CAT AND MOUSE - THE SCAVENGERS

1. OBJECTIVE

The nature of this contest is similar to the Pac-man computer game. It consists of two robots, namely Tom-the-Cat and Jerry-the-Mouse. These two robots have to work together to collect food on the maze. Tom's mission is to bring fish back to the cat's home. Jerry's mission is to bring cheese back to the mouse's home.

Tom and Jerry are not allowed to pick up their partner's food. However they may communicate with each other to help complete the food scavenging as fast as possible. For example, if Tom meets a piece of cheese, it is not allowed to pick the cheese up, but it can signal the location of this cheese to Jerry, who will remember to pick up this cheese. Similarly, Jerry may inform Tom of any fish seen on the maze.

The game is completed when all food pellets has been collected or the time of 10 minutes are up.

2. CAT AND MOUSE SPECIFICATIONS

2.1 Any form of mobile robots (wheeled or legged) are acceptable for this competition.

2.2 The length and width for Tom and Jerry shall be restricted to a square region of 25 cm x 25 cm. There is no restriction on the height of the robots.

2.3 The robot has to be COMPLETELY autonomous.

2.4 The Cat and Mouse should not leave anything behind while negotiating the maze.

3. TERRAIN SPECIFICATION

3.1 The domain is a flat area criss-crossed by reflective tape forming a 16 x 16 array of 180mm x 180mm (between centres) squares. The domain will be bounded by an unobstructed border of at least one square width. A wall height of 50mm will be constructed around the peripheral to contain errant robots.

3.2 The domain floor and its border will be made of wood painted with non-gloss black paint. The squares marking the domain will be constructed with reflective (3M Scotchlite reflective tape) of 10mm width.

3.3 There are 2 Home positions marked by the squares located at diagonal corners of the maze. One Home square for Tom-the-Cat and the other for Jerry-the-Mouse.

3.4 The tolerances of the domain platform will be within the specifications specified in Figure 1.

4. FISH AND CHEESE SPECIFICATION

4.1 The Fish and Cheese shall be flat pellets of 0.5mm thickness, with square (fish) and round(cheese) shapes. They are made of unfinished galvanised steel sheets (0.5mm) which can be picked up by magnet. A sample pellet will be given to each represented institution.

4.2 The Fish and Cheese are to be placed at any corner of the squares formed by the tracks. The gap of separation of the track and the Fish-edge or Cheese-edge, should be 10 mm. See Fig.2.

