backward
- Advise over complex motion being executed for docking or undocking.
  1. Docking load ()
  2. Undocking load ()
- Warn about the obstacle found on path. The reason for warning is that robot can make sudden action to avoid the obstacles.
  1. Obstacle avoidance

Requirement

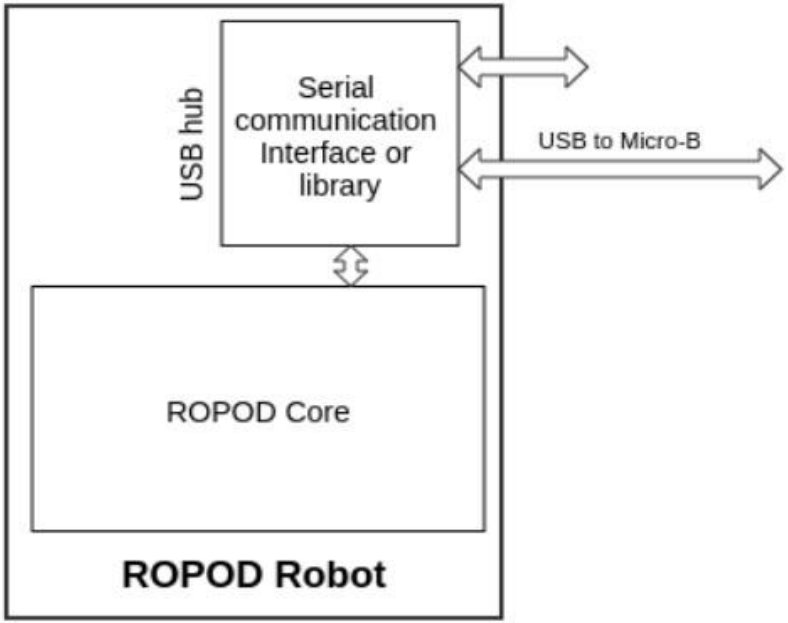
1. Design Communication pattern for each of the robot's navigation action
2. Develop an interface to the Circuit Playground classic so that the LEDs and/or sounds get activated based on messages received from other components.
3. Integrate the board and the developed interface on the ropod platform; in particular execute the GOTO, DOCK and UNDOCK actions while communicating the intentions of the robot at the various stages.

Overview of System

- Robotic Pods for navigating Autonomously in warehouse.
- Circuit playground board with neopixel LEDs.
- Communicate Robot's action to playground board.



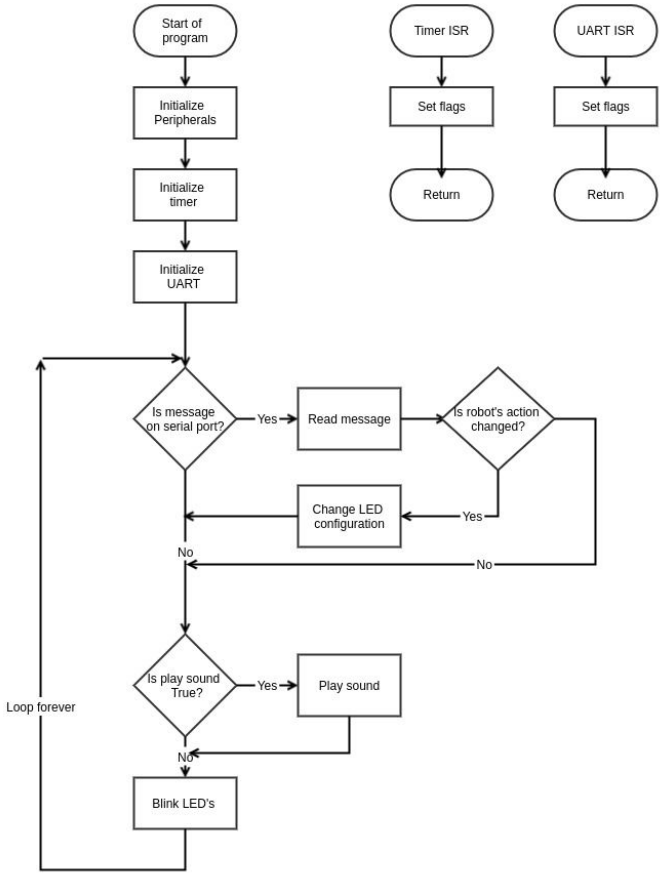
Overview of System (cont...)



Circuit Playground Board

Control flow of Code

- Flow of the designed code in playground board.
- UART interrupt to handle received messages.
- Timer interrupt to handle speaker commands.



