Chapter 2

Chicken

We bring you now to the not-too-distant future. It is a future where the transformation of our society from agrarian to a modern industrial utopia has been fully achieved. Cities are massive, layered constructs, the pinnacle of efficiency and space usage. Their inhabitants must, however, be fed.

Plains states speckled with homely farmhouses have been replaced by vast rectilinear tracts of hydroponic grain, huge vats of nutrient slurry, millions of cloned cows that moo in unison, and acellular sheep composed entirely of wool fibers. Science, however, has not completely conquered the farm. One lone, proud animal remains.

The chicken.

Too fickle to conform to breeding programs, and too specialized to succumb to robotic replacement, the world's chickens still produce natural eggs, such that the omelette has become a symbol of The Way Things Used To Be. *The world's chickens all reside in a massive complex of pens in central Nebraska, fully automated.*

Unfortunately, a recent massive accident resulting from a programming bug has released untold millions of chickens from their pens. They peck and cluck at random, depositing their eggs in a scattered manner, rendering useless the automatic and immobile collecting machines.

It is up to you to produce the world's first generation of Cybernetic Chickens, capable of autonomously recognizing, handling, and depositing these eggs in the collecting machines before they go bad. You must realize that if these eggs go bad, they could unleash a cloud of noxious vapors worse than any chemical weapon.

Time is of the essence. Godspeed!

2.1 The Table

The layout of the contest table is shown in Figures 2.1 and 2.2. All measurements are guaranteed to be accurate to within $\frac{1}{4}''$ of the actual dimensions, though the only official measurements are those of the actual tables. The tables may also have seams, where sections of the table physically meet. Make sure your robot is capable of facing the imperfections of the board.

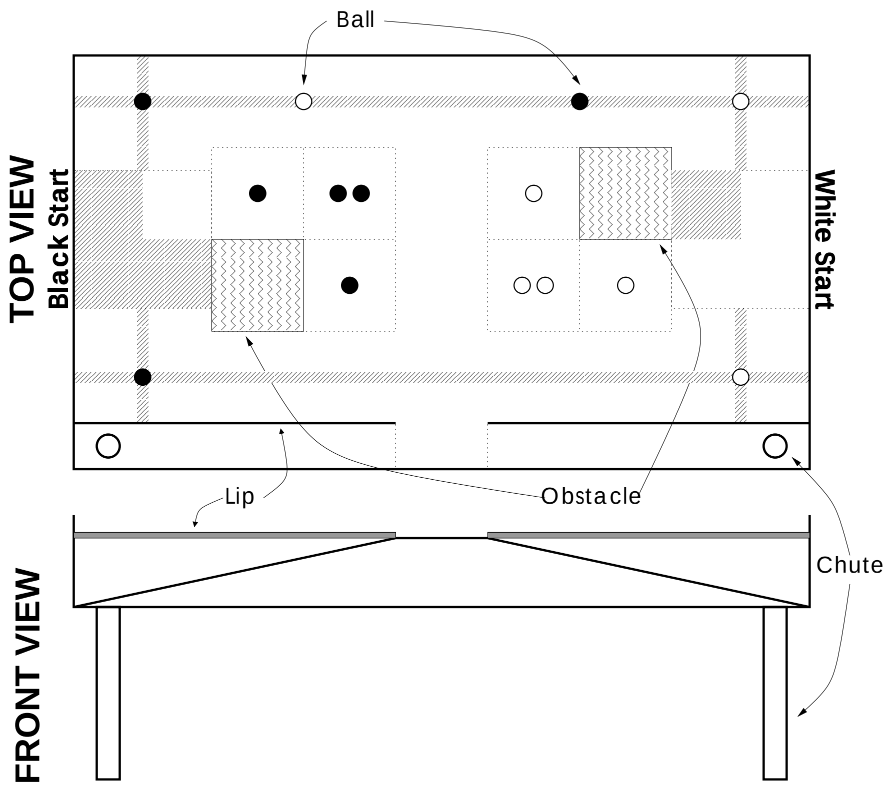

Figure 2.1: The 2002 playing field

The $8' \times 4\frac{1}{2}'$ surface base is surrounded by a $2''$ wall on all sides. The main playing field $8'$ long and $4'$ wide is surrounded by three of these walls. A $\frac{1}{2}''$-tall lip borders the fourth and front side. A $1'$ gap in the lip is located in the center of that side of the table. The gap leads to a trough, which peaks at the center, and slopes downward $9.3°$ toward the ends of the table, where two vertical $4''$-diameter chutes representing the collecting areas are located. A series of $2''$-wide black lines lead to and from various significant locations on the table, and can be used for navigation.

