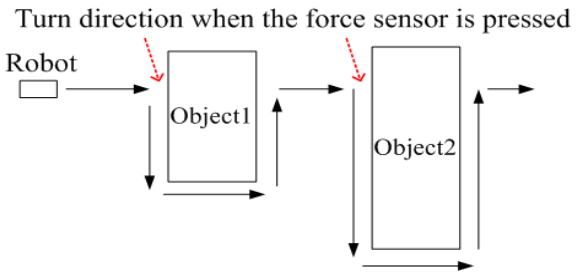
Homework 02/05/2023

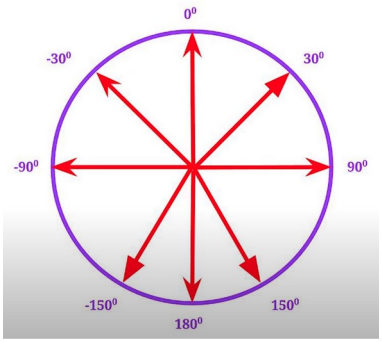
Question 1 (20'):
Write a python program for your hub with an arrow shown on the light_matrix. No matter how you rotate the hub, the arrow is always pointing to the ceiling.

Question 2 (30'): bypass a huge object
Write a program to make your robot be able to bypass a heavy huge cube (such as a box).
Note that your robot should keep going at the same straight line after bypassing the huge cube.
(Hint: You can use the force sensor to detect the object in front. How can you detect the robot should turn left at the edge of the object? How can you make sure the robot get back to the original moving line?)

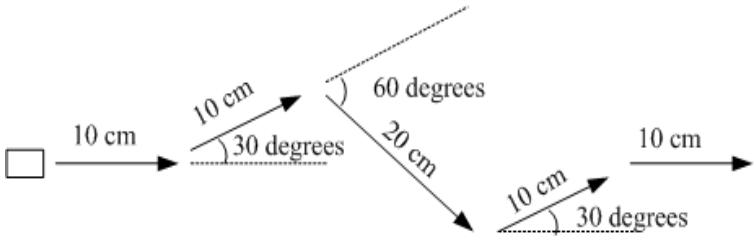


Question 3 (25'): Gyro turn

A gyroscope is a device used for measuring or maintaining orentation and angular velocity. More specifically, the Spike prime hub has a gyro inside (i.e., the motion sensor). It can tell you how the angle of the hub is changing (based on a so-called 'yaw angle'). As shown in the right-hand side figure, the hub's yaw angle can be set to 0 initially, then when the hub is turning right, the yaw angle increases (turning positive values); when the hub is turning left, the yaw angle will decrease (turning negative values).



Please look up the knowledge base about the motion sensor, and let your robot move along the following route:



Question 4 (25'): Bypass a small object
Let your robot be able to bypass a small object based on the following route (4 steps). Note that the left wheels of the car are required to keep 11.2 cm to the center of the object.
Hint:
(1) You can set whatever moving speed by yourself
(2) In case you need, the distance between left wheels and right wheels of the car is 11.2cm.