



MCHE 201: Introduction to Engineering Design

Final Project – Spring 2019

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In Fall 2013...

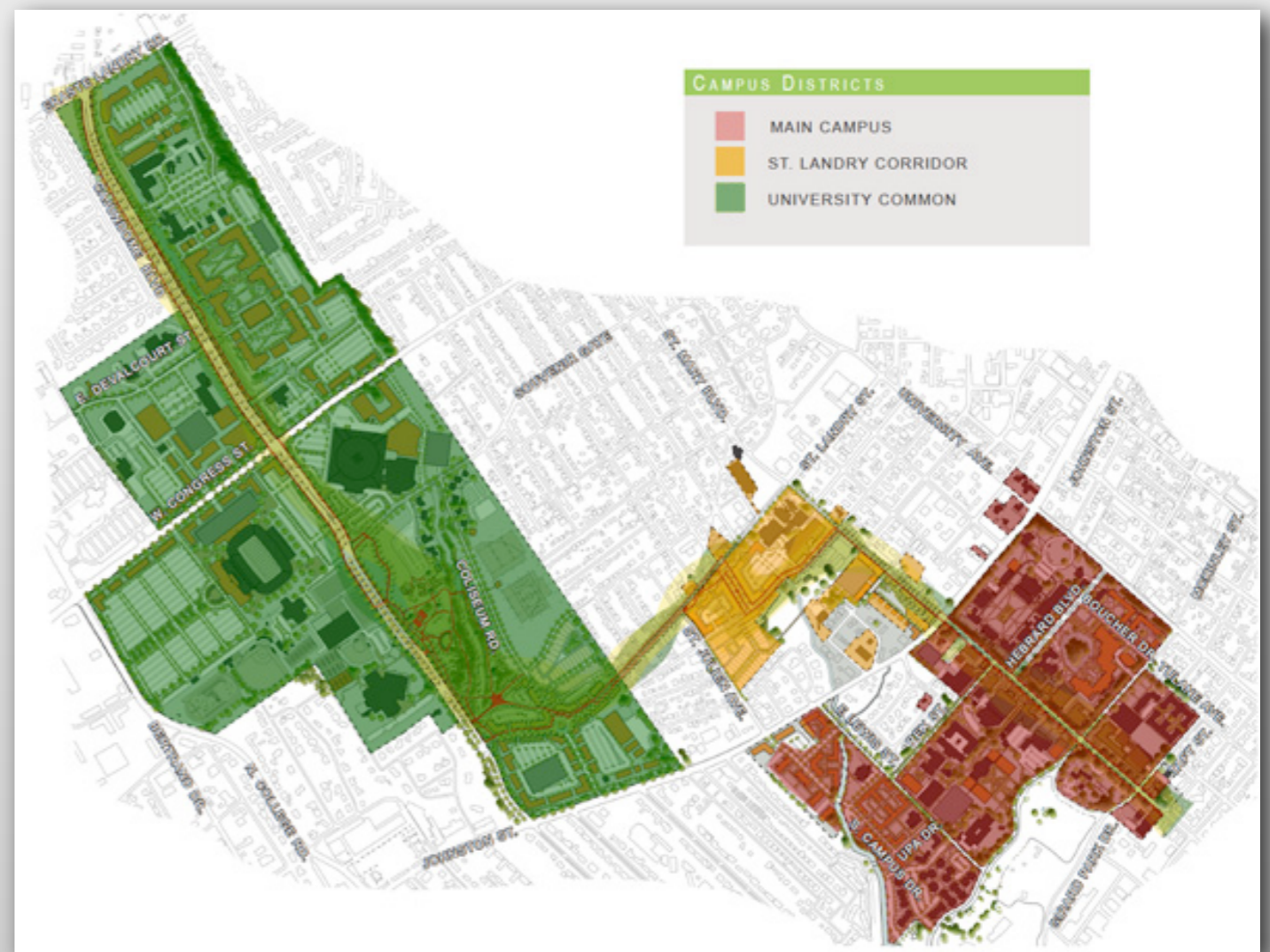


A MCHE470 special topics class on robotics kick-started...

The Master Plan



“A comprehensive plan arose in the spring of 2013 from a vision to improve the University of Louisiana at Lafayette's environment and make it one of the most comfortable and inspiring academic institutions in America. The University undertook the task of developing a master plan, which is intended to guide the physical growth of the campus into the 2030s.”



The Master Plan Contest



UNIVERSITY
OF
LOUISIANA
L a f a y e t t e™

Mechanical Engineering
Robotics Competition

In Spring 2015...



Plan

LAFAYETTE



our people.

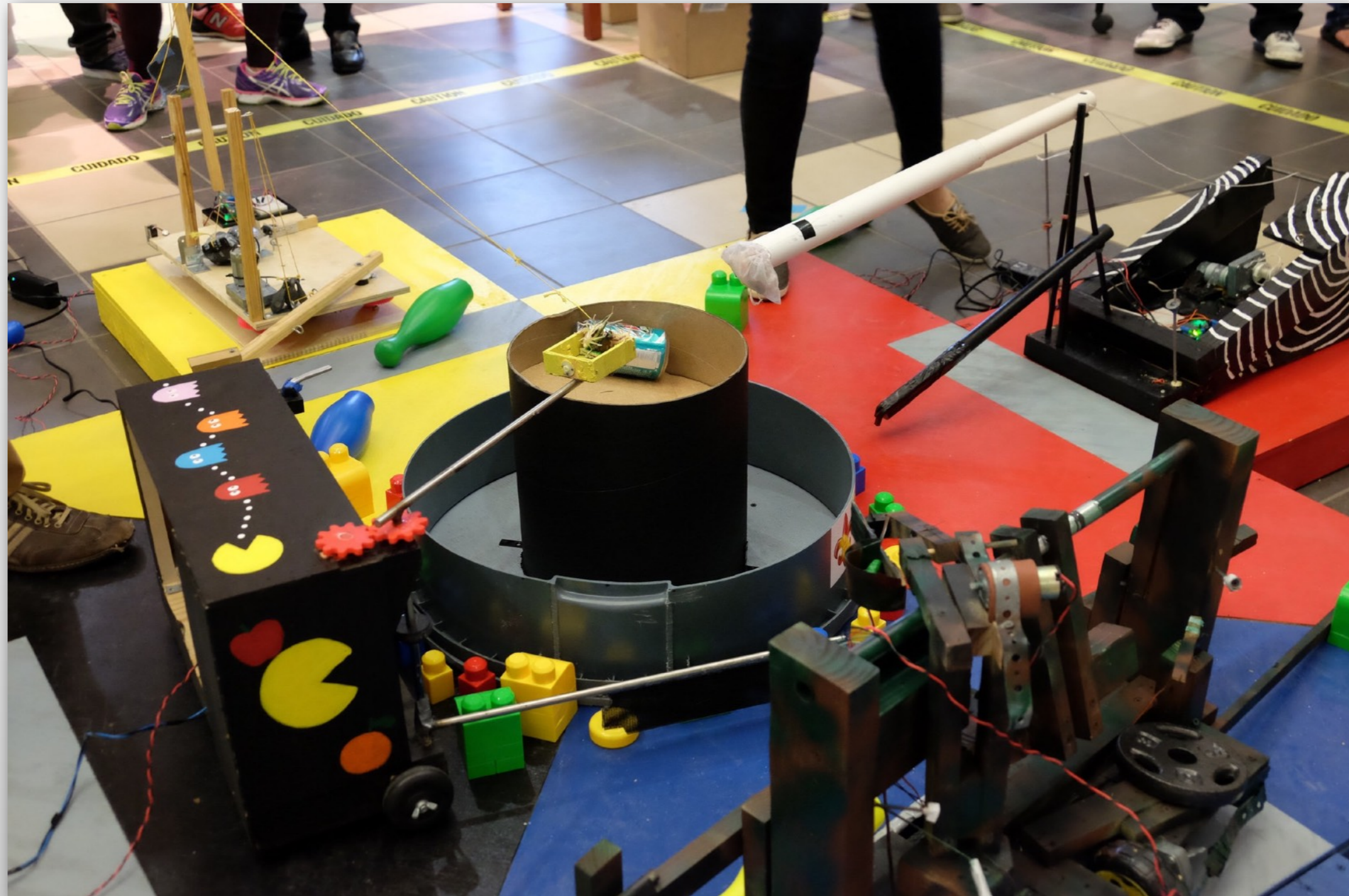
our community.

our economy.

