Preliminary Study for Term Project #1

Teamwork

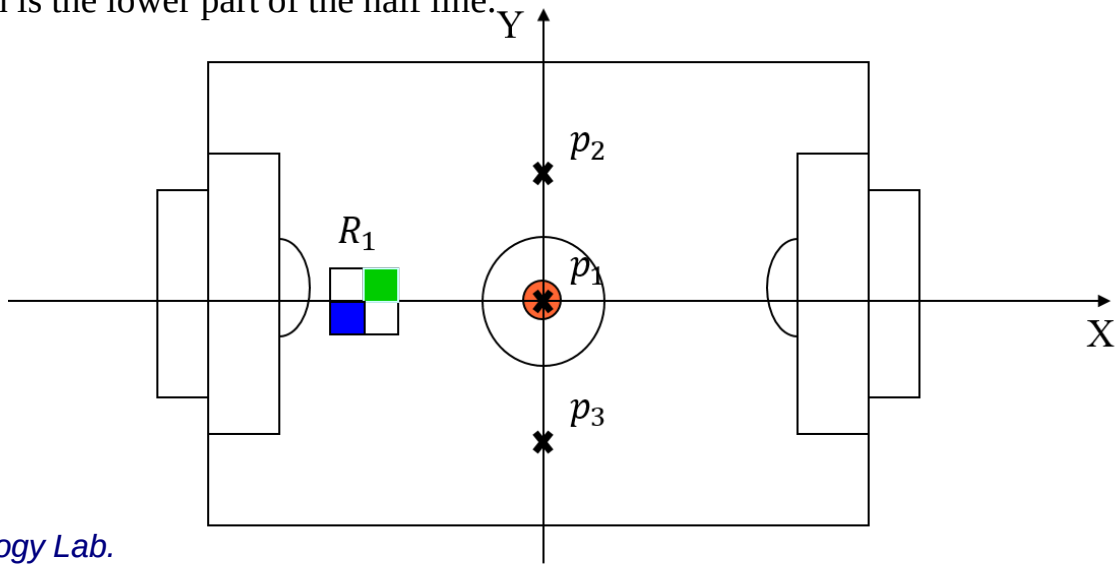
- The purposes of the benchmark tests are
  - to improve each team's ability of strategy performance through cooperation among agents, and
  - to encourage teams to train agents for dribbling, passing, receiving and shooting skills for a team set piece play.
- For these purposes, design a controller based on FLS and/or NN and/or EC to solve benchmark problems.

- Submit a report which includes the description on what your team has done along with the source code.

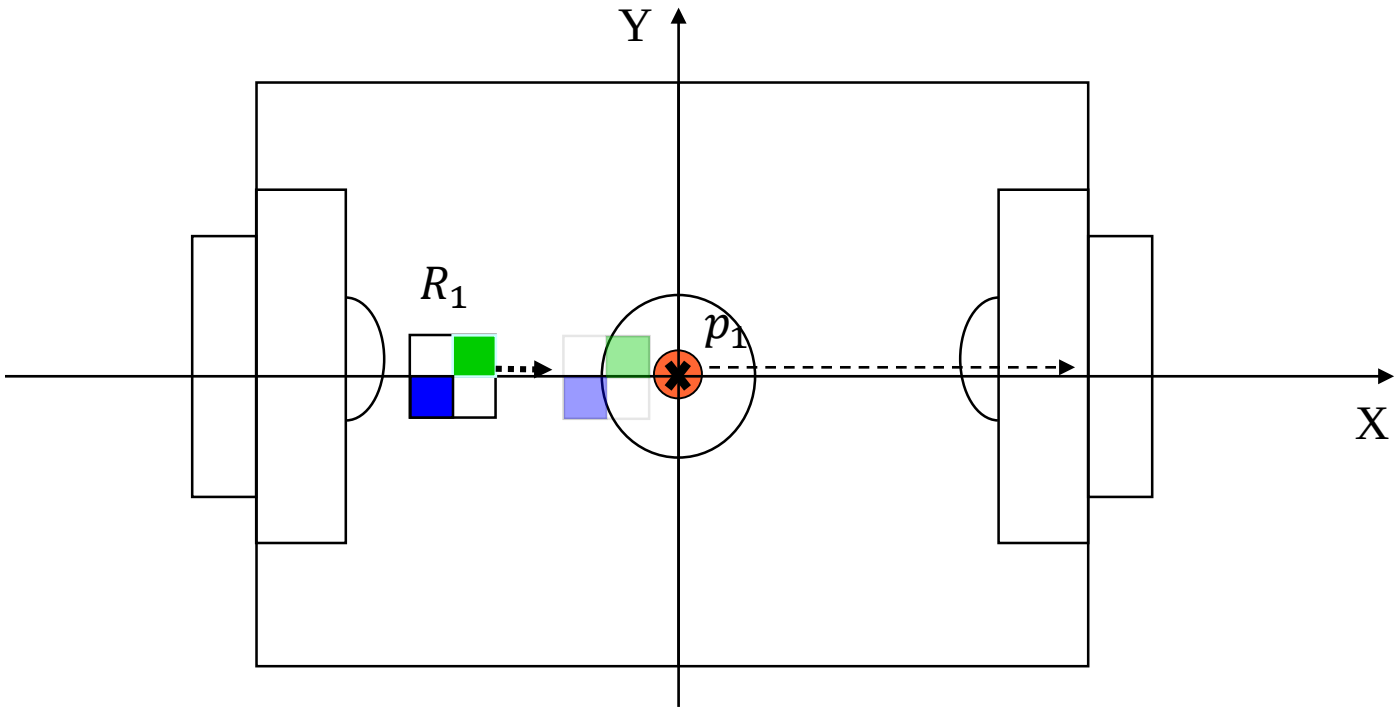
- Due date: Dec. 15, 2019
- To: https://klms.kaist.ac.kr

