



Competition days: May 1, 2017

The “Robo Rodeo” game is a head-to-head challenge where two teams compete separately on identical competition areas. Teams work to complete their tasks as efficiently and effectively as possible. The robot is the cornerstone of the competition. Teams are given the game rules and contest mat in advance and teams design, prototype, build, program, and test their robots prior to the competition date. With these built and programmed robots, teams compete against one another via Distance Learning equipment and the top 4 teams will compete head-to-head on-site at the Coding Club showcase on **May 22, 2017**. All robots must be built and programmed by students with sponsors or mentors serving only to advise.

General Rules

1. Teams are comprised of up to FIVE students and are led by at least ONE team sponsor.
2. Students are not allowed to be part of multiple teams.
3. Two teams from each school may compete in the District challenge. If you have more than two teams interested, then we recommend holding a campus-based contest to determine the top two qualifying teams.
4. Only FBISD middle school robotics students are allowed to touch the robot, computer and iPad that is used to program it – the only exception is when technical problems with the computer occur. Student problem solving is the spirit of this competition!
5. Teams are allowed to use exactly ONE LEGO Mindstorms EV3 or NXT kit to build their robot.
6. Teams are not allowed to melt, deform, cut, bend, glue, solder, or otherwise alter LEGO elements or competition pieces (plastic and electrical) for use in the competition.
7. Teams are not allowed to use extra items (tape, string, rubber bands, etc.).
8. Teams are not allowed to use remote controls to move the robot; it should be programmed to run autonomously.
9. Students are responsible for setting up the mat for each event.
10. Teams are allowed to tape the mat to the floor using painter’s tape, masking tape or scotch tape. **You may not use duct tape.** You may use the tape only to secure the perimeter of the mat. The tape must not touch any of the mat markings.

Robo Rodeo Description

In Robo Rodeo, a team’s robot will compete in three separate events on the competition mat. The events will be played in order. All events do not need to be attempted or completed. Each task completed by the robot accumulates points. The points for each event will be assessed as the game is played. Design, build, and program a robot to master each event and bring home the “Champion belt buckle”!

Game Pieces

Campuses will be provided with the supplies needed for the challenges. These supplies include 3 PVC pipes, 3 animals and 1 Lego man (advanced teams will also receive 3 small wooden blocks). Each campus will be responsible for replacements of any lost or damaged pieces.



Arena Layout

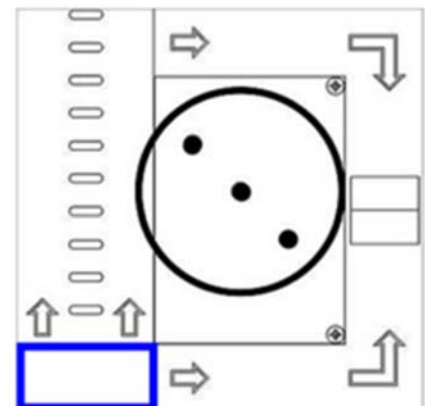
The competition arena for “Robo Rodeo” is composed of an official TCEA robotics competition mat, three PVC pipes, three animals and one Lego man. The competition mat was chosen to provide a uniform layout for the game so that teams would be able to reproduce the same environment for practice and competition. The mat will be set up for one event at a time. Once the event is completed and judged, the mat will be cleared and set up for the next event. The next several sections describe the parts of the mat and the setup instructions for each event.

Game Tasks

In “Robo Rodeo” a team’s robot will have five minutes to complete three separate events, each containing at least one task. The events will be set up in the following order: **Bronc Busting, Calf Ropin’ and Barrel Racing**. Not all games must be attempted or completed. Each task completed by the robot accumulates points, and the points for each game will be assessed as the game is played. Some tasks will allow for the opportunity to earn partial points, while others require the entire task to be completed before any points are awarded.

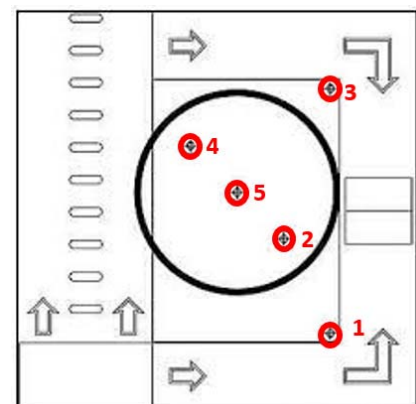
The Starting Chute

The starting chute is where your robot will start and finish each game. This area is selected in blue on the diagram to the right. To begin each game, robots must have at least one drive wheel touching the chute area on the mat in order to be considered “IN” the chute. Robots can earn additional points if they return to the chute at the end of each event.