In Fall 2015...



MCHE201 Teams helped James Bond defeat Blofeld and SPECTRE, saving the world...



In Spring 2016...



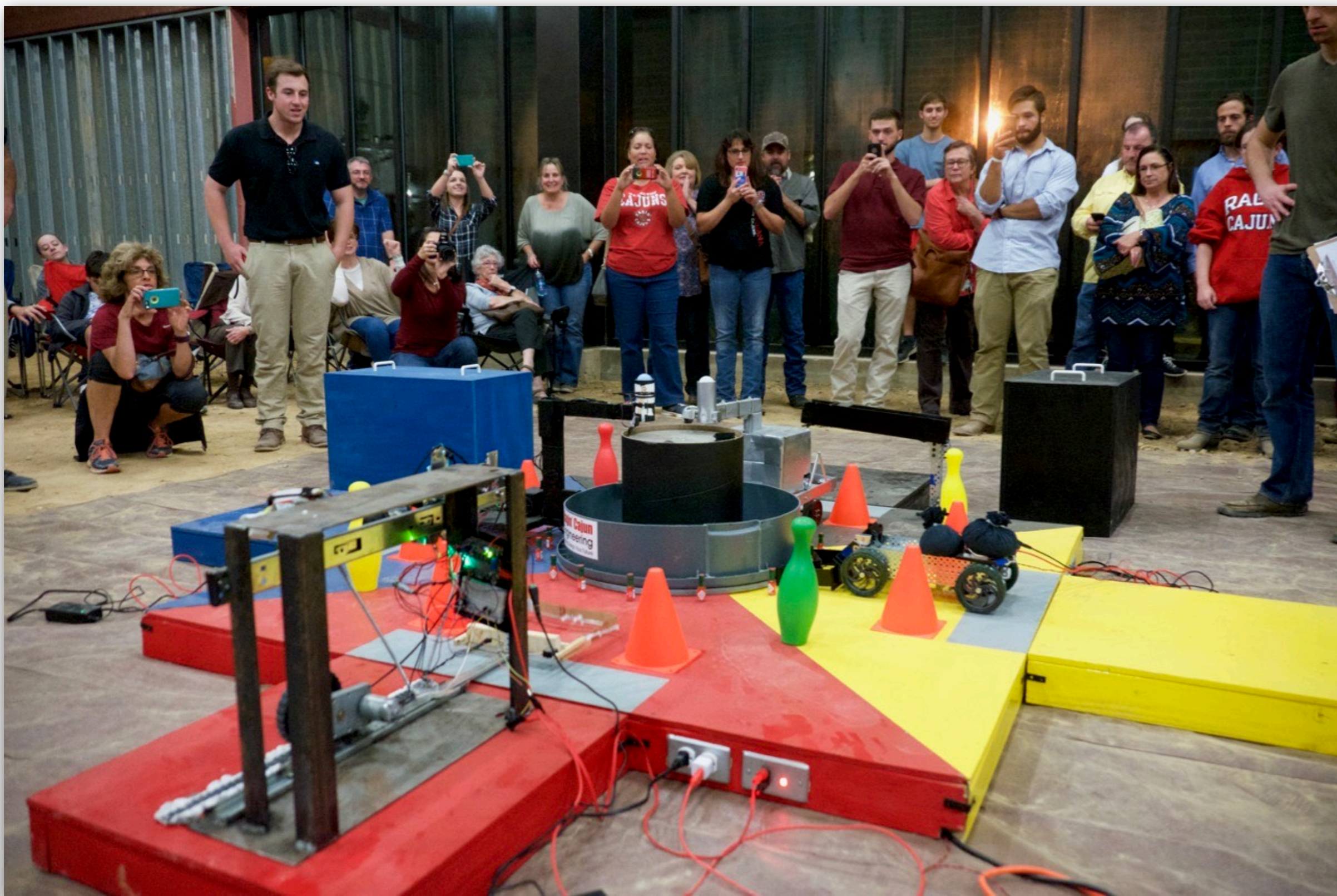
... with the world safe, people are again free to enjoy arts and entertainment.



