

Robotics: Science and Systems II (6.189) – Fall 2005

In-Class Exercise: Test Cases and Robot Behavior

Wednesday, October 19 2005

We have designed an in-class exercise to instigate discussion and consensus about the robot's behavior, in anticipation of the design review scheduled for this Friday. We have structured the exercise in several parts, as follows:

1. Five blackboards are labeled, one heading per blackboard, as EXPLORATION, BRICK DETECTION, BRICK PICKUP, HOMING, and CONSTRUCTION. The class splits roughly evenly into five groups, one per blackboard, according to each student's interest in the above aspects of the challenge.
2. Each group then generates a *test case* by specifying a *brief, high-level description* of:
 - The behavior the test case is designed to test;
 - The robot's initial state (relevant internal or external aspects);
 - Environmental conditions conducive to successful operation (i.e., nominal conditions);
 - Environmental conditions likely to lead to failed operation (i.e., anomalous conditions).

The group then transcribes their test case onto the "test case" form provided for this purpose. (This form will be handed in to the RSS staff for generation and posting of PDF on the RSS wiki.)

3. Each group then describes *privately* (i.e., on the form we hand out but not on their blackboard) the *desired outcomes* (both nominal and anomalous) that they envision for this test case, specifically:
 - Any relevant *preconditions*, i.e., assertions about the state of the robot or its environment before the behavior commences;
 - The behavior subsequently exhibited by the robot;
 - Any relevant *postconditions*, i.e., assertions about the state of the robot or its environment after the behavior completes.
4. Each group then discusses and writes up an outcome to each of the other four groups' test cases (for both nominal and anomalous conditions), using the form (front and back) that we have provided for this purpose.
5. Each group then collects the four other groups' responses to its test cases.
6. Each group then briefly summarizes the consensus outcome to its test case. Where rough consensus was reached, the group simply states this. Where wide variation in the responses arose, the group states that this is a test case calling for further discussion.

TEST CASE

Group Name:

Group Members:

Test Case Name:

Behavior Test Case is Designed to Test

Robot's Initial State (Internal or External Aspects)

Nominal Conditions (i.e., Conducive to Success)

Anomalous Conditions (i.e., Conducive to Failure)

DESIRED OUTCOME (NOMINAL)

Group Name:

Group Members:

Test Case Name:

Preconditions

Desired Behavior

Postconditions

DESIRED OUTCOME (ANOMALOUS)

Group Name:

Group Members:

Test Case Name:

Preconditions

Desired Behavior

Postconditions