Robot Actions

Robot's Action	Colour
Moving Forward	Green
Moving Backward	Red
Rotate Clockwise	Blue
Rotate Anticlockwise	Blue
Docking Load	Yellow
Undocking Load	Yellow

Robot Actions

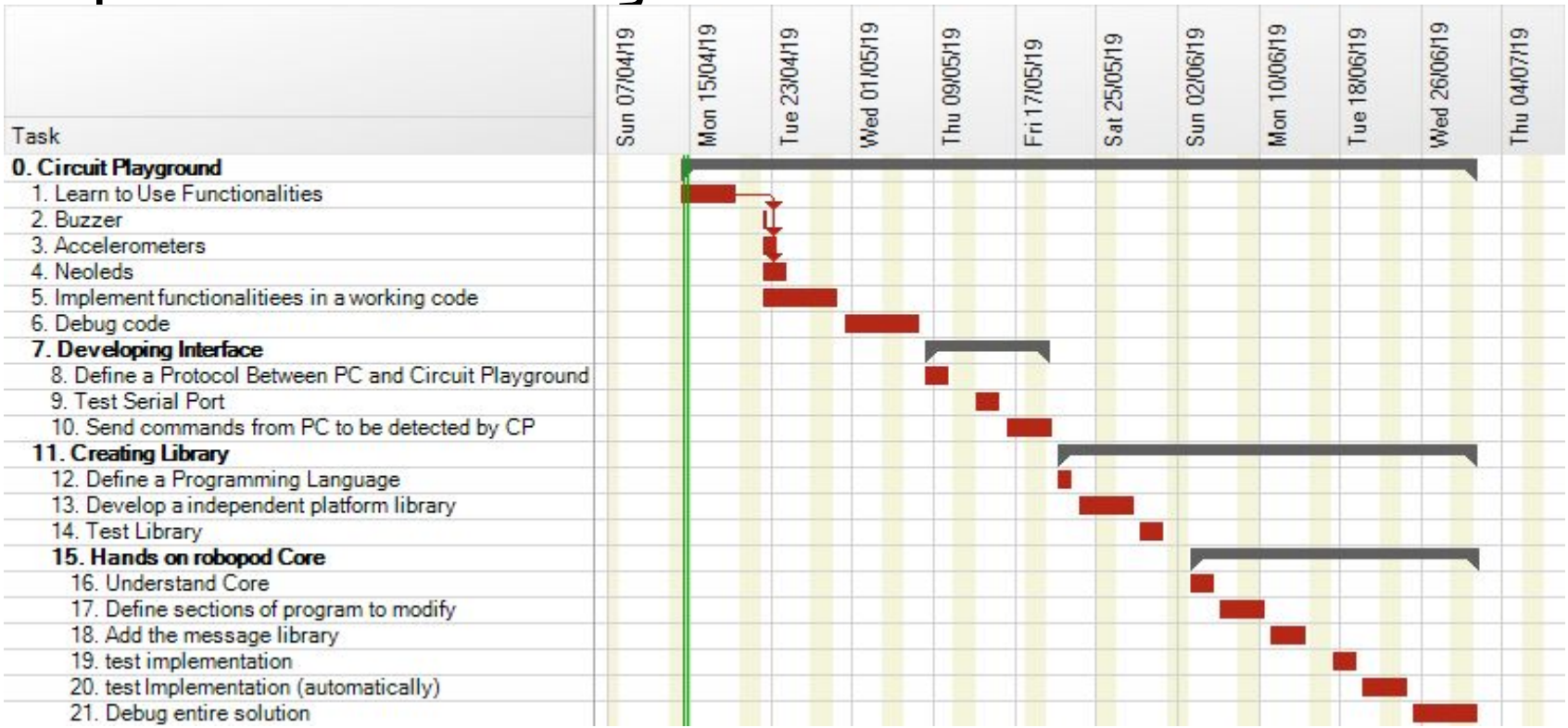
Robot's Action	Colour
Turn Left	Orange
Turn Right	Orange
Obstacle Detection	Purple
Stop	Red

- LED blinking pattern will be decided based on the placement and orientation of playground board

Programming Languages, Libraries and tools

- ROS (Robot Operating system) is used to communicate with the robot. We will use version Kinetic in this project.
  Online link: http://wiki.ros.org/kinetic
- PySerial module is used for the serial communication between the Playground board and the robot PC.
  Online link: https://pythonhosted.org/pyserial/
- Arduino's library is designed in C and C++ language. We will use the same language to control the Circuit Playground.
  Online link: https://www.arduino.cc/reference/en/
- For development of code, we will use Arduino IDE and Arduino web editor.
  Online link: https://www.arduino.cc/en/main/software

Proposed Scheduling



Thank You!