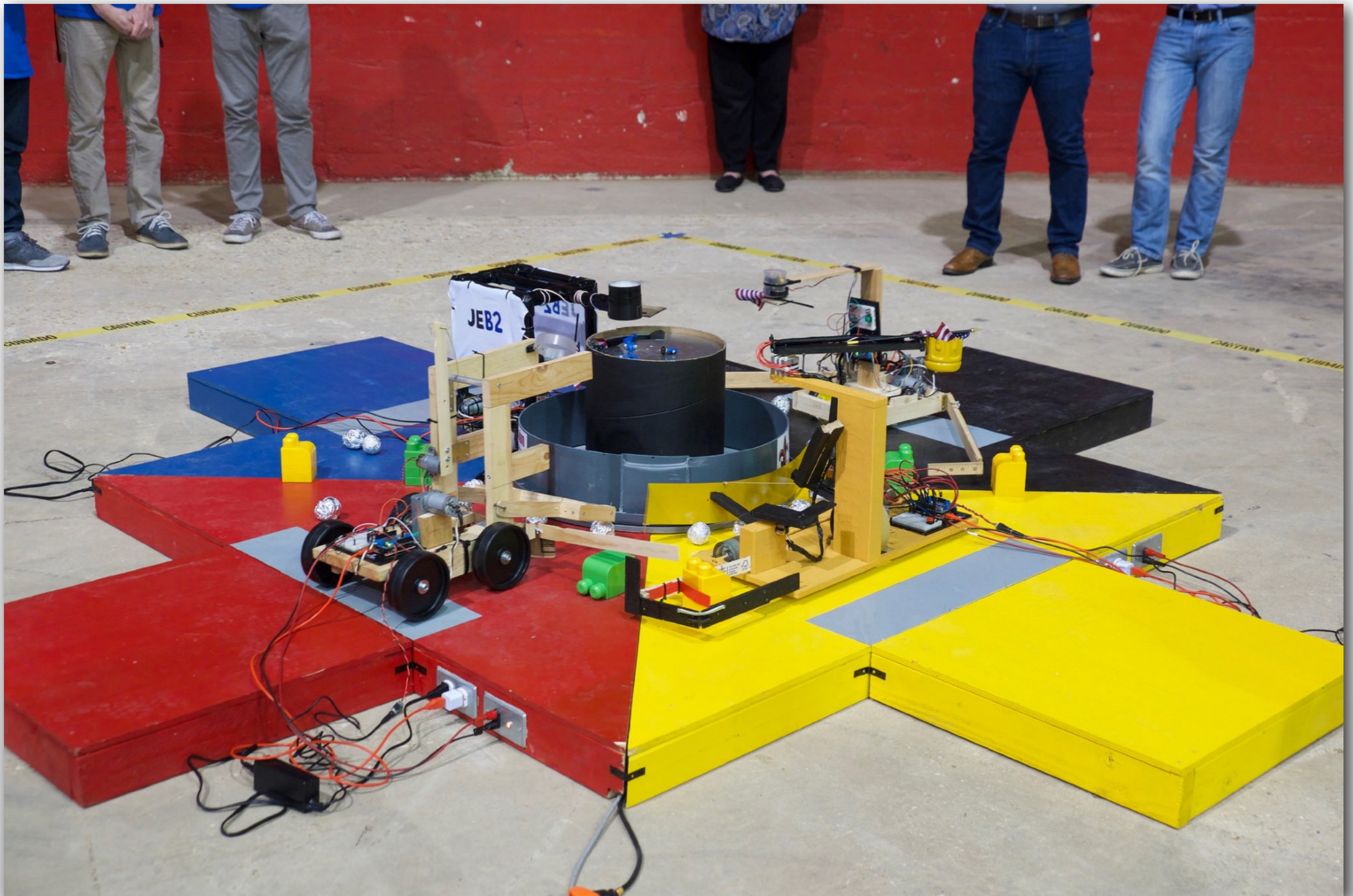
Festival International de Louisiane



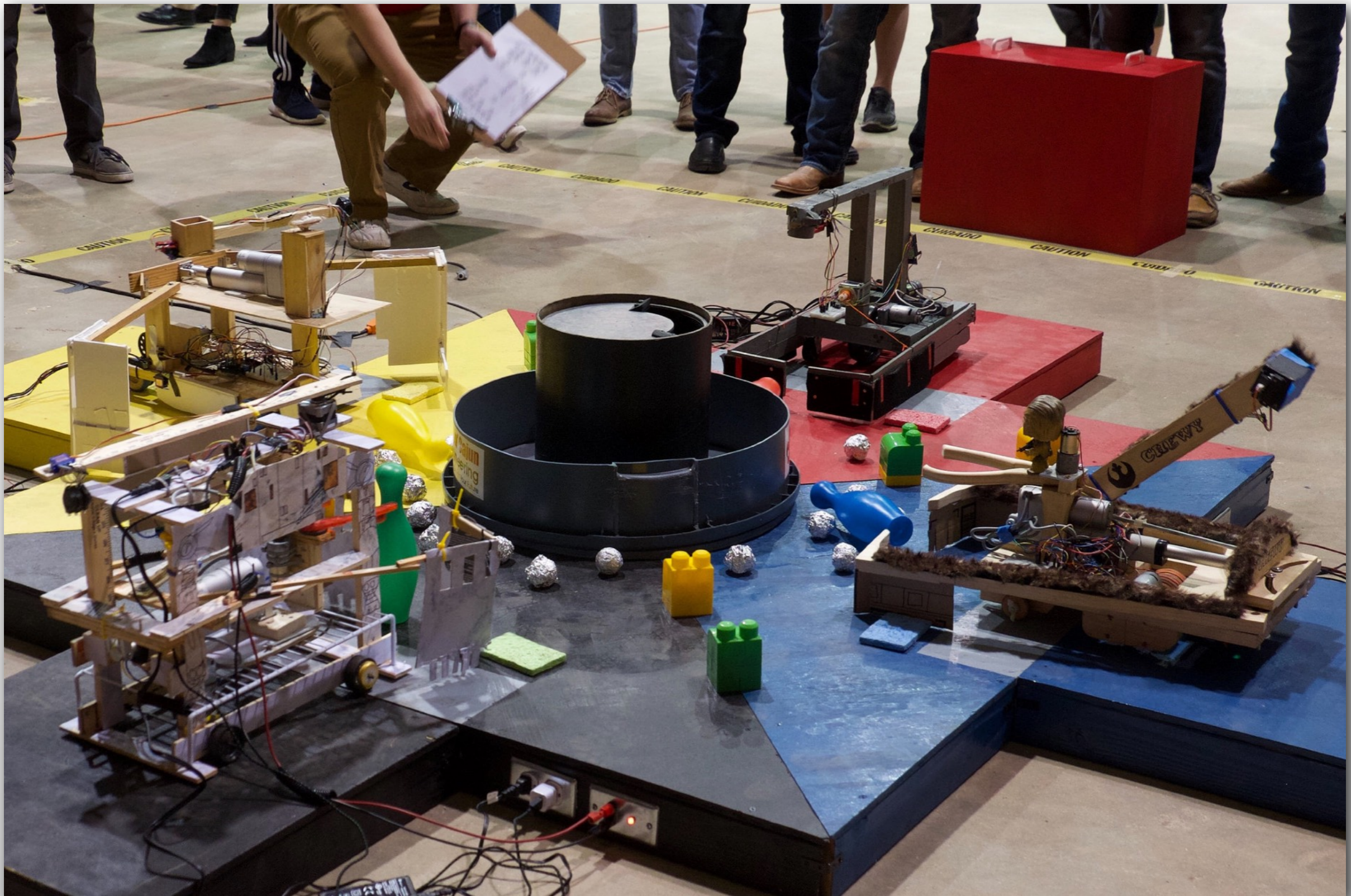
In Fall 2016... RobotX



In Spring 2017... Mission to Mars



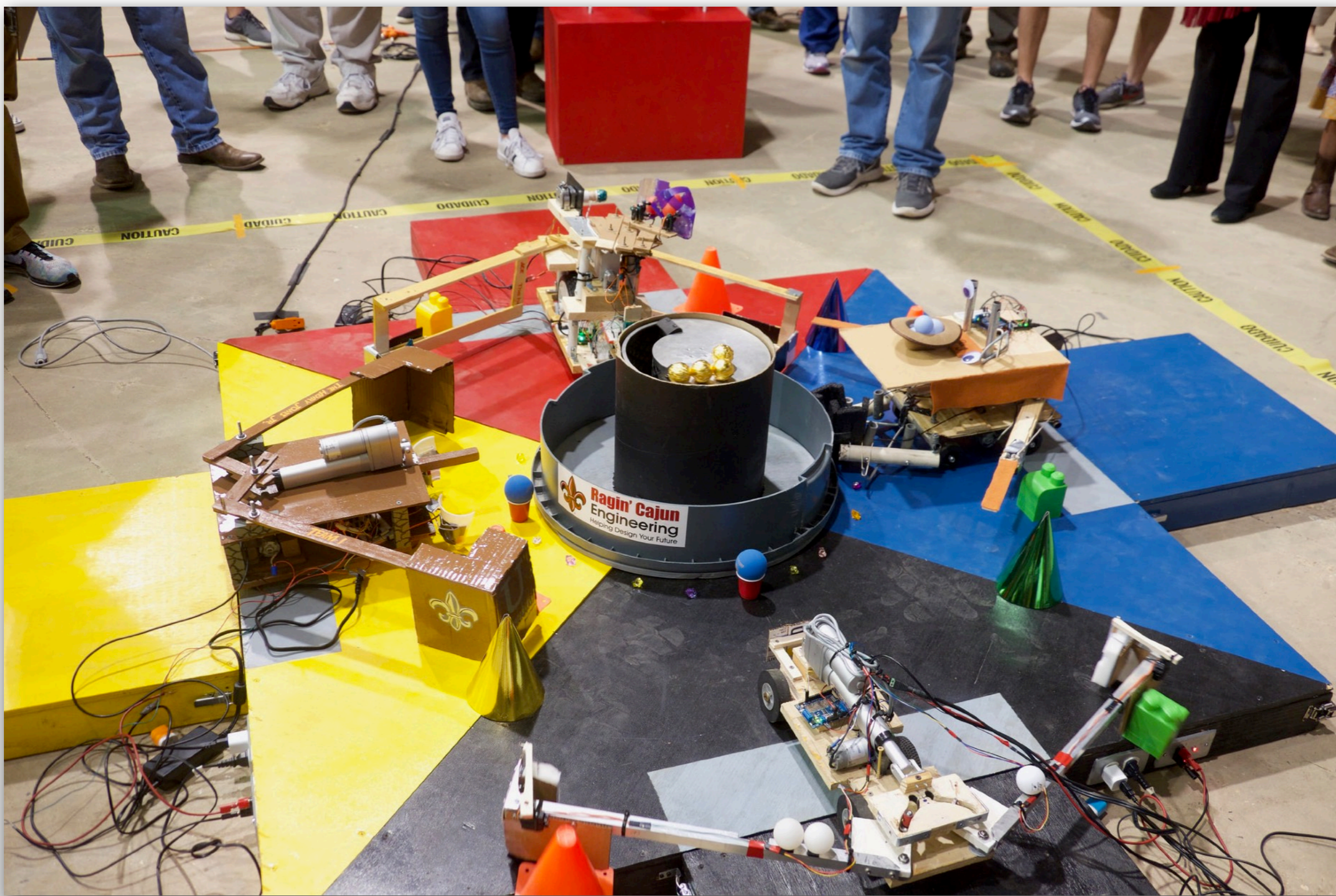
In Fall 2017...**STAR WARS**



In Spring 2018... Black Panther



In Fall 2018... Indiana Jones



Now...



