Objective

The purpose of this project is to construct an autonomous robot capable of locating, grasping, carrying and placing an optical beacon, while navigating within an enclosed area populated with known obstacles placed at restricted locations within the enclosure. Upon receiving instructions on Bluetooth radio, the robot will assume the role of either defender (captures the beacon and hides it) or attacker (capture the beacon and place it at a specified location) and proceed according to its role.

Hardware

Access to 3 Lego mind storm kits is available. These consist of the following components:

* 2 NXT Bricks
* 3 Ultrasonic sensors(2 at the sides and one at the front)
* 3 Light sensors(2 at the front for beacon detection and one at the back for localization)
* 6 servo motors( 2 for robot movement and 4 to control and support mechanical arm)
* 21 cables
* Accessories(wheels, lego components, gears)

Mechanical arm

Up and Down motion

* operated by two motors and
* assisted by a third motor, attached to the arm using a string
* Uses clamps to grasp and release object

Base

* 2 wheels at the front
* One plastic ball at the back

**Explanation for Field**

The robot is to operate over a 12 x 12 tile field, with comprising of 9 interlocking 3 x 3 metal panels. The field is enclosed on all 4 sides by wooden walls. Several obstacles, consisting of wooden blocks, will be placed at random locations on the field, forming a sort of maze.