Bronc Busting

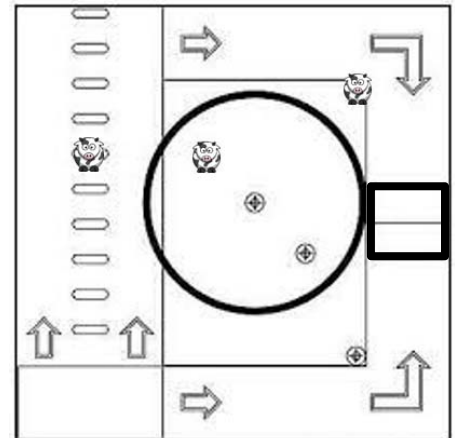
Robot will start with Lego man positioned completely on the display screen of the brick. The Lego man CANNOT be attached to the brick or any other part of the robot. If the Lego man is touching any other part of the Robot other than the brick, they are considered off the Robot. The Robot will continue going around the arena without dropping the Lego man and pass over the circles **in order from 1 to 5**. Robots can only touch each circle once. If circle is touched twice, deductions will be made. Choose your own route back to the chute (Start/Finish). Points will be given for passing over each circle with Lego man on.





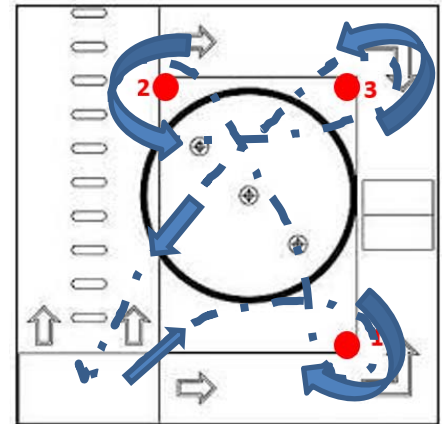
Calf Roping

Robot will need to “rope” 3 calves back to their pens. Refer to diagram on the right for placement of the calves: one on the sixth marker from the chute, one inside the black circle on circular marker farthest from the “pen”, and one on the far right corner of the large rectangle in comparison to the chute. The Robot will push the calves into the pen (two rectangles). Students may build an attachment for the robot to help push the calves. All four of the calves’ hooves must be inside the circle and oval. Calves can only be “roped/pushed” one at a time. Bonus points if calves are still standing up on their feet/hooves after in the pen.



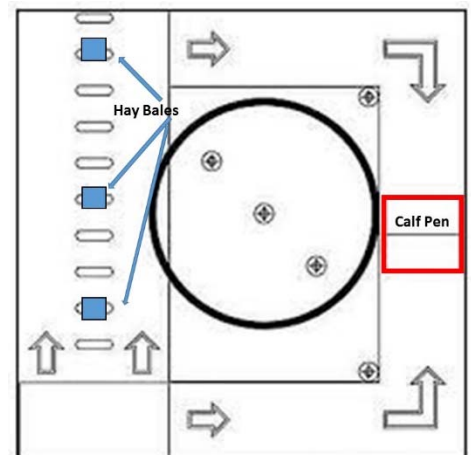
Barrel Racing

Robot will complete a cloverleaf pattern around three barrels, see diagram. The Robot will start in the chute and go around the barrels (PVC pipes), in the correct order from 1 to 3 then head back to chute. Points will be deducted if a barrel is touched and/or knocked over.



Hay Stacking (Advanced Teams Only)

Robot will begin in the chute. Robot must pick up and move each hay block to the calf pen. Hay blocks may not be pushed or pulled, and may not touch the mat in any way while being transported. All blocks must be taken to the calf pen and the robot should stack the blocks into a stack. Points for stacking will only be awarded if a stacked block is not touching the mat. Blocks must remain stacked until the robot has returned to the chute. Choose your own route back to the chute (Start/Finish). Points will be given for each block in the pen and for each block successfully stacked.





Game Specific Rules

These rules are here to define game-specific actions on top of any general rule that might be in place.