The Kentucky Derby



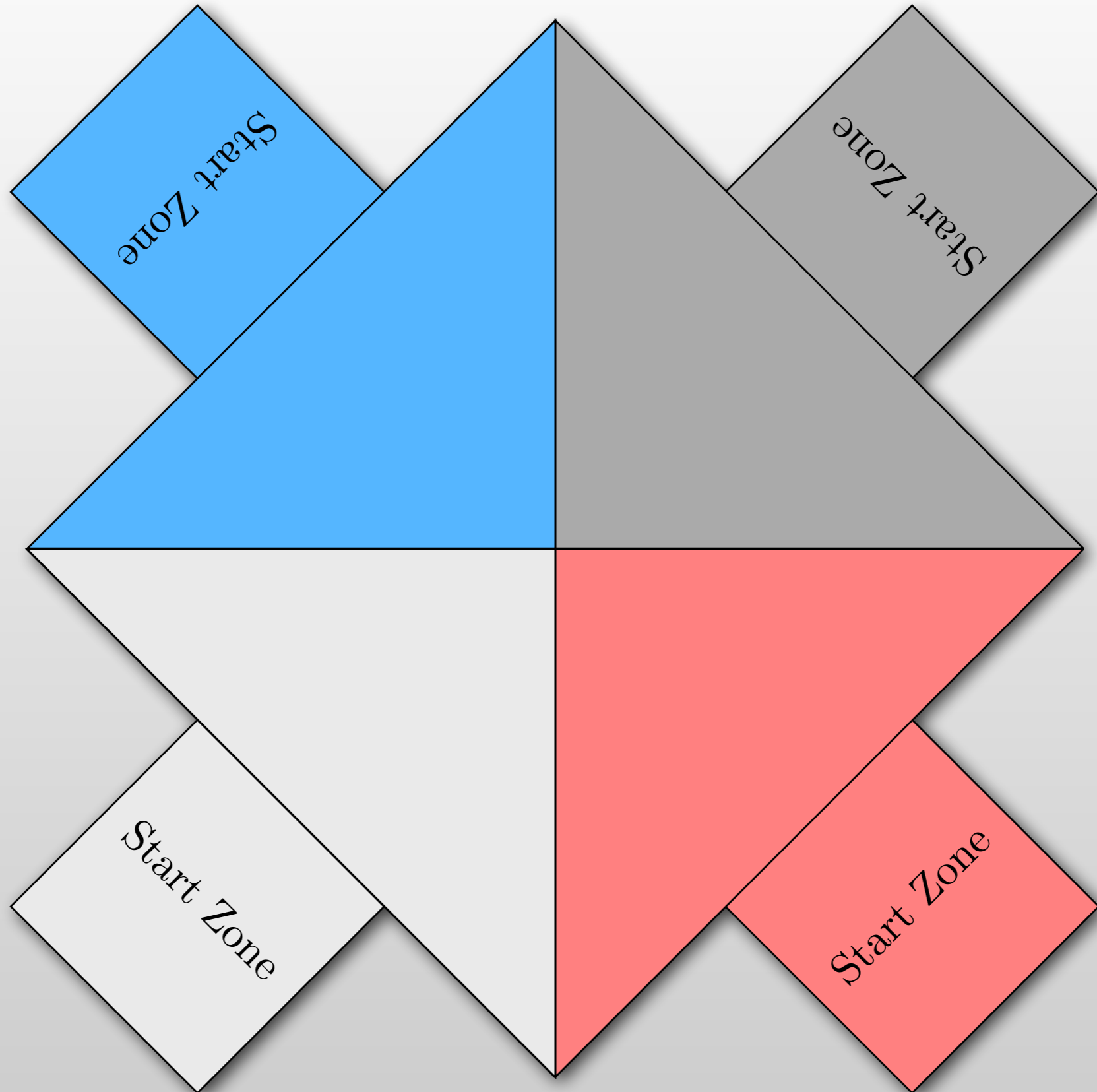
Image from: <https://www.theodysseyonline.com/the-kentucky-derby-festival>

To Compete in the Kentucky Derby

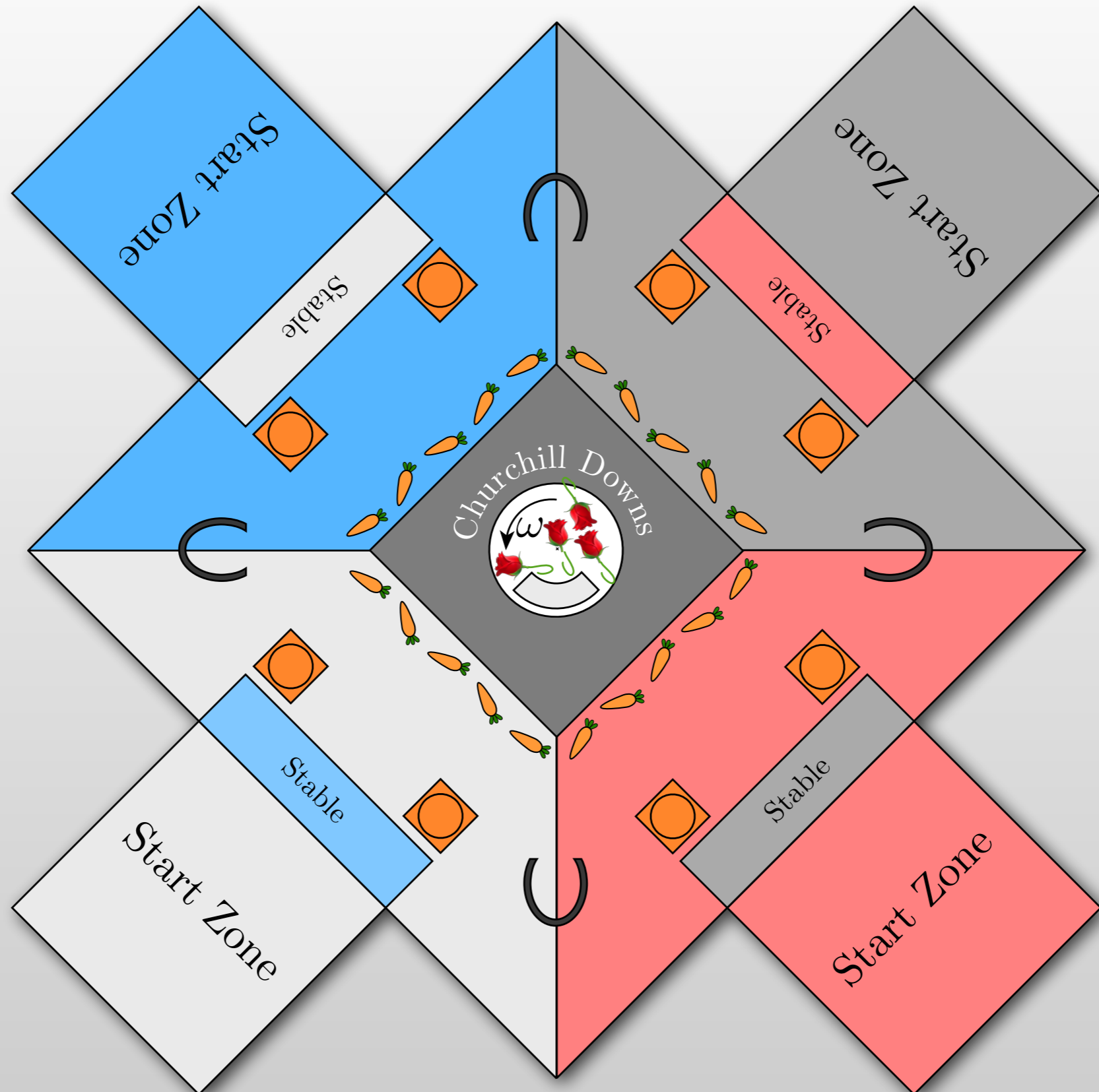


- Complete Training Runs
- Collect Carrots
- Collect Lucky Horseshoes
- Finish Strong Down the Home Stretch
- Send Jockeys to Churchill Downs
- Collect the Winner's Roses

