JBC– Challenge 1 *Tag You're It*

Ability Level: Introductory

Setup: Use Surface-A. Place a 12oz empty soda can in circle 9.

Skill: Learning to drive the robot forward and reverse a set distance. Learning to drive straight and to align the robot the same way every time.

Goal: The robot will drive to the can in circle 9, touch it, and return to the starting area.

Scoring: The lowest time to go out, touch the can and return wins.

General Rules:

1. All robot's must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time. At least one team member must remain with the judge for 5 minutes. Other team members may leave the area to make changes within the 5 minutes.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team within the 5 minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The robot's drive wheels must completely leave the starting box (crossing over and no longer touching the black line marking the starting box).
9. The judge must be able to tell that the can was touched by the robot, either visually (the can moved) or audibly (the robot touching the can made a noise).
10. The can must not tip over and some part of the can must remain in the circle, or that team does not score in that run.
11. Time will stop when the whole robot is completely behind the inside vertical projection of the start line.

Completion: Participants will receive a completion award when the robot touches the can and returns behind the starting line.

JBC– Challenge 2 *Ring Around the Can*

Ability Level: Introductory

Setup: Use Surface-A. Place a 12oz empty soda can in circle 6.

Skill: Learning to turn.

Goal: The robot will drive out and around the can in circle 6, and return to the starting area.

Scoring: The lowest time to go out, around the can and return wins.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time. At least one team member must remain with the judge for 5 minutes. Other team members may leave the area to make changes within the 5 minutes.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team within the 5 minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The entire robot must go around the far side of the can.
9. The can must not tip over and some part of the can must remain in the circle, or that team does not score in that run.
10. Time will stop when the whole robot is the completely behind the inside vertical projection of the start line.

Completion: Participants will receive a completion award when the robot drives around the can and returns behind the starting line.

JBC– Challenge 3 *Precision Parking*

Ability Level: Developing

Setup: Use Surface-A.

Skill: Making precision turns and movements.

Goal: The robot will drive into the smallest colored box (or garage) without touching the solid lines marking the 3 sides of the garage and stop. You will only attempt to park in one garage per run.

Scoring: Teams will first be ranked by the color of garage successfully entered in this order: yellow first, blue second and green third. If more than one team should enter the same garage, ties will be broken by the time to get into the garage. The fastest time into the yellow garage will always win.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time. At least one team member must remain with the judge for 5 minutes. Other team members may leave the area to make changes within the 5 minutes.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team within the 5 minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The team must declare which garage they intend to park in before starting a run, only attempting one color of garage per run.
9. The robot may not touch the sold lines marking the 3 sides of the garage the team intends to enter. A robot may pass over (but not touch) the vertical projection of the solid lines of the selected garage. A robot may drive over the dotted line of the selected garage. All lines from undeclared garages will be ignored.
10. Time will stop when driving wheels from the robot are touching the surface inside the solid lines and dotted line for that garage and the robot has come to a complete stop. Teams will need to make sure the judges understand which wheels are the driving wheels.

Completion: Participants will receive a completion award when the robot successfully parks in any of the garages.

JBC– Challenge 4 *Can Slalom*

Ability Level: Developing

Setup: Use Surface-A. Place 3 empty 12oz soda cans in circles 2, 6, and 9.

Skill: Precision robot driving, recognizing repeated actions.

Goal: The robot will weave in and out of the cans slalom style, round the last can and drive straight back behind starting line.

Scoring: The lowest time to slalom out, round can 9, and drive straight back across the start line wins.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time. At least one team member must remain with the judge for 5 minutes. Other team members may leave the area to make changes within the 5 minutes.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team within the 5 minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The entire robot must weave around the cans (slalom) until the robot makes it around can #9 at which point the robot can head straight for the starting line.
9. The cans must not tip over and some part of each can must remain in the circle, or that team does not score in that run.
10. Time will stop when the whole robot is behind the inside vertical projection of the start line.

Completion: Participants will receive a completion award when the robot drives through all the cans and returns behind the starting line.