Benchmark 1: Goal Scoring

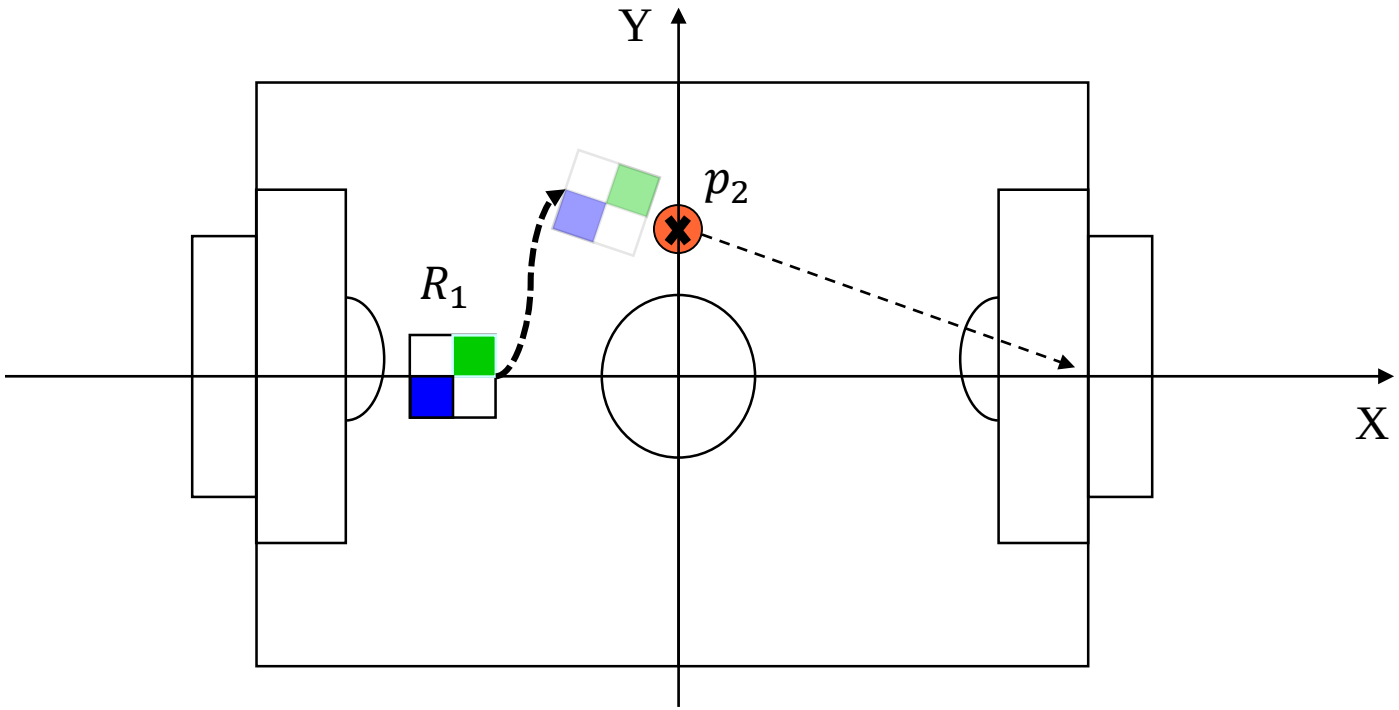
- To improve the goal scoring ability of robots. After the ball is placed on half line, the robot should kick the ball to get a goal.
- Settings
  - A robot: R_1
  - Three position of ball: p_1, p_2, p_3
- Final goal
  - The robot R1 should kick the ball to the goalpost. The ball is on the position p1, which is the center of the half line.
  - The robot R1 should kick the ball to the goalpost. The ball is on the position p2, which is the upper part of the half line.
  - The robot R1 should kick the ball to the goalpost. The ball is on the position p3, which is the lower part of the half line.



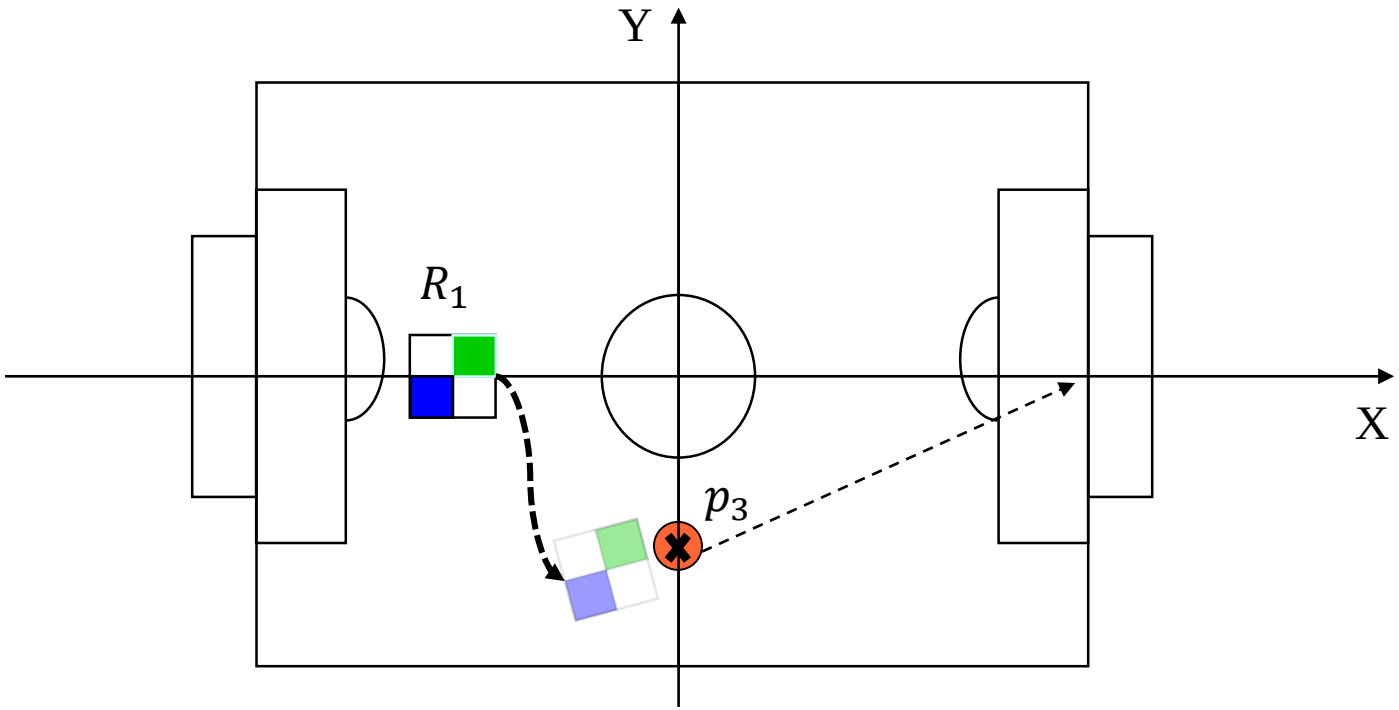
- Goal 1
  - The robot R1 should kick the ball to the goalpost to get a goal.
  - The ball is on the position p1, which is the center of the half line.



