

Robot Project additional specs.

CS 8650 **Introduction to AI & Robotics** **Dr. Ken Hoganson**

Class

Will

Start

Momentarily...

1. Course boundary will be electrical tape.
2. The surface will be poster-board material.
3. The optional-use bumpers will be standard-size bricks (heavy enough to not be pushed around).
Exact dimensions to follow.
4. The light-sensor obstacle will be an electrical-tape square.
5. The bump-obstacles will be soup-cans.

6. Inside-dimensions are correct as given. The course width.
7. The overall course length and width will be a bit over the given dimensions, to allow for the width of the electrical tape.
8. Your robot may overlap the course boundaries some, but should be minimized/avoided.

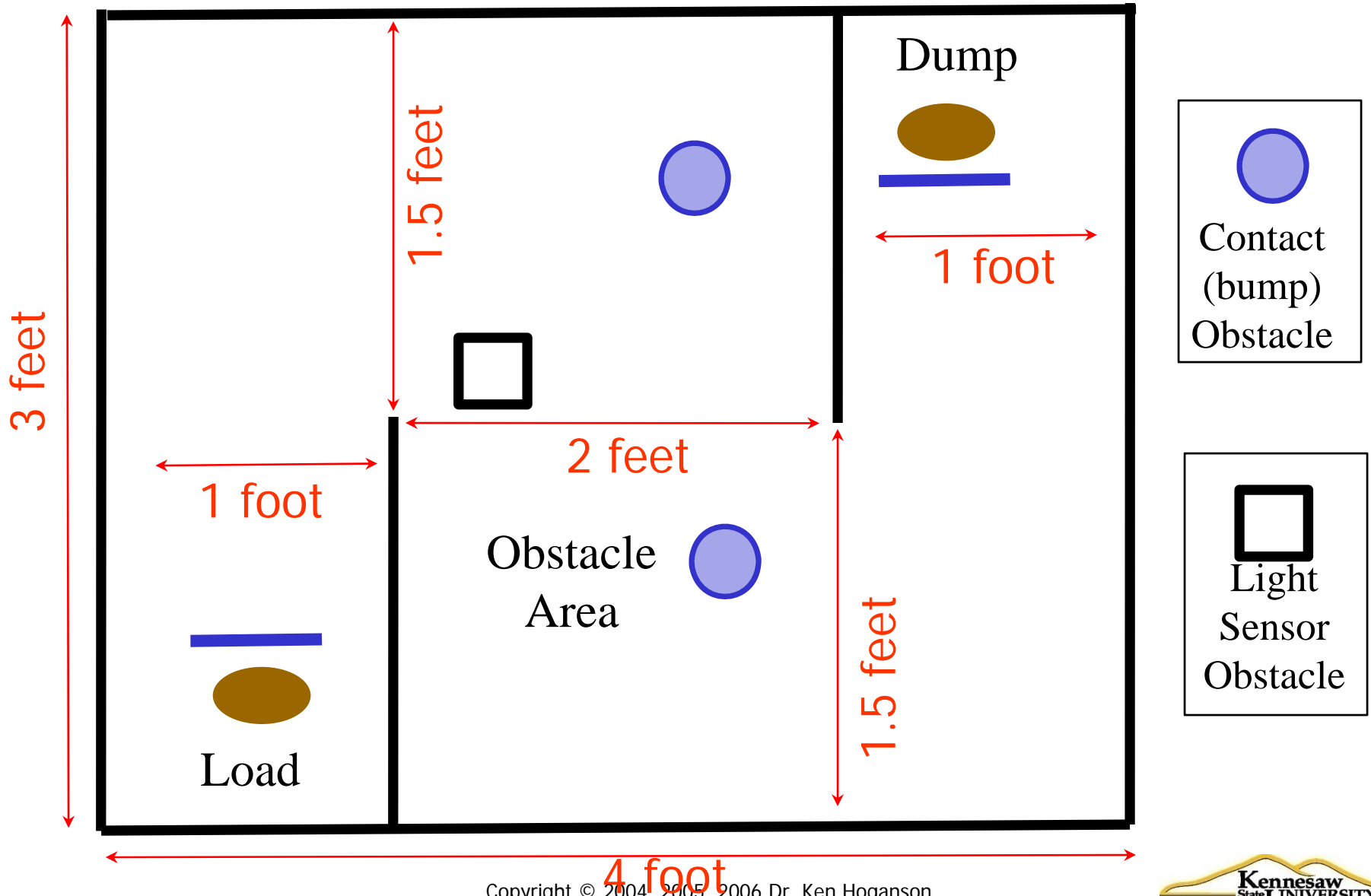
- You can build your own course if you like, and demo your robot on your course.
- Your course must comply with the dimensions and design of the specifications presentation.
- You can build your own load/dump bumpers, or not use bumpers at all.
- Contact me if you do not yet have a light sensor.

- The rest of the presentation is the same as the previously posted presentation.

- Project: use the components in the robotics kit (and you can supplement with additional components – either made or purchased), to build a small robot that will:
- Move materials from one location to another:
- CHOICES: Your Choice of materials to move:
 - Dirt/sand (messy)
 - Small gravel (less messy)
 - Styrofoam packing peanuts (static electricity)
 - Wood or plastic Blocks
 - Wood strips or “popsicle” sticks (hard or easy to pick up?)

- DESCRIPTION/Specs/Requirements:
- Robot: between 6 inches and 2 feet high, running on wheels (three or four).
- The robot will run through a course – it will pick up and transport from point A, and navigate to point B, where it will deposit the articles.
- Designed to run “autonomously”, **not** by remote control.

- The course will not be a fixed path, but is limited. There will be obstacles.
- Some obstacles will be solid that can be “bumped”.
- Other obstacles, and the course boundaries, will be black strips on a white background. Navigate using a light sensor.
- The stop-and-load point, and the stop-and-dump point will be guarded by a small retaining wall, that you can use to “bump” against and detect with your touch sensors, if you like. This is optional, you may choose not to use these sensors or retaining wall.



- If you use dirt, it will be relatively light if dry.
 - Material needs to be loose, and dry.
 - You will need to “scoop” it or pick it up somehow.
 - Carry it while navigating to the dump site.
 - Dump it at the dump site.
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- Time to run the course is **not** critical.
 - Quantity of dirt/sand/blocks moved and dumped in the correct location is the performance criteria.
 - A robot that can make multiple trips (limit of five round-trips) is a plus.

- Successful teams in the past:
- Fabricated a “scoop” from an aluminum soda can or other materials to scoop dirt. Determined a way to connect the scoop to arms made of Lego components.
- Spent some time on the design of the scoop and arms and arm motion:
 - Must have sufficient strength to support a few ounces.
 - Must have a range of motion, or a mechanism, to scoop or load the articles. How to do this?
 - Must have a “dump motion” or drop motion.
(Could be a rotation.)

- You may choose to work in teams of two students, if you like.
- Appears to be sufficient components to solve the problem with one kit.
- By working in teams, you can use components from TWO kits, so you will have 8 motors, two light sensors, and multiple touch sensors.
- This may make the design and construction simpler, because it adds more capability.
- No penalty for working in a team of two, but extra credit will be granted for solving the problem on your own.

- If you haven't already, its time to start playing with the robotics kit.
- You should already have viewed and installed the CD.
- This will be great fun, but will take some time or the next weeks.
- Putting the work off until the last couple weeks of the semester greatly reduces your probability of building a successful robot.
- Future sessions will discuss robot construction ideas, and programming details.

**End
Of
Today's
Lecture.**