Fourteen balls are on the table, seven for each robot, as shown in Figure 2.1. The balls may be pushed around the table or into the troughs by the robots.

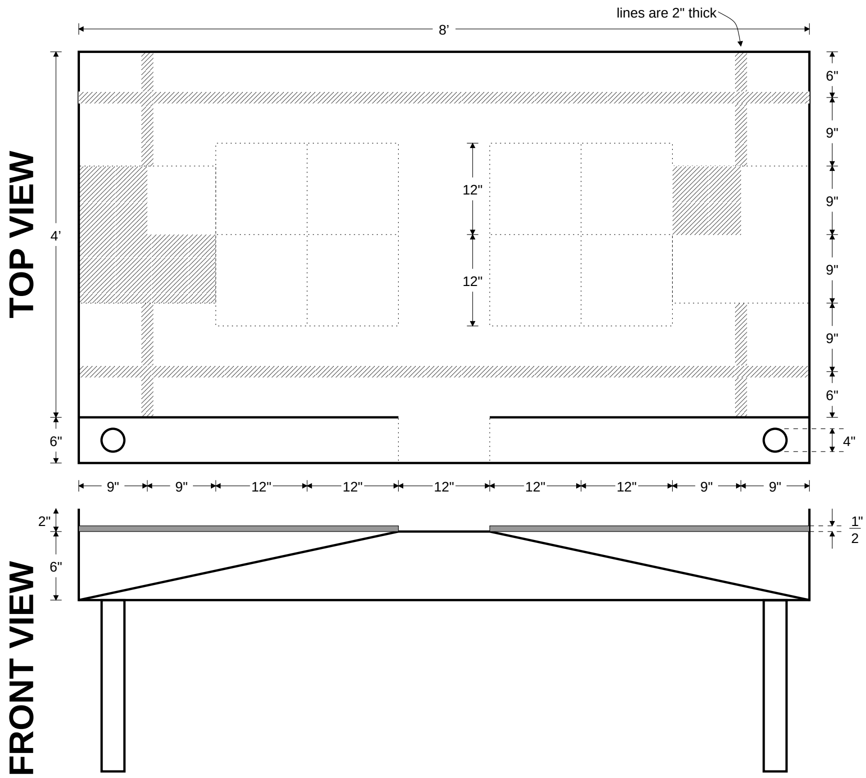

Figure 2.2: Measurements of the playing field

On each side of the table, there are four locations in which a 1′ flat square platform 2″ high may be placed. Contestants will choose the obstacle position for their opponents. Placement of the obstacle also determines ball placement, as shown in Figure 2.3.

The robots begin on either side of the board in an 18″ × 18″ square area with a start light in the center. The patterns on the starting areas assist the robot in determining which side it is on.

The balls located at various points on the table are field hockey balls, approximately 3″ in diameter.

2.2 Scoring

The score that each robot receives is determined by the final state of the contest table after the match has been played. The points are determined by the ball position in each tube. The lowest ball in a tube will be worth one point, the second lowest will be worth 2 points, the third lowest 3 points, and so on. A sample scoring is shown in Figure 2.4. The winner of the match is the one who received the most points.