1. Teams start out with 0 points.
2. There is a **5-minute** time limit to complete all events. In the result of a tie, the time will be the tie breaker. The time will start once the student has set up the first event and stated to the Digital Learning Specialist on site that they are ready. The time will end when the student states to the specialist that they are done working through each event.
3. Students are responsible for setting up the arena (mat) before each event. They should only remove objects from the prior event and add objects for the current event.
4. Robots must start the match with at least one drive wheel inside the chute.
5. At the beginning of the match, the robot shall be no larger than a 12-inch cube, unrestrained. This means that at rest, with nothing holding any part of the robot back, the robot's dimensions measure no more than 12" x 12" x 12" in size. There is no weight limit on the robot. Once the robot is in play, there is no restriction on the size of the robot.
6. During play, team members are allowed to "recover" their robot from anywhere on the game arena, but a penalty will occur. A team is allowed to "recover" their robot no more than 5 times, and each time the robot is recovered there is a touch penalty assessed of -5 points. It is highly recommended that robots are programmed to move back to the chute after each event so that they do not incur a -5 point penalty for moving the robot back to the chute manually.
7. While the robot is in the chute, students can change programs, repair/rebuild the robot, and add or remove parts without a penalty. The robot may be started again anywhere within the chute as long as one wheel is inside the chute.
8. Teams may request to reset the rodeo arena at any time during the 5-minute time limit, but a reset will result in having to start the current event from the beginning and the time will continue to run.
9. Robots must be able to handle some field variances, such as tolerances in board length/width/height and slight waviness in the competition mat.
10. Scoring will be done after the team has signaled that they are done working through each event.



Robo Rodeo Judging Sheet

School _____ Team _____

Task 1: Bareback Riding

Robot will start with Lego man laying somewhere on the brick of the robot and is NOT ATTACHED in any way. Robot will continue going around the track without dropping the Lego man. The Robot will pass over the circles in order from 1 to 5. Choose your own route back to the chute (start/finish). Points will be given for passing over each circle. Extra points will be awarded if Lego man remains on the brick when it returns to the chute.

Robot brick passes over Circle 1 = 25 points

_____/25

Robot brick passes over Circle 2 = 25 points

_____/25

Robot brick passes over Circle 3 = 25 points

_____/25

Robot brick passes over Circle 4 = 25 points

_____/25

Robot brick passes over Circle 5 = 25 points

_____/25

At least one Robot wheel inside the Chute = 25 Points

_____/25

Deductions for circles touched more than once = -15 points

- _____

Points lost for resetting the robot (Touch Penalty rule): -5 points

- _____

Tally marks: _____

Bonus: Lego man is still on robot brick once robot returns to Chute at the finish= 50 points

_____/50

Maximum Points Awarded for this task: 200 points

_____/200

Task 2: Barrel Racing

Robot will complete a cloverleaf pattern around three barrels in the fastest time. Start in chute, go around barrels in correct order 1 to 3 then head back to chute. Points will be deducted if barrel is touched and/or knocked over. Barrels completed out of order or in the wrong direction will not count.

Points awarded for completion around the barrels.

Barrel #1 = 50 points

_____/50

Barrel #2 = 50 points

_____/50

Barrel # 3 = 50 points

_____/50

At least one Robot wheel inside the Chute = 25 Points

_____/25

Points deducted if any part of robot touches barrels -15 points

- _____

Points deducted if barrel falls over. -25 points

- _____

- _____



Points deducted for resetting the robot (touch Penalty rule): -5 points	
Tally marks: _____	
Maximum Points Possible for completion of this task: 175 points	_____/175

Task 3: Calf Ropin' Robot will push the calf into the square pen. Calves can only be "roped" one at a time. Push each calf into the square pen. Bonus points if calves are left standing up on their feet.	
1 st calf in the pen = 50 points	_____/50
Extra bonus point if calf is standing upright on feet = 25 points	_____/25
2 nd calf in the pen = 50 points	_____/50
Extra bonus point if calf is standing upright on feet = 25 points	_____/25
3 rd calf in the pen = 50 points	_____/50
Extra bonus point if calf is standing upright on feet = 25 points	_____/25
At least one Robot wheel inside the Chute = 25 Points	_____/25
Points lost for resetting the robot (touch Penalty rule): -5 points	- _____
Tally marks: _____	
Maximum Points Possible for completion of this task: 250	_____/250

Time Total	
Grand Total	



Advanced Task: Hay Stacking Robot will carry blocks of hay to calf pen. Blocks must be carried, not pushed or pulled. Additional points for stacking hay.	
1 st bale carried to the pen = 50 points	____/50
2 nd bale in carried to the pen = 50 points	____/50
Extra bonus points if calf if bale is stacked = 25 points	____/25
3 rd bale carried to the pen = 50 points	____/50
Extra bonus point for creating a stack of 3 = 50 points	____/50
At least one Robot wheel inside the Chute = 25 Points	____/25
Points lost for resetting the robot (touch Penalty rule): -5 points	- ____
Tally marks: _____	
Maximum Points Possible for completion of this task: 250	____/250