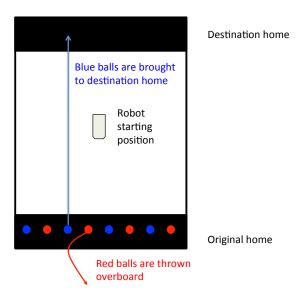# CPE 470-670 – Autonomous Mobile Robots

Instructor: Monica Nicolescu

Lab 8 – Handout

Ball Sorting Contest

In this lab you will write a program that sorts out small toy balls (Red and Blue from the kit) as described below.

The environment is the rectangular arena from the lab. At the two ends, there will be black stripes indicating two distinct home locations as shown in the figure below.

Destination home

Blue balls are brought to destination home

Robot starting position

Original home

Red balls are thrown overboard

Contest rules

a) The robot starts in the middle of the arena, facing in the direction of the "Original home". This location holds 10 colored toy balls (5 Red and 5 Blue). When the contest begins, the robot should start navigating toward the Original home to start sorting the balls.

b) The robot should use its compass sensor to detect in which direction it needs to travel to get to either of the Original or Destination homes. It should also use its light sensor(s) to detect when it has arrived to either of these locations.

c) When at Original home, the robot should look for balls. When one is encountered, it should detect its color and sort it as follows: 1) if the ball is Red, the robot should throw it over the edge of the arena and 2) if the ball is Blue, the robot should pick it up, move it to the Destination home and drop it there. The robot should use its compass and some additional stored state information, to know at which location it is.

d) The robots will earn 10 points for each correctly sorted ball.

e) There is a 5-point penalty for an incorrectly sorted ball (Red ball at Destination or Blue ball over the edge).

f) It is recommended that the robots use their touch sensors for obstacle avoidance, since there will be no tall edge walls, other than the short walls of the arena. You can also use the sonar sensors, if placed accordingly.

The contest will be held at the end of the lab on November 5.