- Goal 2
  - The robot R1 should kick the ball to the goalpost to get a goal.
  - The ball is on the position p2, which is the upper part of the half line.

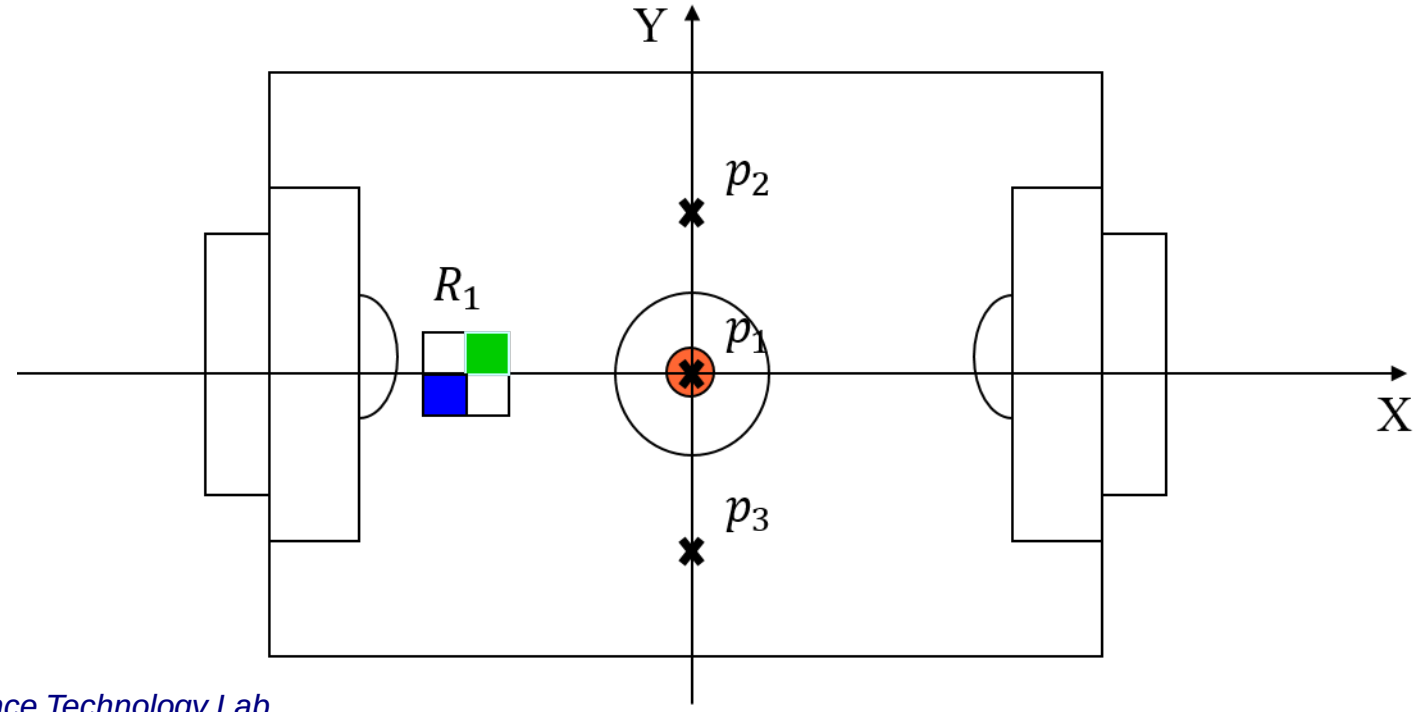


- Goal 3
  - The robot R1 should kick the ball to the goalpost to get a goal.
  - The ball is on the position p3, which is the lower part of the half line.



