IEEE SoutheastCon 2023 Hardware Competition Draft Rules

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IEEE SoutheastCon 2023

Disclaimer

- This release is a concept release.
- The purpose of this release is to provide a textual and visual aid for the competition rules.
- Readers should consider the descriptions, visual components, and dimensions as rough concepts.
- The next phase of the competition rules development includes analysis and testing of the concept to determine the feasibility of the concept, fine-tune details, and determine which are the best design methods which will best help the robot accomplish this challenge.
- Since the requirements are being analyzed, you should not consider these rules to be final.
- You should not build competition boards or robots based on this release of the rules.

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Contents

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Introduction

Welcome to the 2023 Hardware Competition Rules

- This is a draft synopsis that has been released for comments for university teams to review and provide feedback

- Feedback is requested no later than 15 June 2022

- Full rules will be located at https://attend.ieee.org/southeastcon-2023/hardware
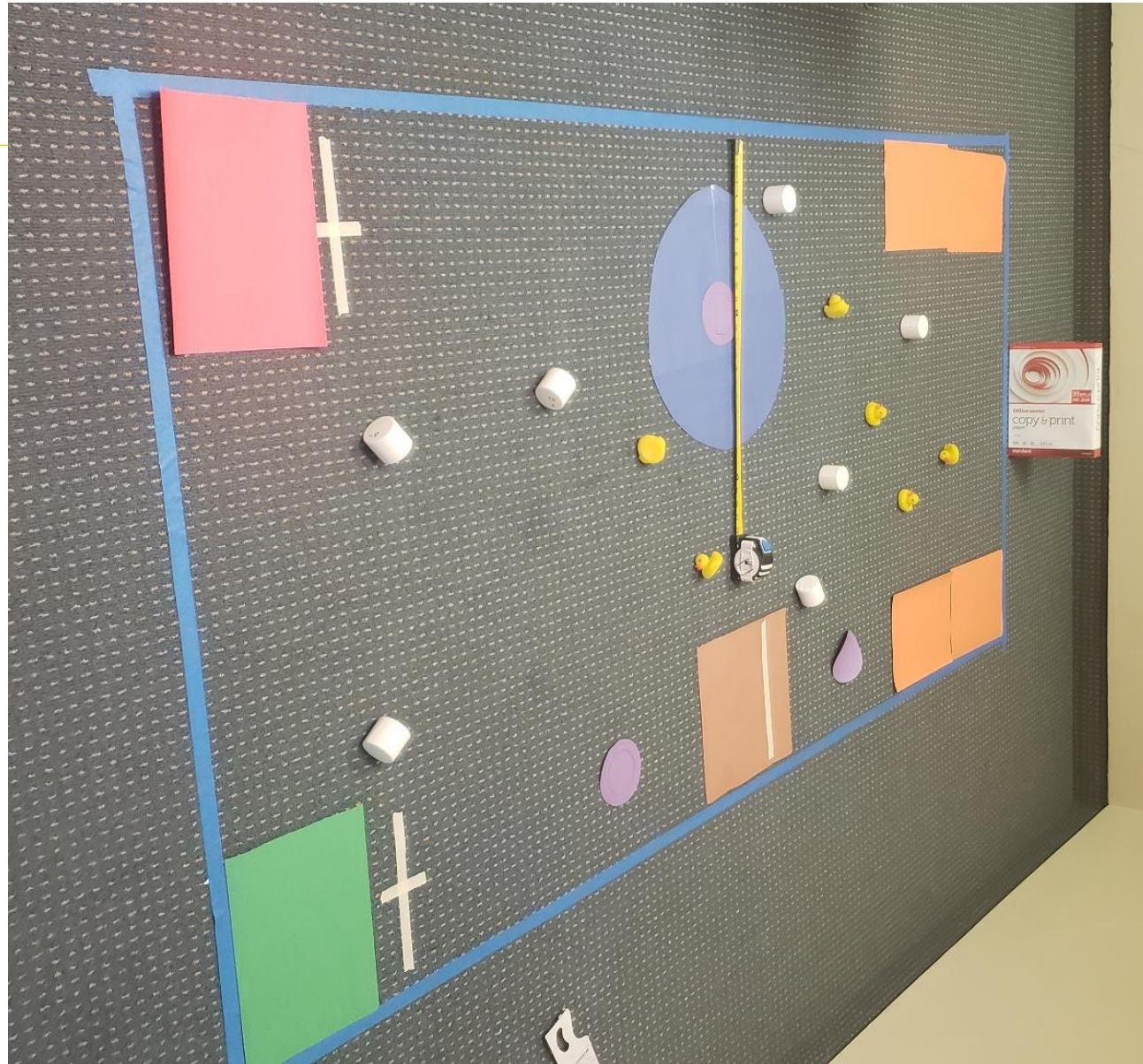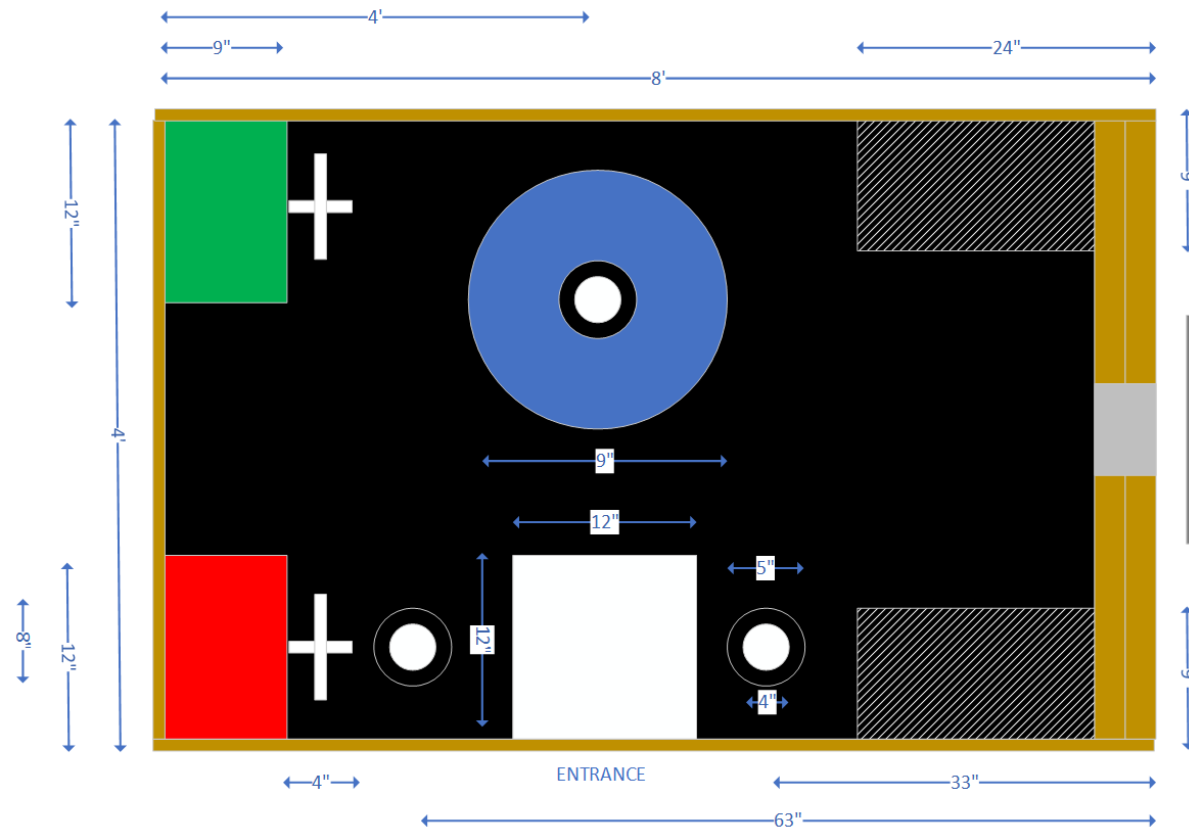
Playing Field

- The arena field has not yet been finalized.

- These are concept dimensions

- We will be performing analysis and testing to determine which are the best design methods which will best help the robot accomplish this challenge.

- The main course is constructed of a 4' x 8' sheet of plywood with a boundary of 1' x 4' wooden beams on three sides and 2 – 2" x 4" x 4' wooden beams on one end. The entire course is painted black.