The Kentucky Derby



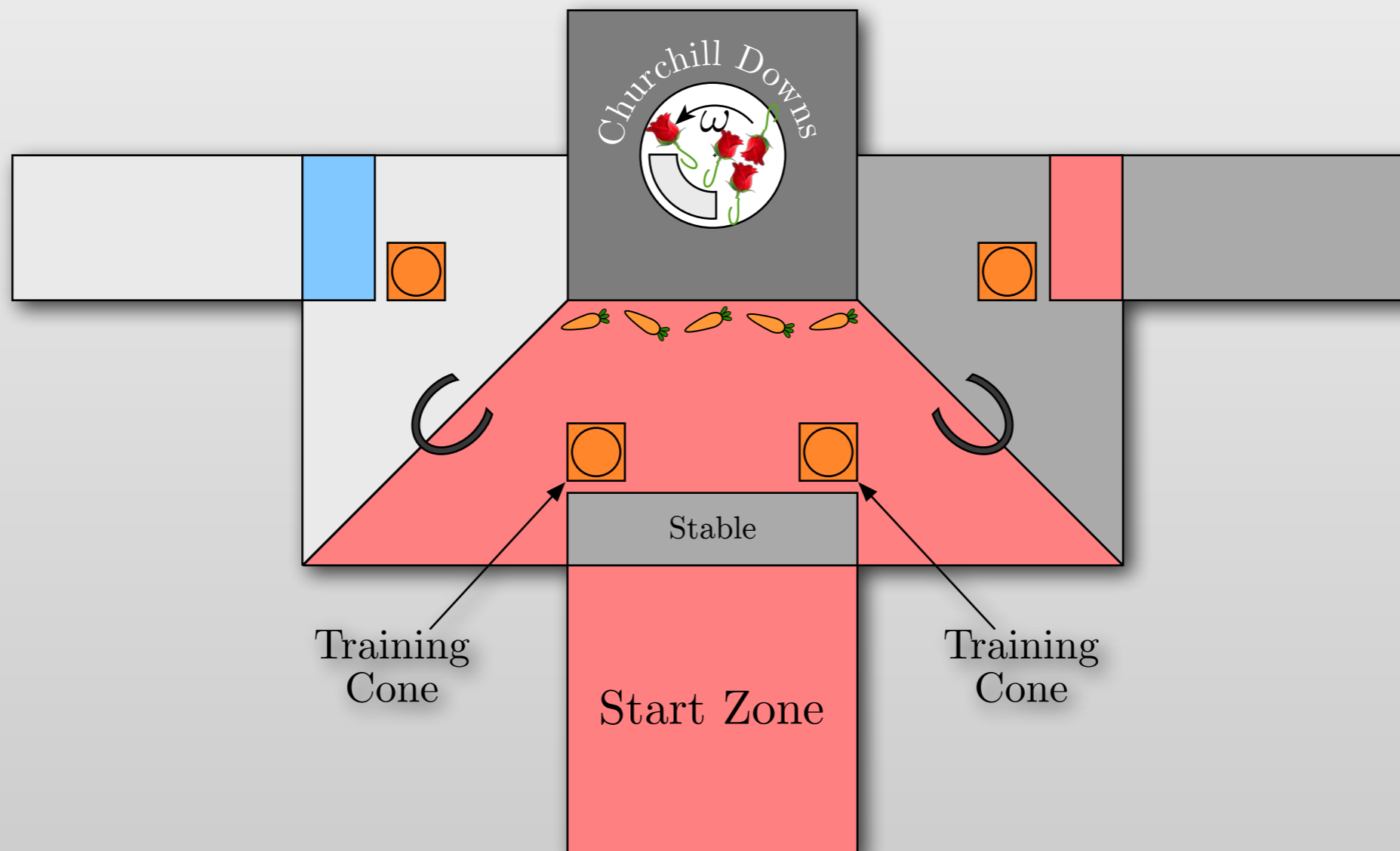
The Kentucky Derby



Complete Training Runs



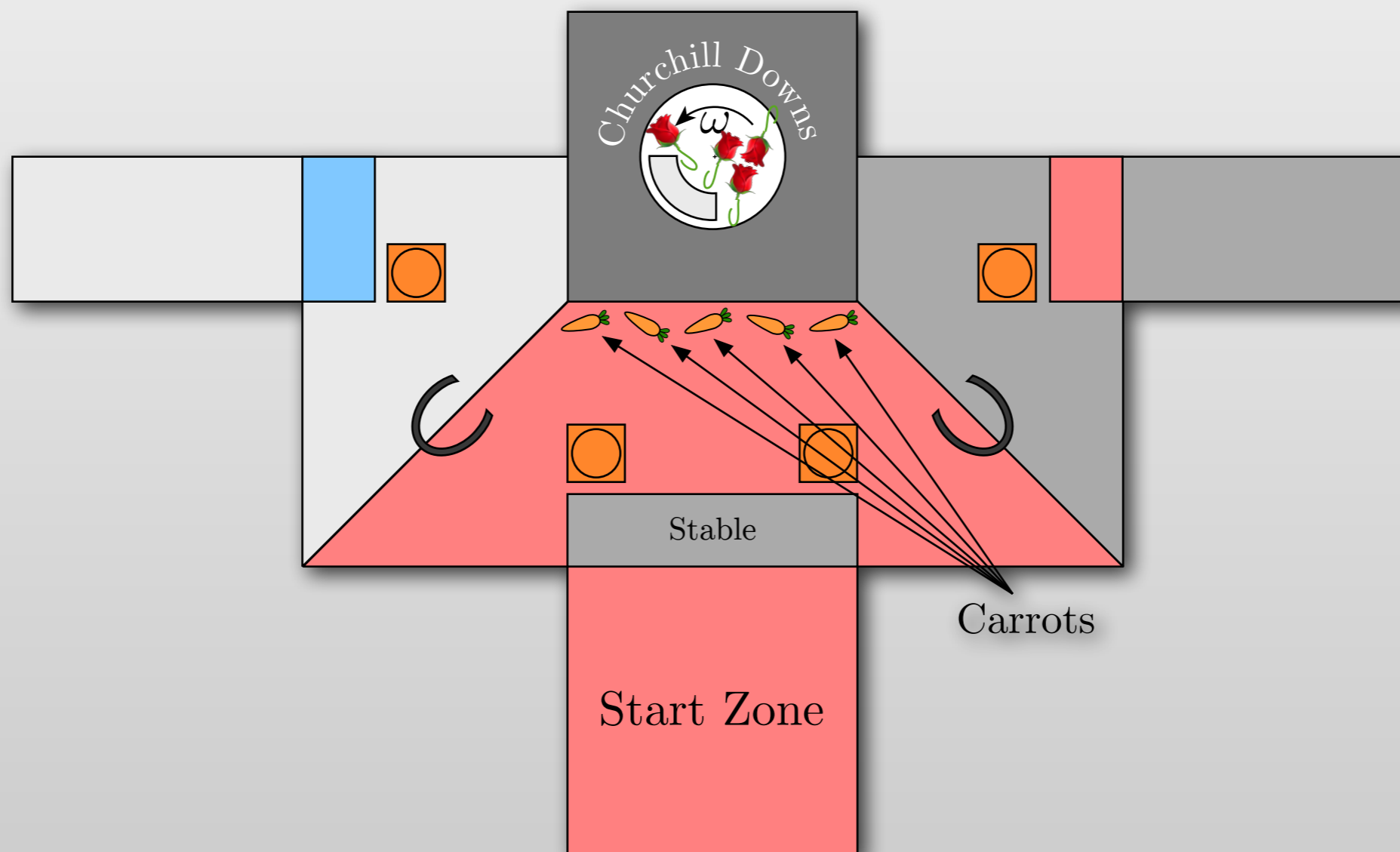
- Training Cones (small cones) are in front of the stable:
 - **-15 points** if training is not completed by *completely* removing the Training Cones from the team zone