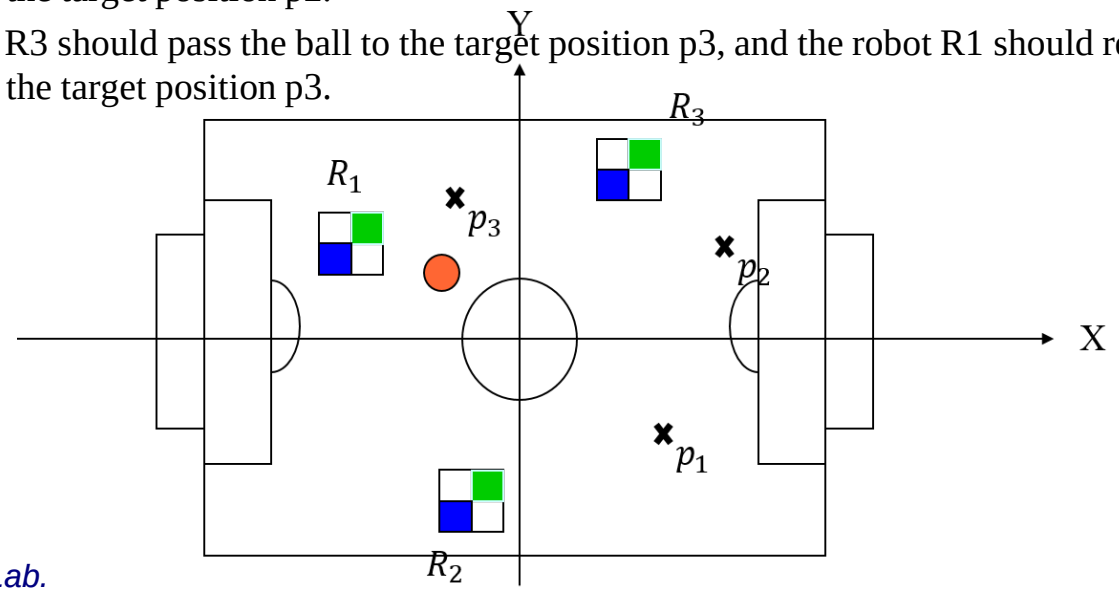
Benchmark 1

- Evaluation scores (20 points maximum)
  - Does the robot make a goal with the ball at p1?
    - ✓ Score: 2 points per goalscoring, 2 chances (total 4 points)
  - Does the robot make a goal with the ball at p2?
    - ✓ Score: 2 points per goalscoring, 4 chances (total 8 points)
  - Does the robot make a goal with the ball at p3?
    - ✓ Score: 2 points per goalscoring, 4 chances (total 8 points)



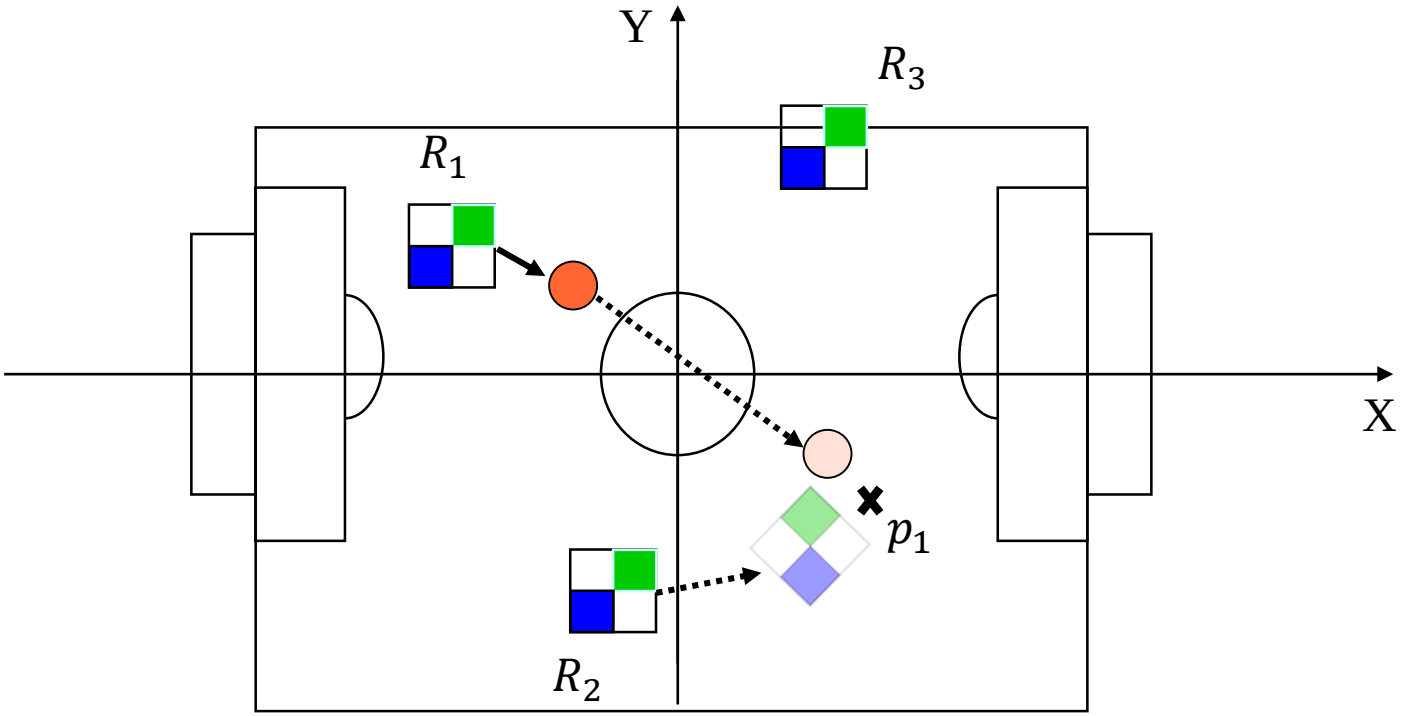
Benchmark 2: 3 Passes

- To control three robots to pass the ball to each other. After three starting positions of the robots and three target positions to pass are determined, each robot should pass and receive the ball.
- Settings
  - Three robots: R_1, R_2, R_3
  - Three target positions: p_1, p_2, p_3
- Final goal
  - The robot R1 should pass the ball to the target position p1, and the robot R2 should receive the ball at the target position p1.
  - The robot R2 should pass the ball to the target position p2, and the robot R3 should receive the ball at the target position p2.
  - The robot R3 should pass the ball to the target position p3, and the robot R1 should receive the ball at the target position p3.



