

# COMP221 Fall 2007 Final Project: LegoCup Description

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## 1 Overview

LegoCup uses soccer game as its background, and uses Lego Mindstorms NXT to construct robots to perform a soccer game. Students are required to work in groups of two / three persons and a league-based competition will be held on the final submission day to determine the winner.

## 2 Important Dates

- Nov 16, Tutorial 1, Basic Introduction of Lego
- Nov 22, Final Project Description Out
- Nov 23, Tutorial 2, Lego Programming (Part 1)
- Nov 30, Tutorial 3, Lego Programming (Part 2)
- Dec 4, Team Discussion
- Dec 7, Tutorial 4, Final Project Demonstration
- Dec 10, Final Project Submission Due
- Dec 17 5pm, Final Project Report Due

The final report must be submitted to [derekh@ust.hk](mailto:derekh@ust.hk) before 5pm, Dec 17. No late report submission will be allowed and no deadline extension will be given.

### 3 Grading Scheme

1. The final grading will be based on two parts, the algorithm and the competition results, each of which has a 50% in the final project grade.
2. The score from competition results will be calculated based on the following formula:  $Score = 18 + 4 * (9 - r)$ , where r is the relative rank ranged from 1 to 9.
3. The score of the final report will be based on the following criteria:
  - Identifiable AI Component with agreement from TA and instructor - 20%
  - Readable and Executable Source Code - 20%
  - Clarity of the report - 10%

### 4 Rules of the Game

#### 4.1 The Field of Play

The field of play is rectangular. A copy of the playing surface will be distributed to each team in class on Nov 22. The floor under the playing surface is level, flat and hard. At the edge of the field surface, a tall wall will prevent the robots from running off the edge. The goal is bordered with two white-colored board. around 100 - 200 mm.

#### 4.2 The Ball

The ball is the standard blue ball from the Lego MINDSTORMS NXT Package. If a ball becomes defective during the course of a match, the match is stopped and will restart by placing a replacement ball at the place where the first ball became defective.

#### 4.3 Robotic Equipments

The robot played in the match and all of its equipments can contain everything in the LEGO Mindstorms NXT Package and an ID Tag but cannot include anything other than that. Robots can use wireless communication to computers or networks located off the field. Human operators are not permitted to enter any information into the equipment during the match, except at the beginning of the match for calibration.

#### **4.4 The Rules of the Match**

1. The duration of the match lasts for 5 minutes.
2. At the beginning of the match, a coin is tossed and the team which wins the toss decides which goal it will attack.
3. Then the ball is placed at the center of the playing field, each robot is placed next to its own scoring area. After that, the match starts.
4. A robot must not stay in the goal area whilst during the course of the match, here "stay" follows the common definition of humans.
5. Also, a robot must not remain in the same position throughout the whole match.

#### **4.5 Scoring Criteria**

- Each winning team wins 3 points, their opponent gets 0 point.
- If the match ends as a draw and the score is 0 - 0, one point will be deducted from each team.
- If the match ends as a draw and the score is not 0 - 0, each team wins one point.
- The final rank will be determined completely on the points described above.

### **5 Requirements of Final Project Report**

- The number of pages of your final project report should be between 2 - 8 pages.
- The paper size is regular A4 paper.
- The font size should be no smaller than 11pt.