

MIME 101/CS 160 Final Design: Pill Sorter



Oregon State
University

BACKGROUND:

Local non-profit, AID Design, has requested Oregon State freshmen engineering and computer science students to design a pill sorting mechanism for visually impaired patients surrounding the Oregon State University campus. More specifically, AID has requested a pill sorting design capable of efficiently and accurately sorting pills of two colors into two corresponding colored containers.

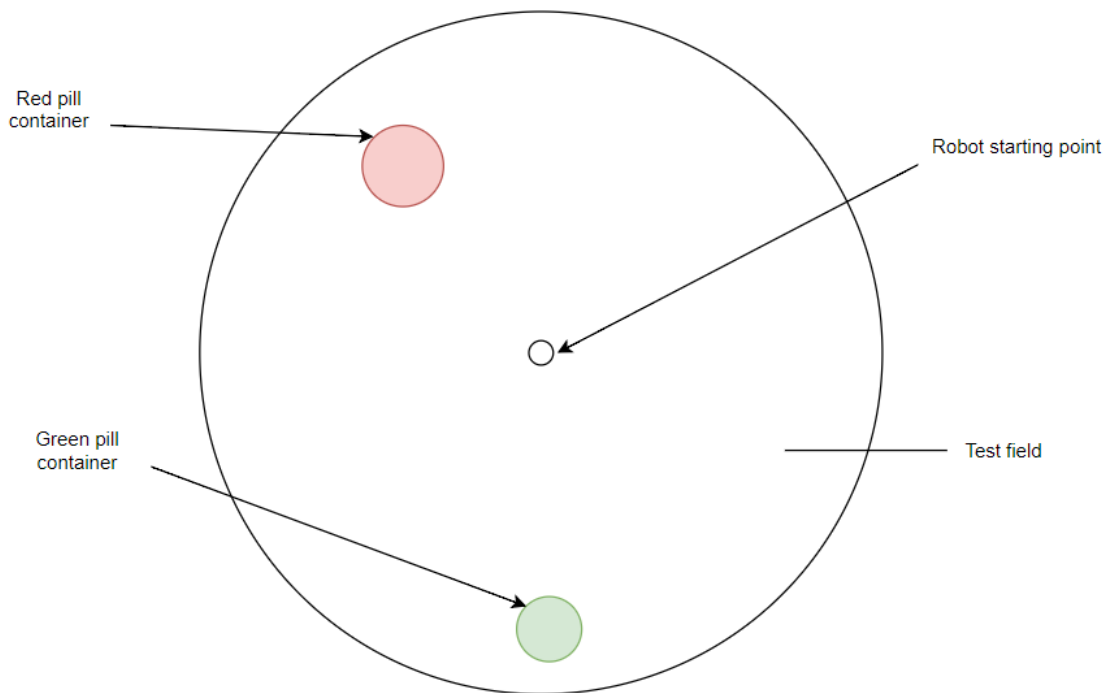
FINAL COMPETITION:

Two colored pill containers (red and green) will be placed at random distances and angles from center within a 360-degree test field. Design teams must create a fully-autonomous system for sorting colored pills into correct corresponding containers. Robots must begin operation at the center of the test field. Design teams are required to produce a 3D printed hopper to be included in their final designs. At competition day, pill hoppers will be filled with pills, and designs will then begin their sorting algorithms. Designs will be given a total of 3 minutes to sort as many pills (out of 20 pills) as possible. Pill container and test field dimensions are standardized and can be seen below.

The final competitions will be carried out during the last week of laboratory. The first hour of competition day will be allotted for construction and testing of their design. Because design teams must assemble their robots during the first hour of the final laboratory, it is **highly** recommended that teams practice constructing their final designs prior to competition day. Additionally, teams are encouraged to bring any needed reference material to expedite the process of constructing the robots; the reference material may include images, outlines, construction steps, etc.

FINAL COMPETITION CONSTRAINTS AND CONSTANTS:

- A. Teams may incorporate Lego Mindstorms, Cozmo, or any combination of both platform.
- B. Designs will be required to begin their operation from the center of the test field. Students may position their designs at any chosen angle.
- C. Pill containers will not be within 20 degrees of rotation from each other.
- D. The three-minute timer will begin immediately when any program begins running on either platform.
- E. In order to maintain the random nature of the project, LAs will ensure random pill distribution as needed.
- F. Pill containers are fixed at their initial positions.
- G. Final Designs must include the 3D printed hopper.
- H. Students are not limited to only one 3D printed component. However, students must print additional hardware outside of class time in the library.
- I. Test field will be a circular test field of a 5-foot diameter
- J. Pill containers will be circular with a 6-inch diameter and 3-inch height
- K. Students may use Cozmo, Lego Mindstorm, or a combination of both systems. Outside materials such as cardboard, duct tape, rubber bands, etc. are not allowed.
- L. All pills are of equal size
- M. Only red and green pills will be given to students



FINAL PROJECT EVALUATION:

Students will be evaluated in four distinct areas with designated weights shown below. Note, these percentages are relative to the 20% final project contribution to the Final grade of the course. For example, the final project is listed as 50% of the final project grade, equating to a 10% total contribution to the course grade.

Grading Criteria	Description	Percentage of Category
Final Design Report	Teams are required to submit final design reports for their projects. The requirements and grading criteria for the final design report can be seen in the design reports requirements handout.	50%
Midterm Design Proposal	Teams are required to submit Midterm Design Proposals by Friday November 2, 2018 by 5:00 PM. See the Midterm Design Proposal handout for requirements and grading criteria.	25%
Competition Day Evaluation: Accuracy and Time	Teams will be given three minutes to sort as many pills as possible. An incorrectly sorted pill will be worth zero points (No negative scoring opportunity). Teams will be graded in the ranges specified below.	25%

Competition Day Accuracy Ranges:

	Tier 1	Tier 2	Tier 3	Tier 4
Pills Sorted Correctly within 3 Minutes	15-20	10-14	6-9	0-5
Percentage of Points Earned in <i>Competition Day Evaluation</i>	100%	85%	70%	50%

Any questions regarding constraints, materials, and scoring should be addressed to GTA staff.