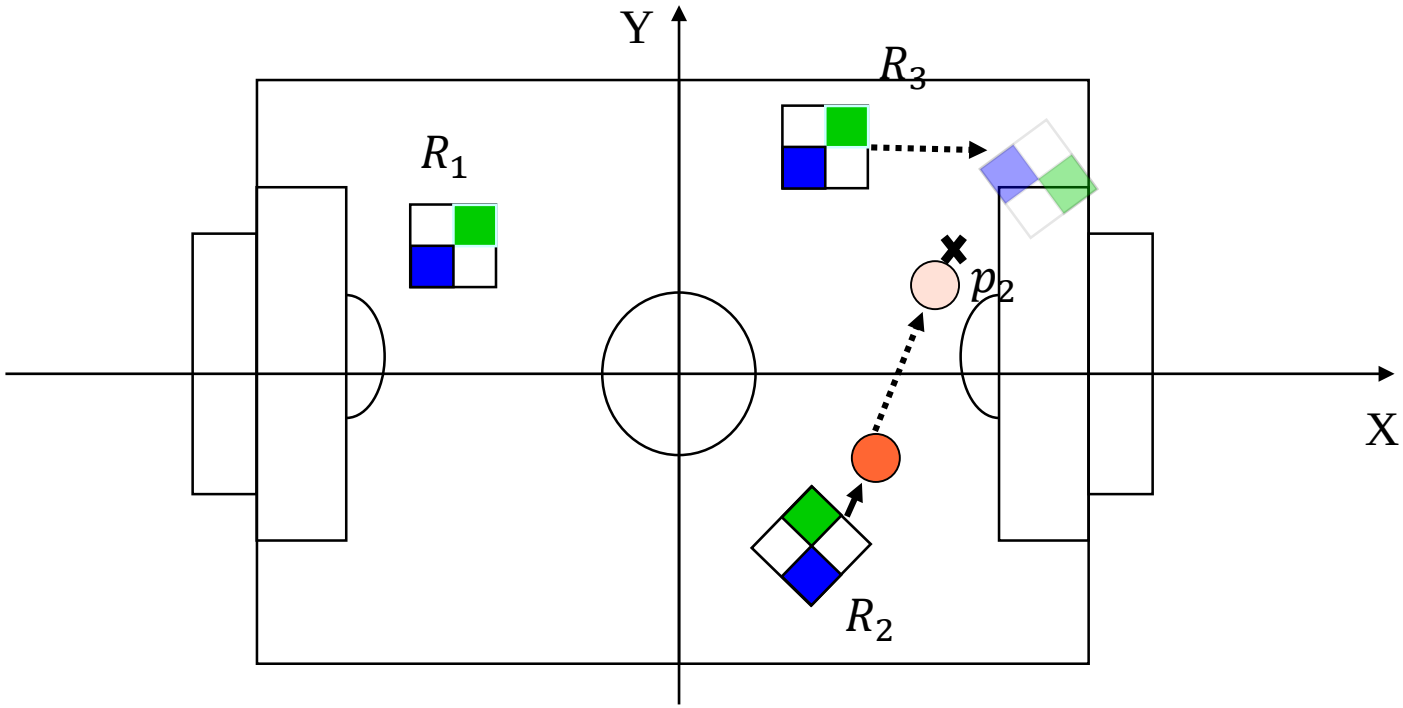
Benchmark 2

- Goal 1
  - The robot R1 should pass the ball to the target position p1.
  - The robot R2 should receive the ball at the target position p1.
  - Pass will be considered as a success if the ball passes through a circle with a center of p1 and a diameter of 100 cm. Refer field dimensions in the figure to confirm the size of circle.
  - Also receive will be considered as a success if R2 touches the ball in the circle of p1.

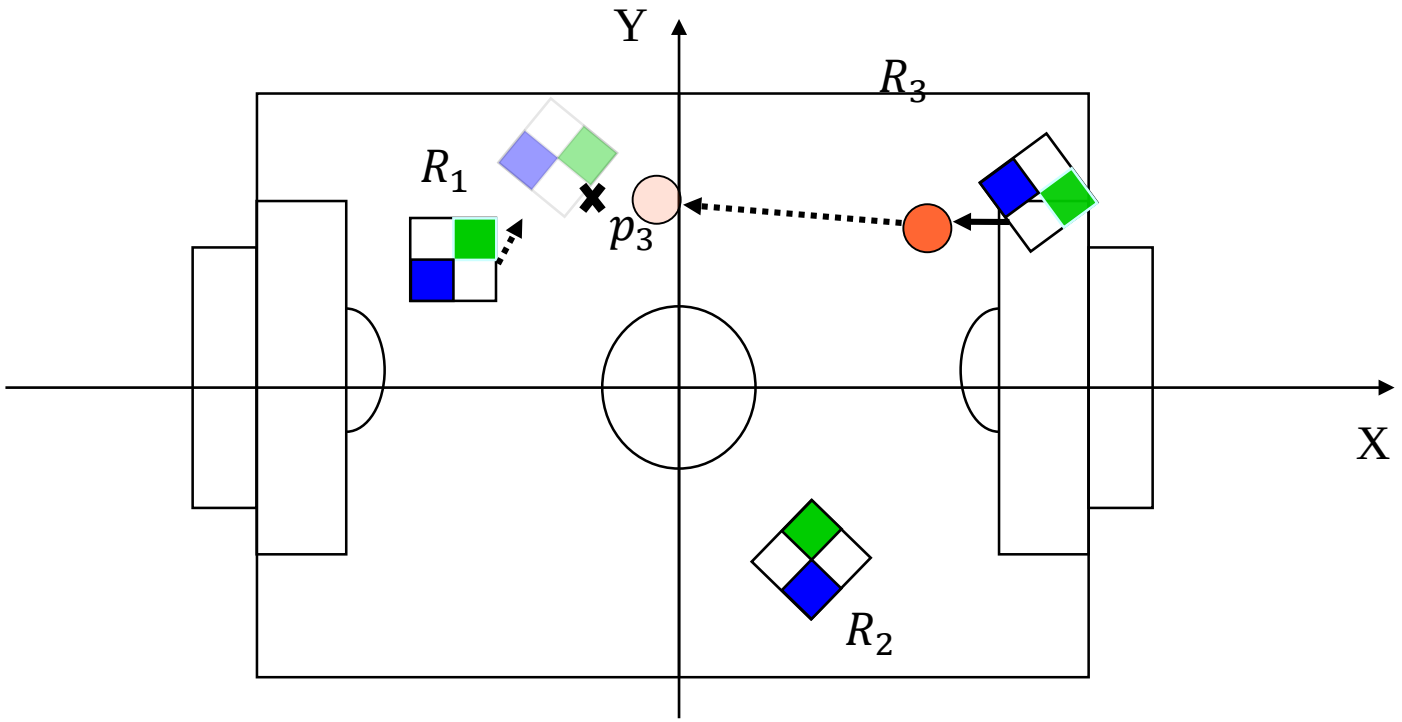


Benchmark 2

- Goal 2
  - The robot R2 should pass the ball to the target position p2.
  - The robot R3 should reveice the ball at the target position p2.

