In week 3 lab we saw how to create and use custom messages. This week we will implement trilateration based localization and subsequent navigation using the localization information:

Part A)

- A ROS project named `**week3**` is provided to you. Copy this project in your ROS workspace and do `***catkin_make***`. Launch the `trilateration_world.launch` launch file and verify the following topics exist:
  - /trilateration_data
  - /mobile_base/commands/velocity
- Create a **new** ROS project named in the following format `**week3_{Roll_1}_{Roll_2}**`
- Create a launch file with the following content

```
<?xml version="1.0" encoding="UTF-8"?>
<launch>
 <include file="$(find week3)/launch/trilateration_load.launch"/>
</launch>
```

- Add a node that Subscribes to /trilateration_data. Compute the robot position (x,y) from landmark data. **Publish** this position on a **/robot_pose** topic
- Use `rqt_graph` and save the ros-graph as image

Part B)

- Implement a second node that subscribes to the topic created previously (**/robot_pose** topic)
- Generate waypoints along a circle of radius 4 meter. You can reuse the code from week2 lab assignment.
- Move the robot along the circle of radius 4 meter by tracking the waypoints.
- **Plot** the waypoints and the robot trajectory
- Note the **time** required to complete one revolution. The given robot starts from origin i.e. (x=0, y=0).

Part C)

- Compute the RMS of radial distances of robot pose when it is traversing 1 revolution of the 4 meter radius circle.
  Radial_distance = (x^2 + y^2)^(0.5) - 4
  RMS = (Σ (Radial distance)^2)^(0.5)

Part D)

In the report, add a section for each of the parts (A and B). Add following:

- Image of Ros-graph in part A, B
- Pseudo-code for part B and C
- RMS value for part C