Collect Carrots



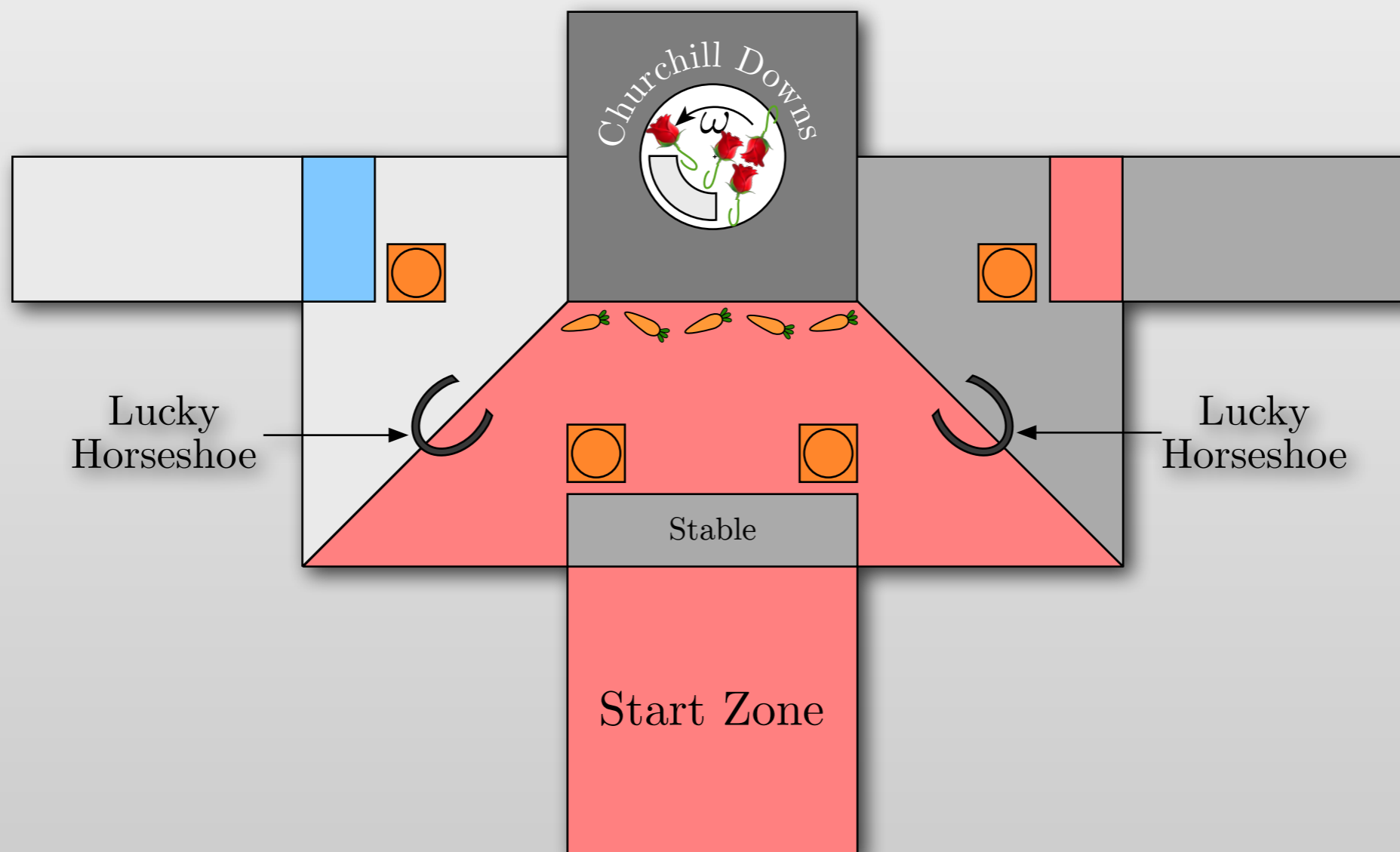
- 5 carrots (small toy carrots) are in each zone:
 - **+5 points** for each collected *completely* into the Stable



Collect Lucky Horseshoes



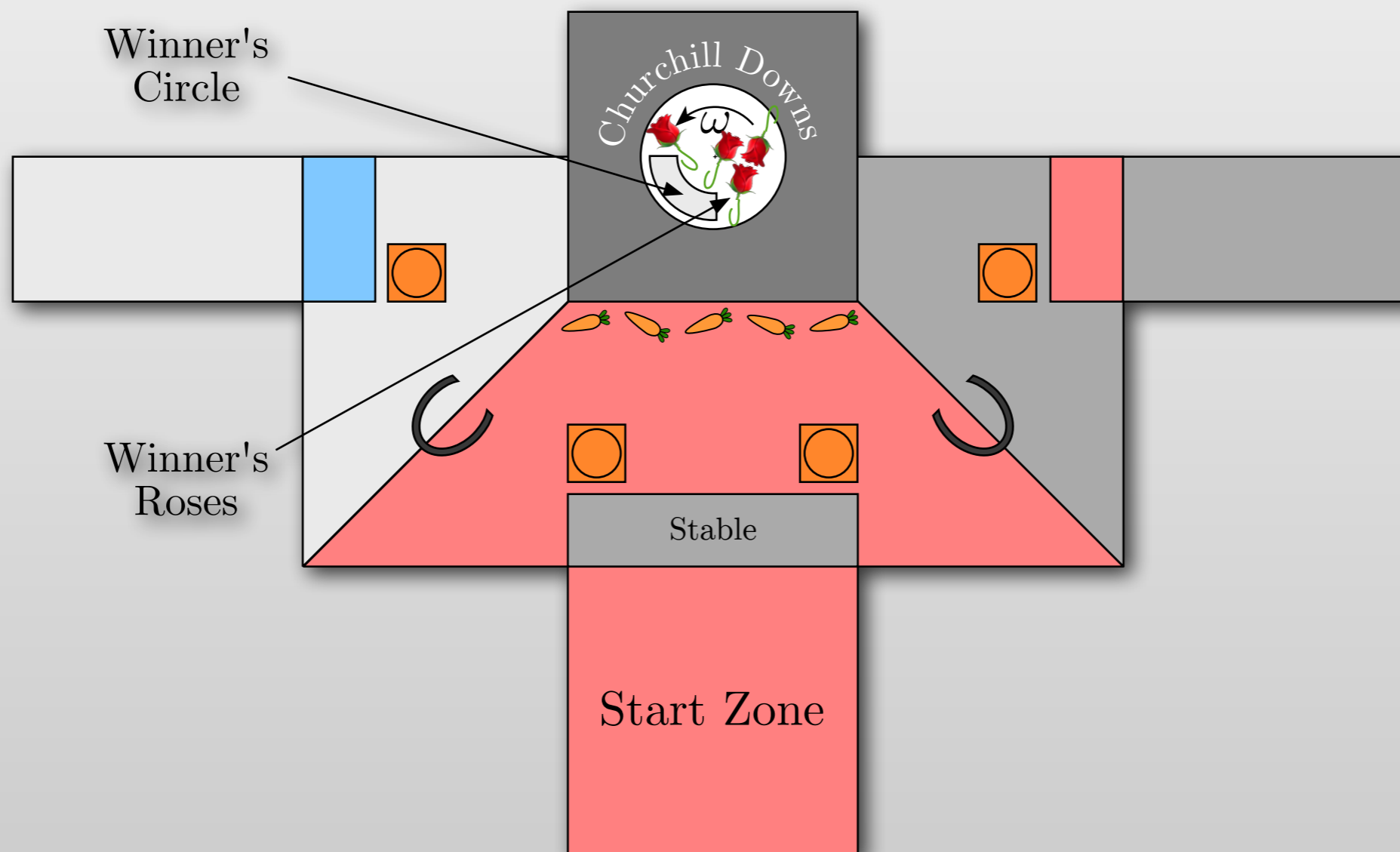
- Lucky Horseshoes (plastic horseshoes) are at each zone edge:
 - **+15 points** for each collected *completely* into the team zone



Send Jockeys to Churchill Downs



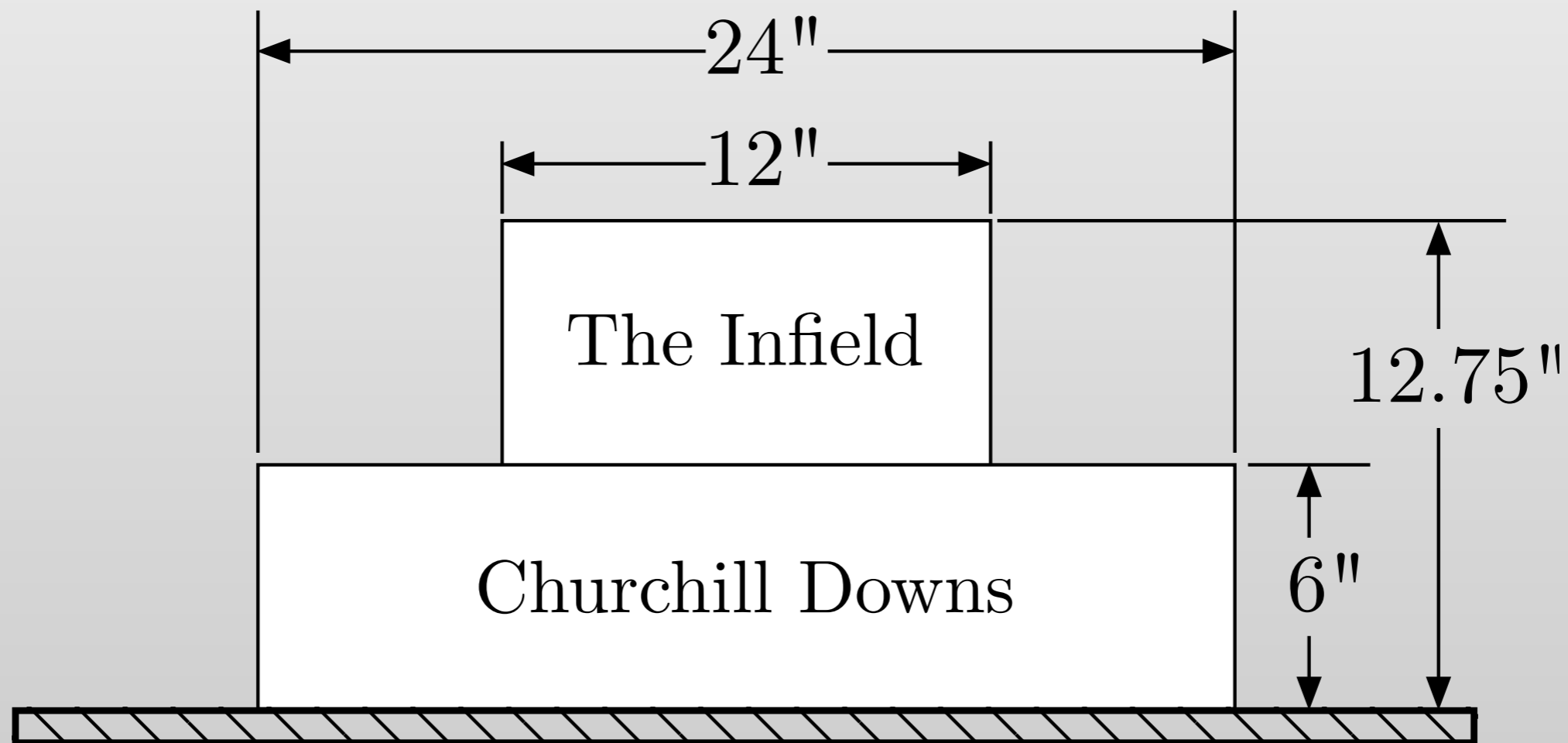
- Each team given 3 Jockeys (LEGO Minifigures)
 - **+5 points** for each placed in Churchill Downs
 - **+15 points** for each placed in *rotating* Winner's Circle



