challenge: RoboCupJunior Soccer

- Design the program for a robot that can play RoboCupJunior soccer.

- The basic rules for RoboCupJunior soccer are:

    - There are two robots on each team. One may be a goalie. The other(s) can be attackers and/or defenders. Each must fit inside a cylinder 22cm in diameter and 22cm high.

    - The robots play on a special soccer field that has walls and has a "color"-coded floor. One end of the floor is white and the other end is black—this way the robot can use a light sensor to read the floor and tell whether it is heading toward the "white" goal or the "black" goal.

    - The robots play with a special electronic soccer ball that transmits infra-red (IR) light.

    - An official RoboCupJunior soccer game has two halves, each lasting 10 minutes. There is a 5-minute half-time in between.

    - At the start of the game, a referee places the ball in the middle of the field. One human team-member is chosen as captain and s/he will place the two robots on the field and press "RUN" when the referee blows the whistle.

    - "Lack of Progress" occurs if the ball gets stuck between two robots, or is stuck between a robot and the wall, or if no robot has touched the ball for more than 20 seconds. In this case, the referee moves the ball to a neutral spot and the game continues. If one or more robots are stuck, the referee may also move them to a neutral spot.

    - There are no penalty kicks, free kicks or offside rules in RoboCupJunior soccer.

    - As in FIFA World Cup Soccer, once the game clock starts, it does not stop!

    - When time runs out, the team with the highest number of goals scored wins.

    - In a tournament, wins count as 3 points, draws as 1 point and losses as 0 points. In the case of a tie score in wins, the number of goals scored is counted.

- Plan out the robot's behavior:

    - First, write a simple program to spin until the robot finds the soccer ball, then move toward it.

    - Then, add complexity— add obstacle avoidance so the robot will not get stuck in the corner of the field, against a wall or another robot.

    - Then, add mapping— program the robot to look at the floor so it knows if it is heading toward the white or black goal.

- Test it by playing robot soccer games!