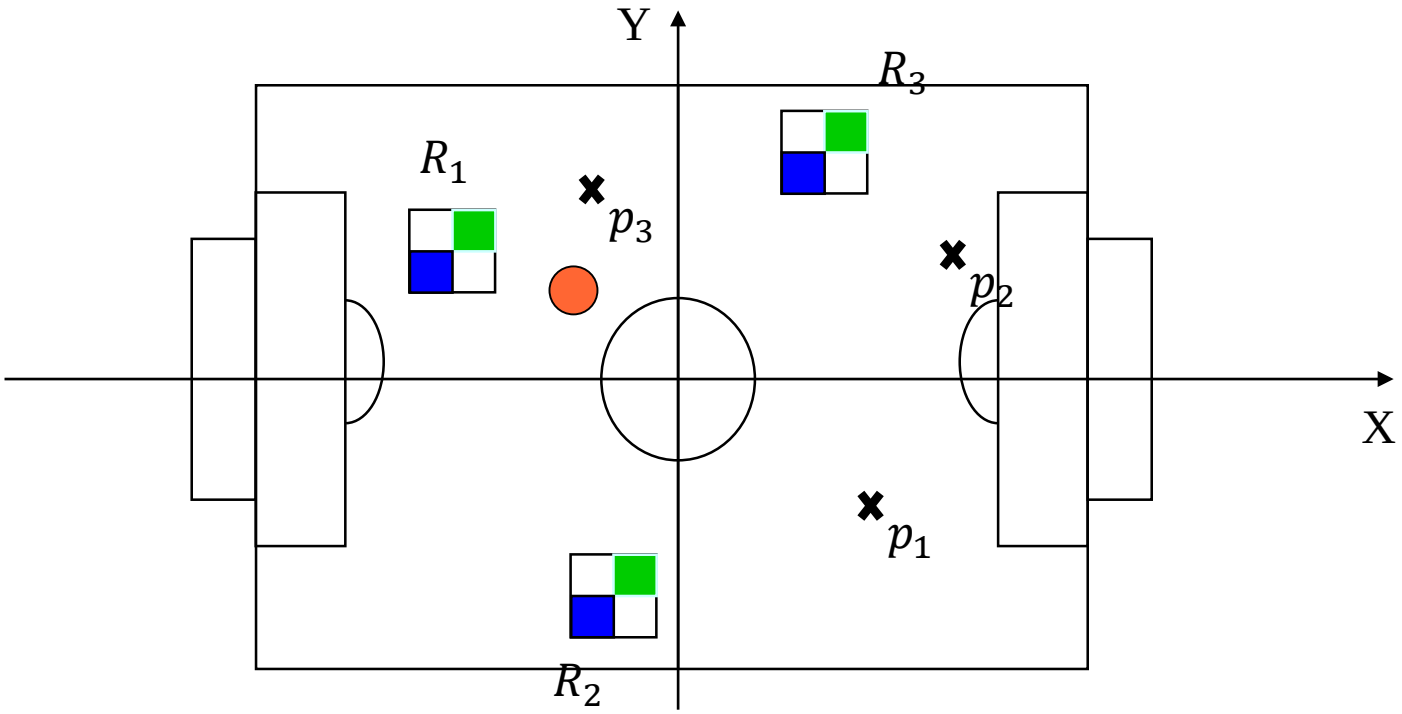


- Goal 3
  - The robot R3 should pass the ball to the target position p3.
  - The robot R1 should receive the ball at the target position p3.



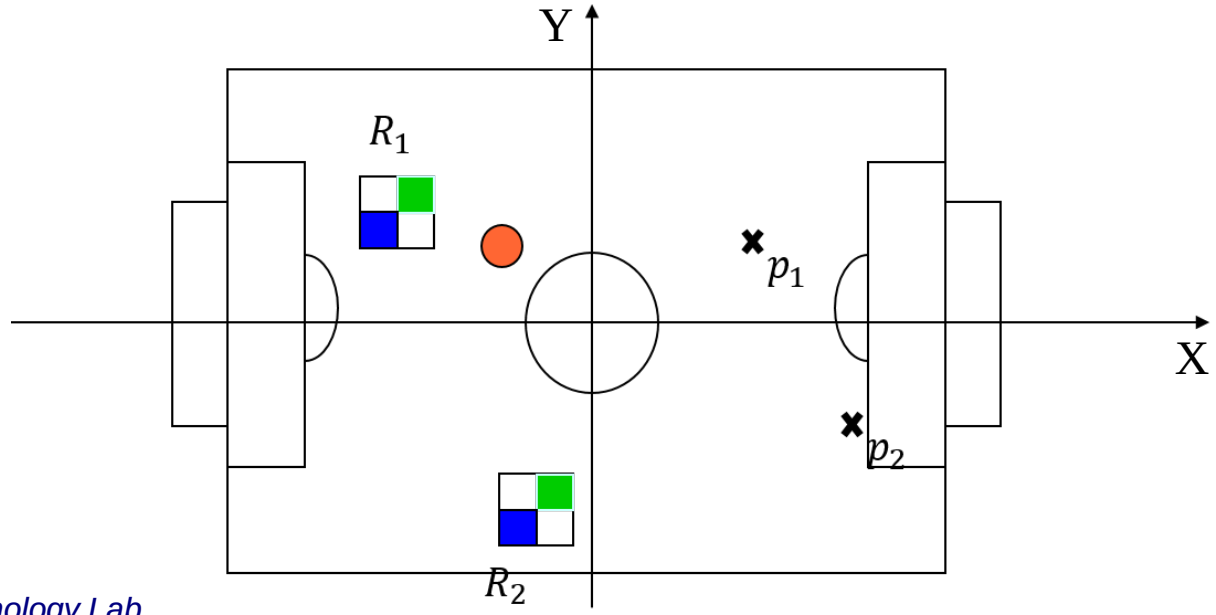
Benchmark 2

- Evaluation scores (15 points maximum)
  - Does the robot can pass the ball at the position it wants?
  - Does the ball can pass through the target position?
    - ✓ Score: 3 points per pass (total 3 passes, 9 points)
  - Each robot can pass and receive the ball well?
    - ✓ Score: 2 points per receiving (total 3 receivings, 6 points)

