A competition full of hacks: Annual 2.007 finale pits robots against MIT history

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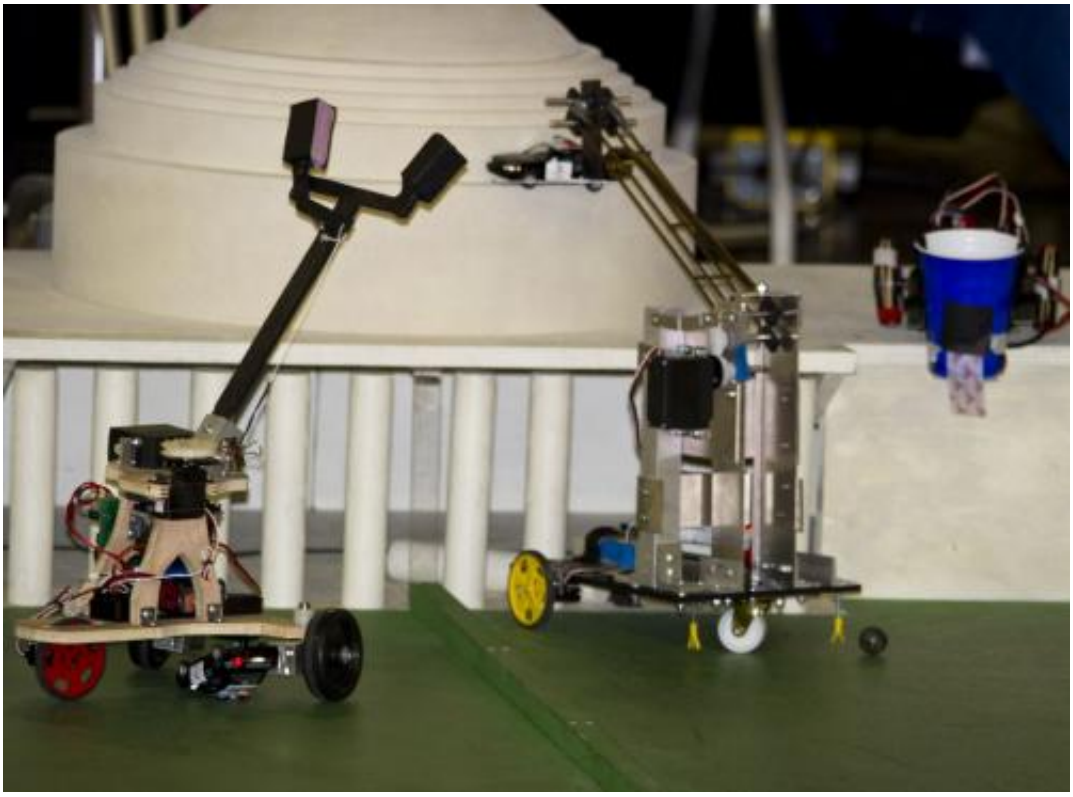

Tow robots go head-to-head in an attempt to lift a toy police car onto a scaled-down roof of MIT's iconic dome. Photo: Melanie Gonick

This year's 2.007 robotics competition paid homage to MIT's illustrious hacking tradition, and challenged students to build robots that could replicate some of the greatest hacks in Institute history.

During two gear-crunching nights this week, more than 100 robots battled each other on scaled-down models of the MIT campus, racing to complete any and all of a given set of infamous MIT pranks: moving the Caltech cannon, inflating a balloon on the Harvard football field and placing a police car on the Great Dome.

“Imagine the energy that goes into these hacks, and that goes into these robots,” said Daniel Frey, an associate professor of mechanical engineering and engineering systems and the lead instructor for 2.007. “Today we’re having a little fun … celebrating the great hacks of all time.”

Each spring semester, 2.007 — officially known as Design and Manufacturing I, a required course for mechanical engineering students — culminates in a robot competition. While the students’ performance in the tournament has no bearing on their grade, the competition is still fierce.

At the beginning of the semester, students are given a supply kit and a mission. Throughout the spring, they apply their lessons to build robots — first on the computer, then in the shop. For some, the class is their first experience building machines. Course co-leader David Gossard, a professor of mechanical engineering, frequently reminds students to spend no more than 12 hours a week on the course (a policy the whole 2.007 staff supports), but a good number of hands Thursday night attested to exceeding that guideline during the run-up to contest night.

For this year’s competition, 2.007 teaching assistants Amelia Servi and Greg Tao, who was 2.007 champion in 2008, erected models of MIT’s Great Dome, Killian Court and the Harvard football field. Students maneuvered their robots through the models, accumulating points for each hack successfully completed. Competitors faced off in pairs, remotely operating their robots using video-game controllers, iPads and

laptops.

Some students opted for a focused strategy, building a single robot that performed a single hack. A crowd favorite was a balloon-inflating robot built by junior Laura Matloff, who said her piston-powered plunger system was inspired in part by the pumps clowns use to blow up balloons. “My robot went through a lot of different design iterations, and I got a lot of ideas just by looking at everyday things,” Matloff said.

Others diversified, with some teams utilizing up to three robots to tackle multiple hacks at once. A particularly tense moment came in the middle of one of the final rounds Thursday night, as junior Kelsey Brigance faced off against sophomore Ari Umans, whose balloon-inflating machine steadily racked up points. Brigance, on the other hand, utilized two robots — one to drop balls from Building 10’s roof, which earned her fewer points, and the other to place a police car on the dome. Her second robot got the police car on the dome with one second left, barely winning the round, and setting off raucous cheers.

Other students, such as sophomore Juan Felipe Carrillo, went on the offensive with “bother-bots,” built to block an opponent’s robot. Frey provided most of the play-by-play description, but in a new twist this year, students also participated in the color commentary.

In the end, sophomore Wyatt Ubellacker took home first prize for his formidable team of three robots: a simple coffee-cup-carrying ball dropper, a robo-reeler built to clamp onto and reel in the Caltech cannon, and a robotic arm that inflated the MIT balloon over the Harvard football field. Following 2.007 tradition, Frey lifted Ubellacker, a two-meter tall swimming champion, and carried him across the floor in a victory lap. “I’ve been rooting all night for the lighter contestants,” Frey said, in reference to his bad back. “People over six feet intimidate me … but I’m feeling strong.”

The top four finishers were presented with clocks in the shape of MIT's iconic dome, unique trophies made by mechanical engineering's Pappalardo Lab staff on their water-jet cutting machine. Several of the top 2.007 students will get a chance to compete in the International Design Competition in Cambridge later this year, a two-week event that Frey describes as "2.007 on Red Bull."

At the end of the night, Frey solicited ideas from the audience for next year's competition, a strategy that generated this year's hack challenge. Ideas included obstacle courses simulating a triathlon, carnival games and the video game "Mario Kart."

"These are all great ideas," Frey said. "We'll put them in the hopper for next year."

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