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Playing Field

- Concept picture

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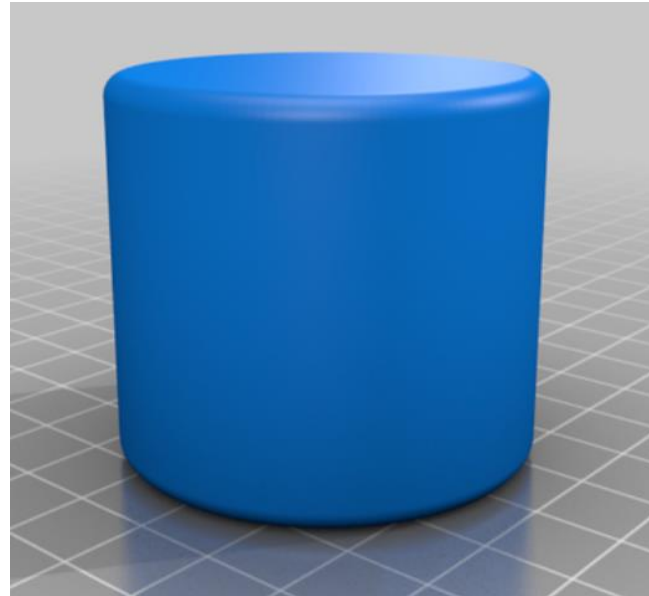
Playing Field

Board Component	Description
Duck Gardens Theme Park	4' x 8' arena
Green Rectangle	Manatees Aquarium Attraction
Red Rectangle	Alligator Aquarium Attraction
Blue Circle	Duck Pond Attraction
Black and White Circle	Duck Statue Attraction
Rectangle with Diagonal White Lines	Recycling Attraction
Light Grey Rectangle	Switch Box for Fireworks
Dark Grey Rectangle	Fireworks Display Computer

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Playing Field

Ducks
9 x Yellow
1 x Pink

Statue Pedestals
3 x White
3 x Green
1 x Red

Food Chips
3 x Green
3 x Red

Objectives

Teams will build a robot that operates inside Duck Gardens. Unfortunately, the roads are damaged. Most of the lines on the road are washed away. A few broken lines remain.

- The hurricane forced the ducks out of the duck pond and knocked over the three duck statues.
- The ducks and statue pieces are scattered throughout the park.
- The park includes manatees and alligators. The manatees are safely in their pen but are hungry. The alligators are in their pen next to the manatee pen. The alligators are hungry as well.
- The robot will navigate the park feeding the manatees, feeding the alligators, moving the ducks back to the pond, rebuilding the statues, and placing the remaining pieces in the recycling bins.
- In customary theme park tradition, the robot may end their cleanup by starting the daily fireworks!
- The robot may do any number of tasks in any order.

Duck Statues Attraction

Three Duck Statues

- In the Duck Pond
- Right of the start area
- Left of the start area

- Placed on statue rings
  - Two to three pedestals
  - Duck on top

- Stack pedestals in colored order for more points
  - Duck Pond – white, green, red
  - Others – white, green

- A Duck on top for more points
  - Pink duck on Duck Pond Statue for more points

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Manatee and Alligator Aquariums

- Hungry Manatees in a green rectangular aquarium
  - Feed green food chips
- Hungry Manatees in a red rectangular aquarium
  - Feed red food chips
- Food chips may be preloaded into the robot
- Food chips in the wrong aquarium, lesser points

Duck Pond Attraction

- Relocate ducks into the pond

- Seven ducks

- The other three are statue tops

Recycling Attraction

- Recycle any items not used into the recycling area

- Two areas near right end of arena

- Diagonal white lines in black rectangle

Fireworks Attraction

- Toggle switch (light switch) in standard electrical box

- Flip switch to start fireworks

- Start fireworks at the end of the run

- Complimentary fireworks video will show on a computer display

Team Fireworks

- Teams may submit custom fireworks

- mp4 format

- Five seconds duration

- Demonstrate team spirit

- Team Fireworks will also be judged separately

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Vehicle

The Robot must fit into the following parameters

- Fit within a volumetric cube 12" x 12" x 12"

- Only one start button/switch is allowed

- Must have an emergency cut-off switch

- Must also stop at the three-minute elapsed time

- May expand into multiple independent robots, but must all initially fit into the volumetric cube

Vehicle (continued)

Additional restrictions are as follows:

- SONAR and LIDAR are OK, but must accept interference

- No tethering or external controls (No remotes)

- No pyrotechnics or corrosive materials

- Compressed gas up to 30 psi allowed

Vehicle (continued)

What does the start switch do:

- Powers the robots

- Allows the robot to position in start area

- Does NOT start the run

- LED recessed in board in the center of start area

- Judge presses button to start two arenas at once
  - Red LED lights up
  - Robot detects red LED and starts run

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Rules of Play

- ## Match Pre-staging
  - Retrieve robot from sequestration (2 minutes)
  - Move to match pre-staging
  - Perform final checks

- ## Setting up for a Match
  - 2 minutes to setup the robot in the start area and switch on

- ## Challenges and Order
  - May perform challenges in any order
  - May perform any or all of the challenges

Competition Format

- Three-minute matches

- Team can stop their robot at any time before the three-minute period and signal to the judge that they are finished with their match.

