Final Project

CS445 Fall 2007

Schedule:

Week	Assignment
10/16-10/22	Final Assigned
10/23-10/29	
10/30-11/5	
11/12	Milestone #1
11/13-11/19	
11/26	Milestone #2
11/27-12/3	
12/4	Final Due

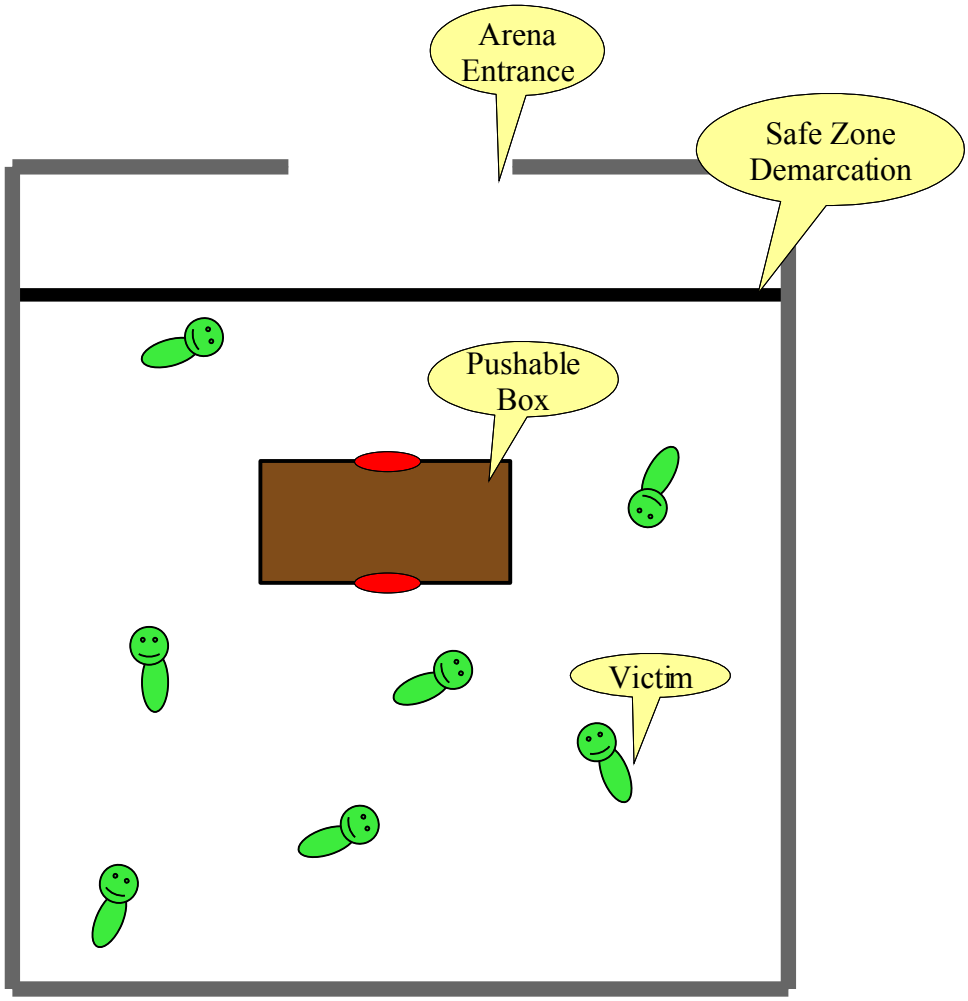

Diagram of the Final Arena (not to scale)

Project Objectives: The goal of this project is to exhibit all of the skills and knowledge that you have accrued over the course of the semester. Your team should demonstrate the ability to create a robot which that can successfully sense, navigate, and manipulate their environment. You are free to incorporate any of the sensors or manipulators that you have used in class, and any new hardware may be petitioned for purchase with the TA.

Project Goal: To build at least one autonomous robot to enter a room and humanely rescue injured victims and bring them back to the safe zone.

Rules:

1. At my signal, a 10 minute countdown will begin. At that point, teams may place their robot(s) outside of the entrance of the arena and may start them in any way they wish.
2. As soon as a robot crosses the threshold into the arena, no further contact is allowed.
3. Robots must *pick up* victims as per the rules below and place them beyond the "safe zone" as marked by the line of black tape in the arena.
    1. As soon as they are free of the robot and more than 50% of the victim is across the leading edge of the tape, they are considered "saved."
    2. Once a victim is "saved," it will be promptly picked up by the TA as soon as the robot which dropped it is no longer facing it.
4. Victims may also be "saved" by being in or on a robot which is outside of the arena at the end of the 10 minutes.
5. When a victim is placed in the "safe zone," it will be promptly picked up by the TA and moved out of sight.
6. Teams may place anything at the entrance of the arena, but nothing may extend over the walls of the rest of the arena.
7. Victims will be colored neon green
8. The box will have a red dot on both of the long sides.

Grading:

+10 points per victim saved (between 7 and 15 victims).
+20 points per active robot outside of the arena at 10 minute limit*
+15 points for box pushed to seal exit at 10 minute limit
+10 points for Professor aesthetic judgement
+30 points each milestone
+20 points extra credit**
-5 points for every victim foul including:
    Dragging a victim for a distance longer than the height of that victim
    Dropping a victim from higher than ½ the height of that victim onto a hard surface.
    Dropping a victim from higher than the full height of the victim onto a soft surface.
    Rolling over a the victim
    Any other inhumane actions as judged by the TA.
        Teams should verify that their mechanisms are "humane" with the TA
-10 points for each robot inside the arena after the 10 minute limit
-15 points for each week a milestone completed late.

Milestones:

Milestones must be completed by the end of the due week.

1. For the first milestone at least one robot must find a nearby victim, humanely pick it up, and move it at least two feet.
2. For the second milestone at least one robot must find a nearby victim in the arena, pick it up, and deposit it safely in the safe zone.

*Robot Exit Clause:

Teams will gain 10 points for each robot which actively participates in the saving of at least one vicim and is located outside of the arena after the end of 10 minutes.

**Extra Credit: Extra credit is awarded on a person by person basis. To earn extra credit, a separate proposal must be submitted to the TA before the first milestone by each person. This proposal should consist of a few sentences outlining details of what will be turned in as extra credit, and specifically what work will be done by you. On the date of the final, a short report must be submitted to the TA which describes the work in enough detail so that an outside party could reproduce the results. For mechanical designs this should include diagrams and or pictures, and for algorithmic designs this should include pseudocode. In both cases, the report must also include an analysis of both the design and implementation.