Send Jockeys to Churchill Downs



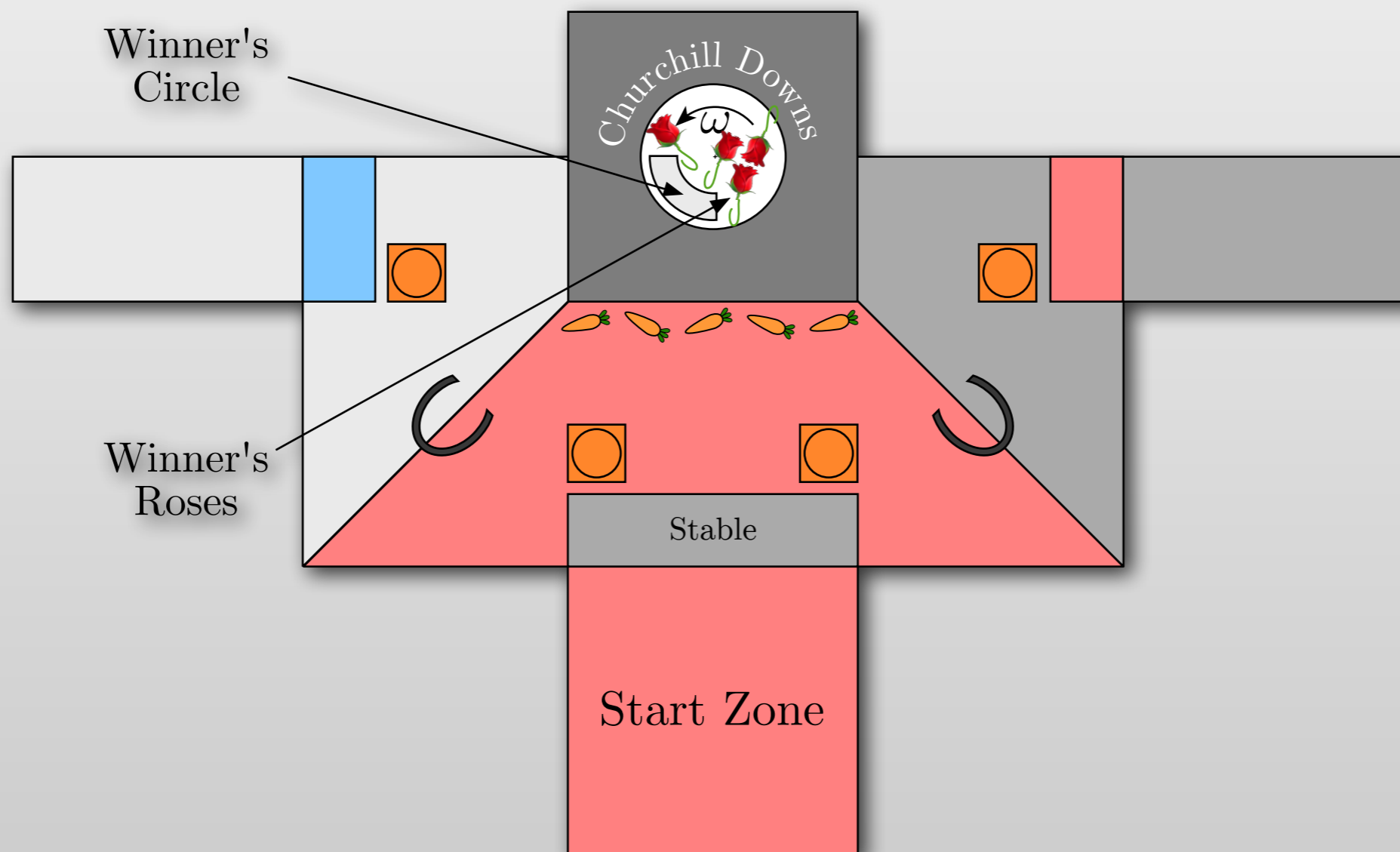
- Each team given 3 Jockeys (LEGO Minifigures)
 - **+5 points** for each placed in Churchill Downs
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Collect Winner's Roses



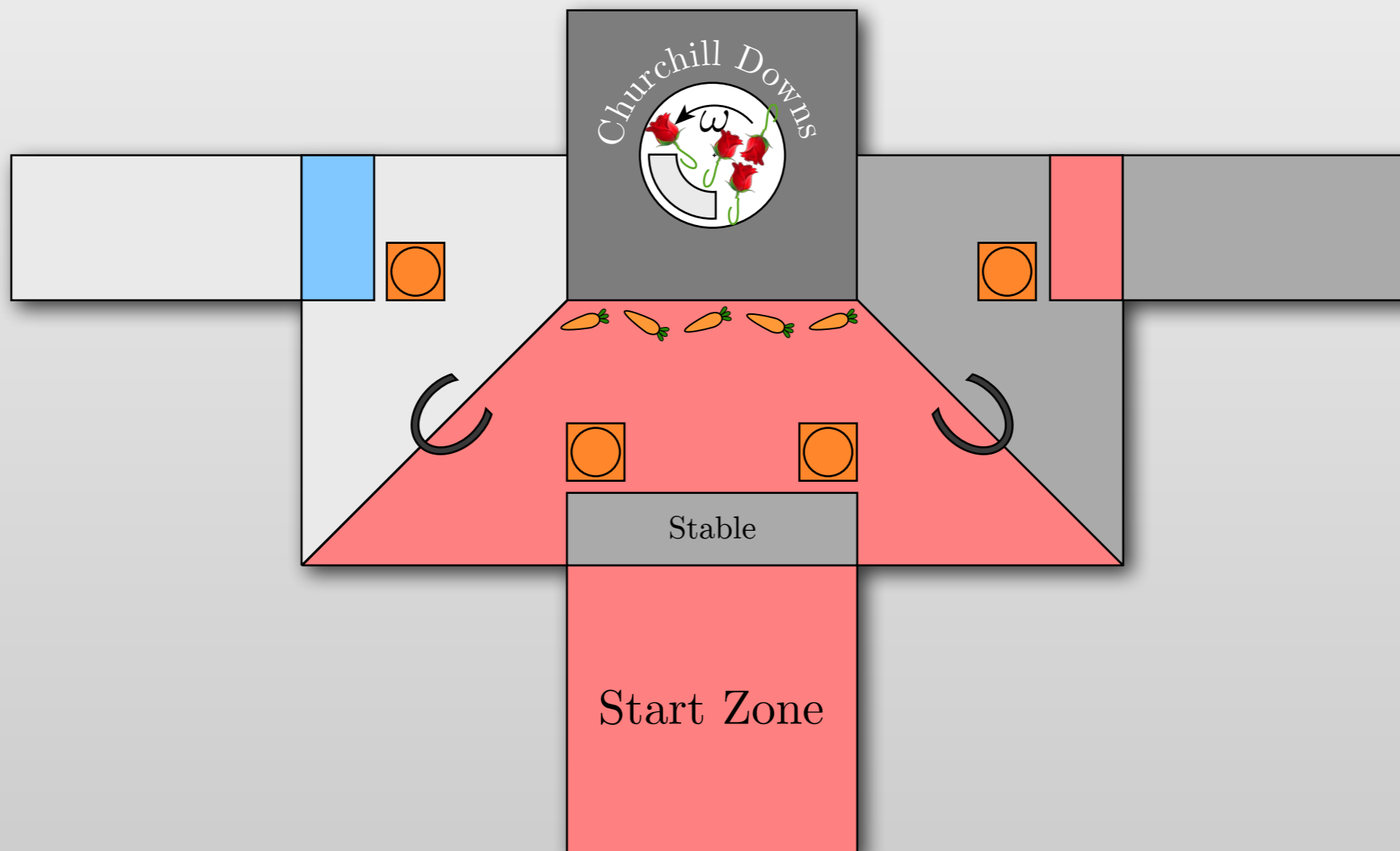
- Four Winner's Roses (cloth roses) are in the Infield of Churchill Downs:
 - +50 points for each *completely* in team zone