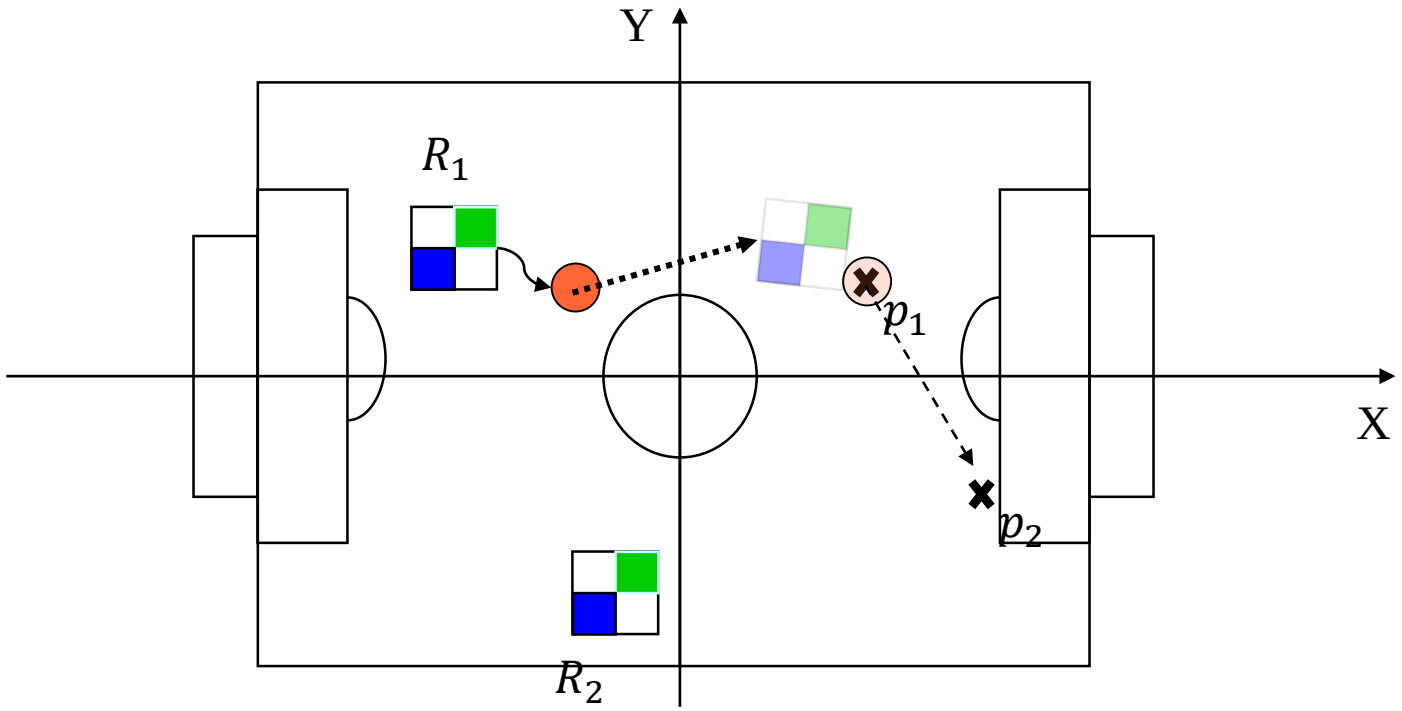


Benchmark 3: Dribble, Pass, and Scoring

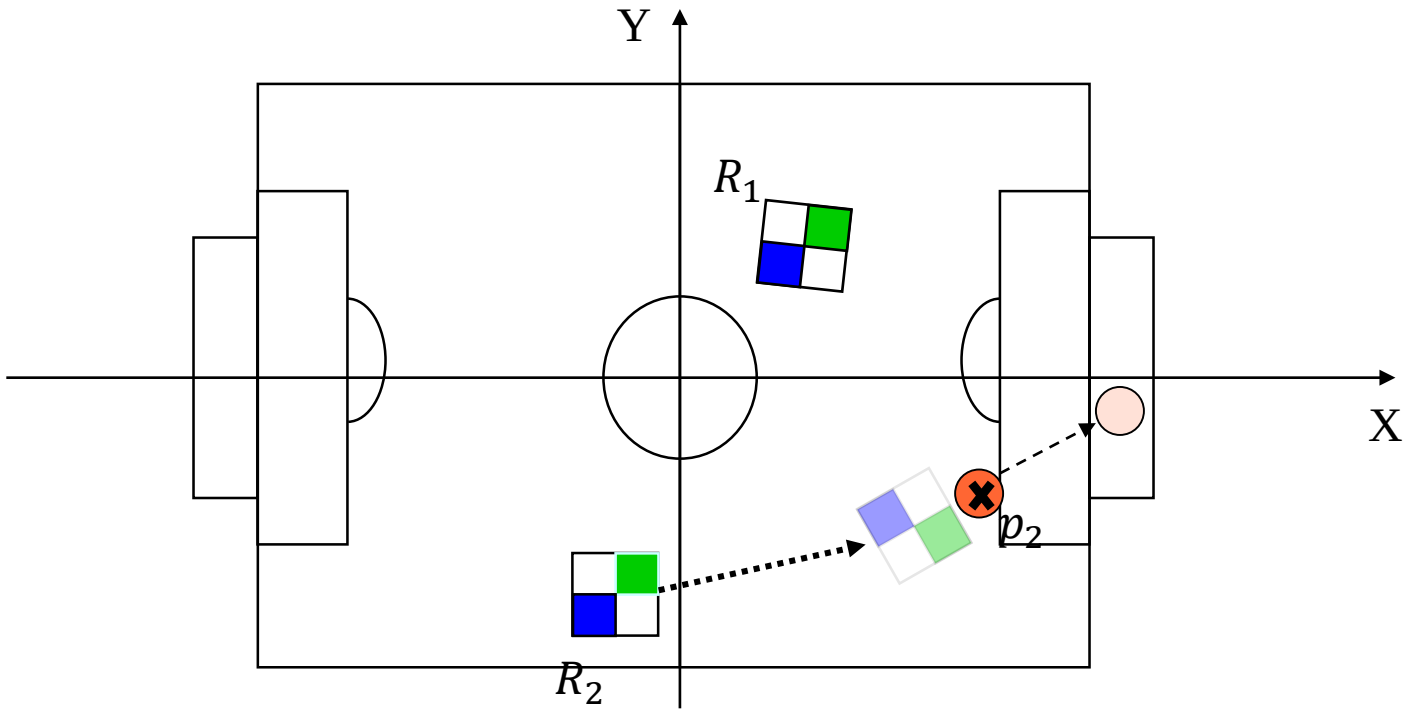
- To control two robots to dribble, pass, and shoot the ball. After two starting positions of the robots and two positions to dribble and pass are determined, one robot should dribble and pass the ball and the other should receive and shoot the ball.
- Settings
  - Two robots: R_1, R_2
  - Two target points: p_1, p_2
- Final goal
  - The robot R1 should dribble the ball to the position p1, and pass the ball to the target position p2.
  - The robot R2 should kick the ball to the goal post at position p2.



- Goal 1
  - The robot R1 should dribble the ball to the target position p1.