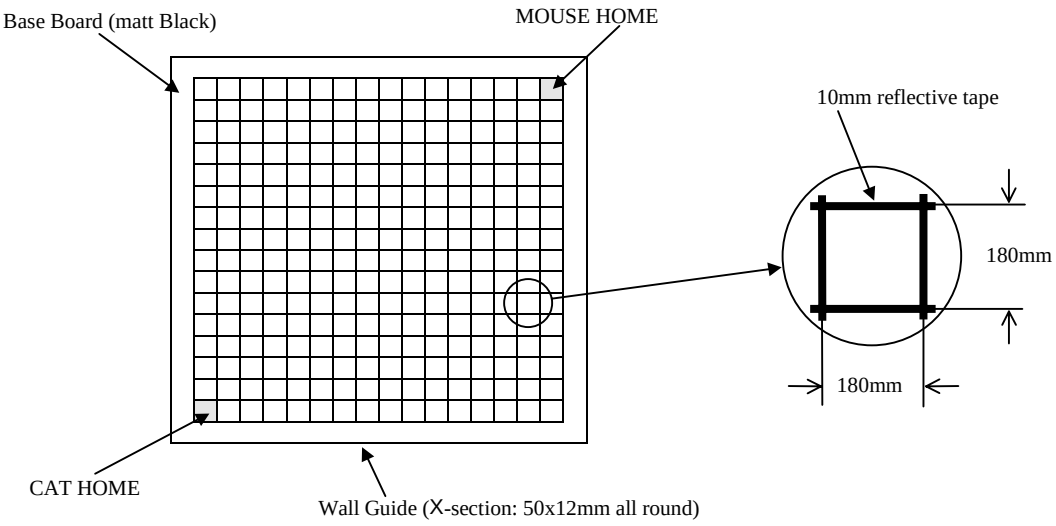

Figure 1: Cat and Mouse - The Scavengers' Terrain

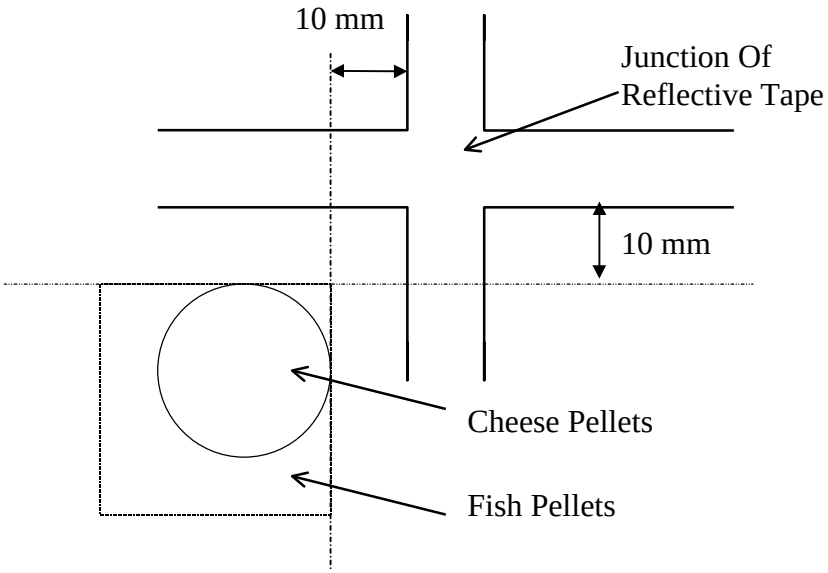

Figure 2: Cat and Mouse - Placement of Food Pellets

4.3 At any square, there may be more than one food pellet placed. However, at any intersection of the tracks, there will not be more than one food pellet placed.

4.4 The Fish pellet dimension is a square of 3 cm x 3 cm.

4.5 The Cheese pellet dimension is a round disk of diameter 2 cm.

5. RULES FOR THE CONTEST

5.1 Each run shall be subjected to a time limit of 10 minutes on the maze. Within this time limit, Tom and Jerry may make as many runs as possible.

5.2 There will be 5 to 10 pieces of Fish and 5 to 10 pieces of Cheese on the maze.

5.3 The robot starts from Home position. It may start in any orientation within the Home square.

5.4 Once the robots are out of the Home position, it can only go back to the respective homes with a food pellet. The robot is considered to have returned to Home position when any part of the robot is inside the Home square.

5.5 Tom may only deposit Fish in the Cat's home. Jerry may only deposit Cheese in the Mouse's home. The deposit of food into Home position means that the final resting position of the food must be within the Home square and not touching the tape.

5.6 Once each food pellet is brought and dropped at Home position, participants may re-position the pellets at the border area outside the maze. This is to prevent the food pellets from cluttering the homes.

5.7 The robots must pick up and bring back only one piece of food at each time. In manoeuvring the maze, a robot is NOT allowed to physically touch more than one pellet at any time.

5.8 The robots are NOT allowed to touch each other. Once they touch each other while manoeuvring the domain, both robots are considered to have crashed.

5.9 The game ends when :

a. All food pellets has been collected.

b. Time of 8 minutes is up.

5.10 Judging Criteria :

a. The shortest time to complete the game.

b. Penalty of 1 minute to be given for each food pellet not taken home.

c. Penalty of 30 seconds to be given to each wrong food pellet taken home.

d. For the following instances, a robot is required to restart from home position:
   i. robot has crashed.
   ii. robot has dropped it's food outside it's home.
   iii. robot has touched more than one food pellet at a time.

e. If robot is holding the pallet when d i) to d iii) occurs the food pallet will not be returned to its original position and will be taken out of the maze.

6. CLONING

6.1 In accordance with the spirit of the competition, clones among the winning entries will only be awarded one prize. Clones will be identified during the "caging" procedure.

6.2 Clones are robots with substantially identical physical appearance and working principles.

6.3 When in doubt, the decision of the Judges will be final.