Finish Strong Down the Home Stretch



- **+15 points** if robot is *completely* out of the team's zone at the end of contest



Individual Contest



- Tuesday, March 19th
- Every student competes individually
- Mechanical-only design
- Only Complete Training Runs
 - Only Training Cones set up
 - +10 points for each removed *completely* from zone
- 2 runs within 3 minutes
- 1 of the 15 Robot Performance points

Preliminary Competition



- Tuesday, April 2nd
- Only 1 team at a time
- 3 runs within 5 minutes
- Only subset of the tasks
 - Complete Training Runs
 - Collect Carrots
 - Collect the Winner's Roses
- 3 of the 15 Robot Performance points

Qualifying Round



- Thursday, April 11th
- Full contest rules
- Determines seeding for final contest
- Compete until seeding is evident or we run out of time
- 3 of the 15 Robot Performance points

Final Competition



- **Thursday, April 25 at Blackham Coliseum**
 - Design Review - 5:00pm
 - Robotics Contest - 6:15pm
- Family, friends, UL faculty/staff, high school robotics teams, and industry sponsors attend



Design Review



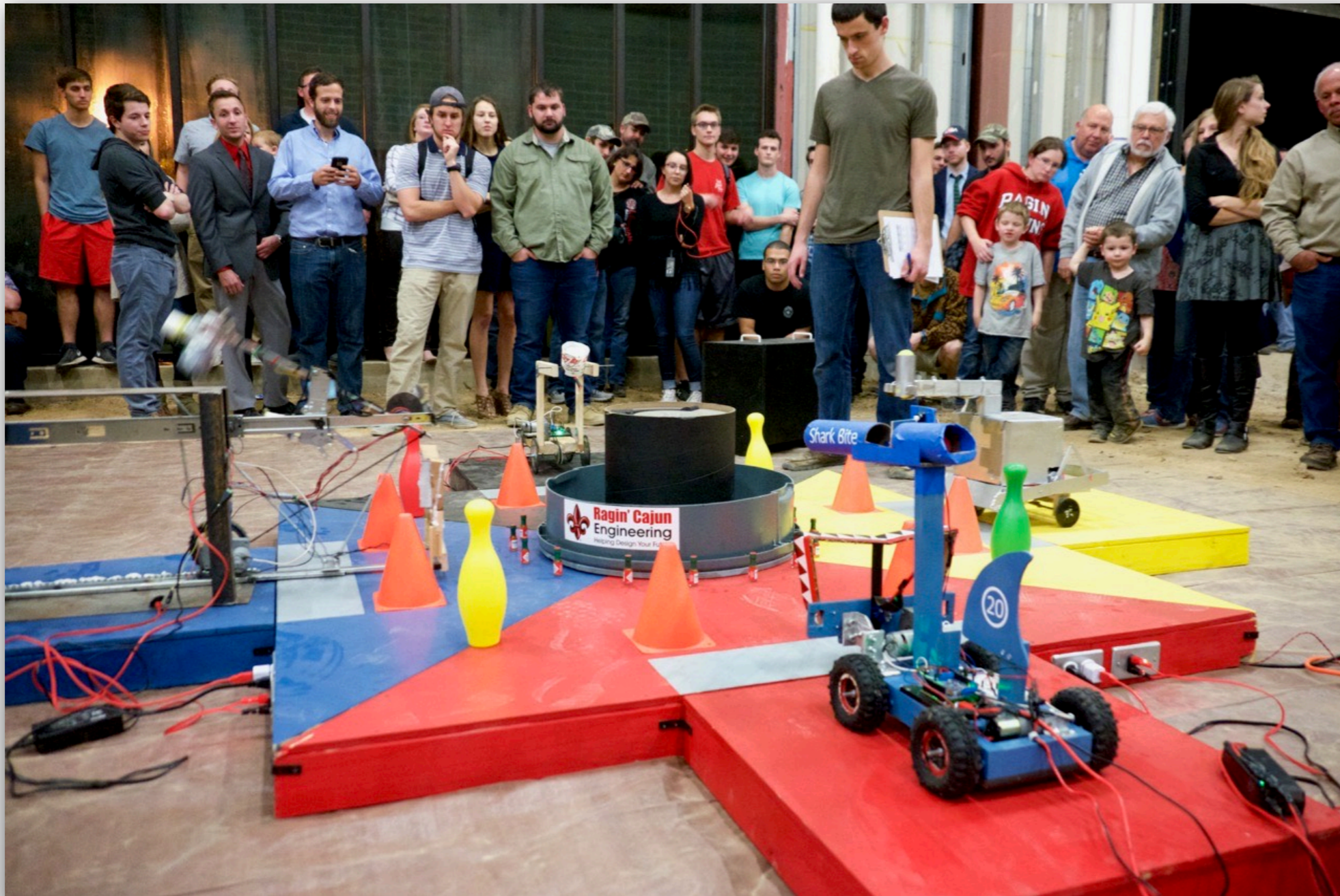
- “Science Fair-style” presentation to:
 - Faculty/staff
 - Graduate students
 - Local robotics clubs
 - Industry guests
- Judged on:
 - Aesthetics
 - Ingenuity
 - Presentation
- 5 grade points



Robotics Contest



- All contest rules in effect
- 8 of the 15 Robot Performance points



More Details



- Must operate autonomously
- Can use:
 - 1 pyboard
 - Components from 3 kits
 - Gravity
 - MCHE201 kit
- Will need to sense a “start” signal (like a switch)
- You can buy <\$100 of additional
 - Sensors
 - Building materials
- Must fit onto 2ft-by-2ft starting area and <12"x24"x18"

Size Requirements



- Your device must be “boxed” prior to each run
- After “boxing” you can only move your device into its final position. You may *not* make *any* other adjustments.
- If adjustments are made, you must re-box your machine (even just reaching inside may warrant this)



Even More Details



- Your machine cannot:
 - Use energy other than that from gravity or the components in the kit
 - Wantonly damage other machines
 - Damage the competition track
 - Damage any competition pieces
 - Operate for more than 30sec.
- You cannot:
 - Enter the competition track during a match
 - Interfere with your machine during a match
 - Use foul language during a match

**Any one of
these will
result in a DQ**

Even More Details...



- Your machine should be robust to minor deviations in the Kentucky Derby grounds
- *Many* more in the handout

Intermediate Reports



- Problem Understanding
 - Presentation – March 15, 5pm
 - Report – March 15, 5pm

The week before
the Indiv. Contest

- Concept Evaluation and Selection
 - Presentation – April 5, 5pm
 - Report – April 5, 5pm

The week before
the Qual. Contest

Notice that these due dates lead the contest dates. Use the design tools during your design process!

Final Report & Presentation



- Final report
 - 15 grade points
 - Due: Tuesday, May 7, 5pm

- Final presentation video
 - 10 grade points
 - Due: Thursday, May 9, 5pm