- The judge may stop the match at any time if the robot is acting in a manner that may cause injury to anyone nearby or damage to the arena or itself.

Competition Format (continued)

- After the preliminary rounds, the top eight teams will advance to a single-elimination bracket.
- The teams will be seeded based on their placing in the preliminary rounds.
- The top two teams will advance to the final round.
- The final round will be held at the awards banquet.

Scoring

- Many scoring opportunities
- In the event of a tie, the team with the lowest total time will advance.
- Points may be made in 36, 33, 30, 27, 24, 21, 18, 15, 12, 10, 9, 7, 6, 3, and 2 point increments
- No deduction points
- No penalty

Scoring (continued)

Points	Task
30	Three pedestals stacked on the duck pond statue location inside the inner circle and in any order with a pink duck on top
27	Three pedestals stacked on the duck pond statue location inside the inner circle and in any order with a yellow duck on top
27	Three pedestals stacked on the duck pond statue location inside the inner circle and in the correct order (base level – white, second level – green, third level – red)
24	Three pedestals stacked on the duck pond statue location inside the inner circle and in any order
24	Three pedestals stacked on the duck pond statue location inside the outer circle and in the correct order (base level – white, second level – green, third level – red) with a pink duck on top

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Team Participants

- There is no limit on team size for the participating team
  - Each team member should be a member of the same local student branch
  - And they must all be IEEE Region 3 student members.

- Only one team per student branch is allowed in the main competition.

- Teams that do not fit this qualification may compete in the Open category, but all team members must be IEEE members.
  - Teams including students from other regions, hobby groups, or non-students, or the robots are not associated with the local student branch

Design, Analysis, and Testing of the Competition Rules

- The SoutheastCon 2023 Chair is the lead for the design, development, testing, and analysis of the arena, robot requirements, and the competition rules.

- The Valencia College hardware team is the local branch for the Orlando hardware competition

  - The local branch is part of the team for building, testing, the arena prior to the competition.
  - The local branch will support operations of the competition during the competition.

Clarification and Design Questions

- Competition teams may contact the SoutheastCon 2023 Chair through direct email and the competition Discord site.

- The SoutheastCon 2023 Chair will post responses to questions and comments in the SoutheastCon 2023 Google Docs site.

- Answers will be in the form of two categories, clarification and contest design.
  - Clarifications relating to contest design will be posted to the Google Docs site.
  - Questions relating to contest design will be submitted to the design review, testing, and analysis.
  - Contest design changes will be communicated via official rules updates.

Communications

- Hardware competition communications will be through the SoutheastCon 2023 website, the SoutheastCon 2023 Discord site, and the SoutheastCon 2023 Google Docs site.

- The website includes official releases and notifications and links to the Discord and Google Docs sites.

- The Discord site provides an open channel for questions, comments, and discussion.

- The Google Docs site provides a repository of rules, design, and development information.

- Information on the website and Google Docs is authoritative.
  - The website is authoritative if the information between the website and Google Docs differs.

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Schedule

Date	Milestone
March 30, 2022	Presentation / Draft to R3 SAC
April 3, 2022	Presentation / Draft to SEC Community, Discord opens for teams to join
April 17, 2022	Google Docs opens for teams to access
June 15, 2022	Competition team initial rules input deadline
June 1, 2022	Updated release of rules and software
August 1, 2022	First official release of arena and arena electronics
October 1, 2022	Frozen rules released for review Post lessons learned to Google Docs site
October 15, 2022	Competition team deadline for frozen rules review inputs
November 1, 2022	Rules frozen FAQ started
March 11, 2023	Deadline to submit fireworks videos
April 8, 2023	Deadline for teams to register

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Expectations

- I will lead a design team to build the board, analyze the concept, fine-tune the details, and provide refined rules by August 2022 with the goal of a final release by November 2022.

- I am looking forward to your input on this release. I encourage you to provide your questions and comments directly to me.

- Stephen Hopkins
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