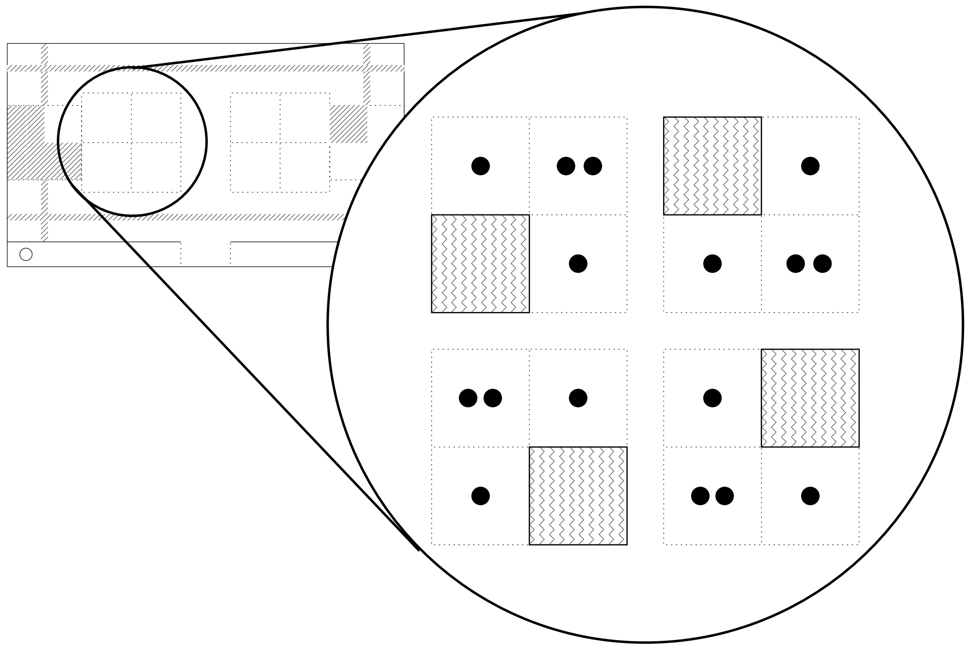

Figure 2.3: Possible Configurations with Obstacle

Balls left on the troughs or the playing field do not count. Any balls that overflow from the top of the tubes that are not in the tubes do not count. Each tube can hold up to 8 balls.

In the case that there is a tie, robots which at any point did something during the match that directly improved their score instead of only preventing the opposing robot from scoring receive a win, and those that did not receive a loss. Thus, in a tied situation, a double-win, double-loss, and a single win are all possible outcomes.

2.3 The Competition

The competition will be a double elimination tournament held over the course of two days. Robots compete head to head in successive rounds until they lose twice. When all but one robot has been eliminated, that robot will be crowned champion.

- **Contest, Qualifying Round.** The first round of the contest will also serve as a qualification round. If a robot demonstrates the ability to score points, regardless of whether it wins or loses, it will be allowed to proceed to the next round. If it does not, modifications may be made, and it will have two more chances in lab to run against an inert placebo. If it cannot score points against the placebo after two

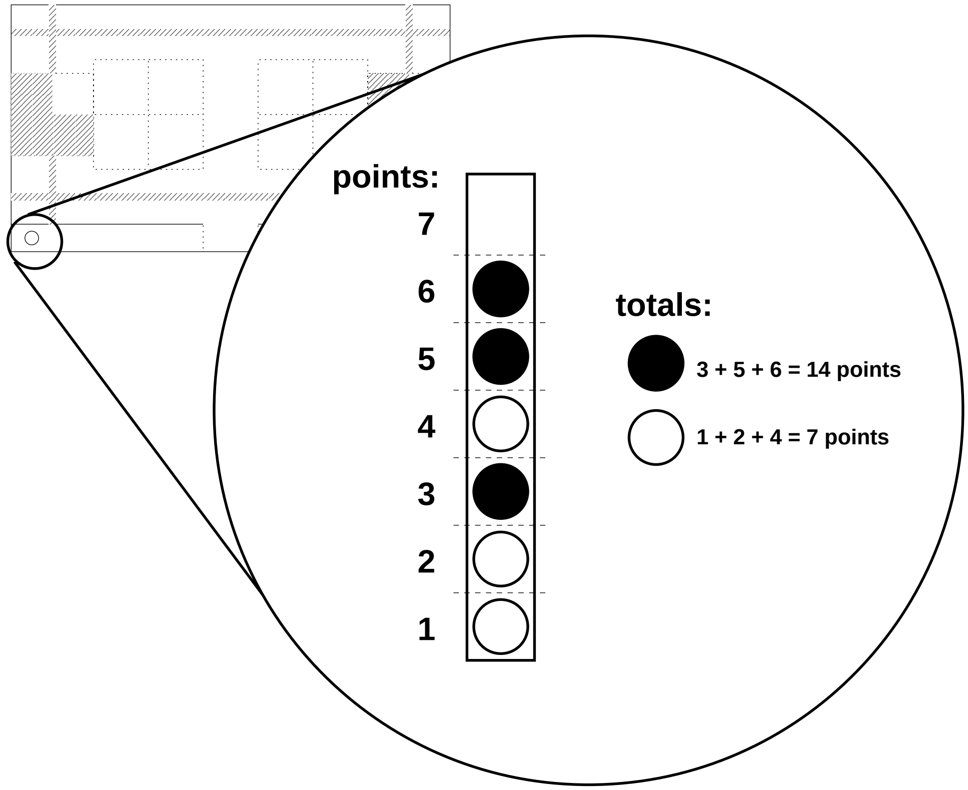

Figure 2.4: Calculating Points

tries, it will not qualify for the rest of the contest. Losses to opponents during this round do count towards a robot's elimination.

- **Contest, Second Round.** Only qualifying robots may compete in the second round. If a robot which has lost in round one also loses in this round, it will be eliminated from the competition. This round may be skipped if few enough robots make it past round one.

- **Contest, Final Round.** This is the main competition that everyone comes to see. Robots will compete until all but the winner has been eliminated. At the discretion of the Organizers, the final round of competition may be conducted in a round-robin format, ignoring previous losses.