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FAQ Project 2

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- How do run this project in my own Ubuntu machine?
 1. Launch Project 2, then in Vocareum click Actions>Download Starter code. This will download all the files you need to make the project run locally in your computer.
 2. **IGNORE** all the files outside the catkin_ws folder. You do not need these in your local machine
 3. The downloaded files are structured as a catkin workspace. You can either use this structure directly (as downloaded) and build the workspace using the "catkin_make" command or use whatever catkin workspace you already had, and just copy the packages inside your own src folder. If you are having troubles with this, you should review the first ROS tutorial "Installing and configuring your ROS Environment".
 4. Once you have a catkin workspace with the packages inside the src folder, you are ready to work on your project without having to make any changes in any of the files.
 5. NOTE: You can source both your ROS distribution and your catkin workspace automatically everytime you open up a terminal automatically by editing the ~/.bashrc file in your home directory. For example if your ROS distribution is Indigo, and your catkin workspace is called "robotics_ws" (and is located in your home directory) then you can add the following at the end of your .bashrc file:

```
source /opt/ros/kinetic/setup.bash
echo "ROS Kinetic was sourced"
source ~/robotics_ws/devel/setup.bash
echo "robotics_ws workspace was sourced"
```

This way every time you open up a terminal, you will already have your workspace sourced, such that ROS will have knowledge of the packages there.

- 6. To run the project, open up a terminal and fire up a roscore (just type "roscore"). **Before moving forward, if you haven't followed the instructions on step 5, you will need to source ROS and the catkin workspace every time you open a new terminal.** On another 2 separate terminals you need to run the scripts in each package: "roslaunch marker_publisher marker_publisher" and "roslaunch project2_solution solution.py". Now, to visualize the markers we need to launch rviz. In a new terminal type "roslaunch rviz rviz". First thing you need to do is change the Fixed Frame option on the left of the UI. Select "base_frame", and notice that the Global Status now reads "Ok". Now we need to add the information we want to be displayed. Click Add and on the popup screen select the tab "By topic". Here you will see the topic /visualization_marker>Marker. Select it and then you should be able to see the block, cylinder and arrow. You can also add the item "TF" if you want to see a visual representation of the frames.
- How to aim the camera?

Hint: There is a simple geometrical argument that can help you rotate the x-axis of the arrow to point at the cylinder. Calculate the vector pointing from the camera to the object, use the dot and cross products to deduce the angle and axis to rotate around

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