  - The robot R1 should pass the ball to the position p2 at position p1.

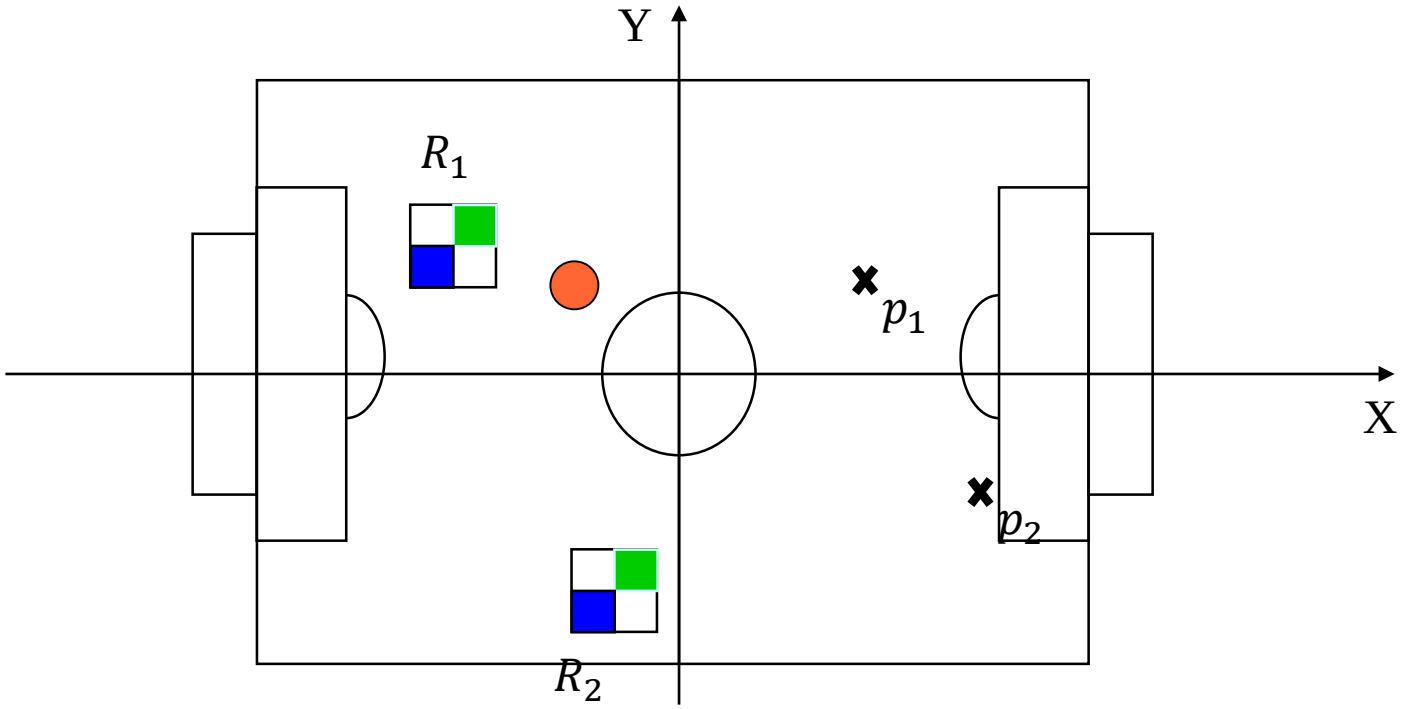


- Goal 2
  - The robot R2 should receive the ball at the position p2.
  - The robot R2 should kick the ball to the goal post.



Benchmark 3

- Evaluation scores (15 points maximum)
  - Does the robot can dribble the ball to the target position? Score: 3 points
  - Does the robot can pass the ball at the position it wants? Score: 2 points
  - Does the ball can pass through the target position? Score: 3 points
  - Does the robot can kick well after receiving the ball?
    Score: 2 points to receiving, 5 points to kicking



Field Dimensions