JBC– Challenge 5 *Load 'Em Up*

Ability Level: Developing

Setup: Use Surface-A. Place 3 empty 12oz soda cans in circles 2, 9, and 10.

Skill: Precision robot driving, engineering an effector to push cans.

Goal: The robot will manipulate the can in front of each garage into the garage. Put the can from circle 2 into the green garage, can 9 into the blue garage, and can 10 into the yellow garage. You will attempt all cans in a single run.

Scoring: Teams will first be ranked by the number of garages with cans in them. If more than one team should put the same number of cans into garages, ties will be broken by the time it took to get the last can get into the last garage. The fastest time to put the three cans in the three garages will always win.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time. At least one team member must remain with the judge for 5 minutes. Other team members may leave the area to make changes within the 5 minutes.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team within the 5 minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The team must declare which garages they intend to put cans in before starting a run.
9. The cans must not tip over and some part of each can must remain in the inside edge of the solid and dotted lines denoting the garage touching the surface, or that can does not score in that run. If a tipped can was the last intended target, time will stop when the can stops or leaves the game surface.
10. Time will stop when the last declared can has come to a stop.
11. The robot may be touching cans at the end of the round.

Completion: Participants will receive a completion award when the robot successfully manipulates two of the cans into two of the garages in one run.

JBC– Challenge 6 *Bulldozer Mania*

Ability Level: Developing

Setup: Use Surface-A. Place 1 empty 12oz soda can in each numbered circle (12 cans total).

Skill: Precision robot driving, engineering effectors (blades, claws etc.).

Goal: The robot will manipulate all 12 cans behind the starting line on the surface.

Scoring: Teams will first be ranked by the number of cans behind the line. If more than one team should move the same number of cans behind the start line, ties will be broken by the time taken to move the third can behind the starting line.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time. At least one team member must remain with the judge for 5 minutes. Other team members may leave the area to make changes within the 5 minutes.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team within the 5 minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The robot's drive wheels must completely leave the starting box (crossing over and no longer touching the black line marking the starting box).
9. The cans must not tip over and some part of each can must touch the surface and be behind the start line, or that can does not score in that run.
10. Time will stop when the third can has come to a stop behind the starting line.
11. The robot may be touching cans at the end of the round.

Completion: Participants will receive a completion award when the robot manipulates three upright cans behind the starting line in one run.

JBC– Challenge 7 *Walk the Line*

Ability Level: Developing

Setup: Use Surface-B.

Skill: Using a reflectance sensor.

Goal: The robot will follow the black line from start to finish.

Scoring: Teams will first be ranked by the number of colored lines touched with the driving wheels. If more than one team should cross the same number of colored lines, ties will be broken by time to touch the blue line. The fastest time to follow the black line to the blue line and then continuing on to the finish line will always win.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time. At least one team member must remain with the judge for 5 minutes. Other team members may leave the area to make changes within the 5 minutes.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team within the 5 minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The robot must be following the line. Dead reckoning will not be allowed and will result in a disqualification. If the judge believes dead reckoning is occurring, he will immediately check the code running on the robot.
9. Time will stop when the driving wheels touch the blue line.
10. Lines are only counted as touched if all the driving wheels touch the colored line.

Completion: Participants will receive a completion award when the robot's drive wheels touch the blue line.

JBC– Challenge 8 *Clear the Way*

Ability Level: Advanced

Setup: Use Surface-B. Place one can where each colored line intersects the black line (4 cans total).

Skill: Line following and sensing when you have reached a can.

Goal: The robot will follow the black line, detect each can, and manipulate each can behind the start line.

Scoring: Teams will first be ranked by the number of cans upright behind the start line. If more than one team should score the same number of cans, ties will be broken by time to score the first can. The fastest time to score the first can and then scoring all other three cans will always win.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time. At least one team member must remain with the judge for 5 minutes. Other team members may leave the area to make changes within the 5 minutes.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team within the 5 minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The robot must be following the line on the way out to collect cans. Dead reckoning will not be allowed and will result in a disqualification. If the judge believes dead reckoning is occurring, he will immediately check the code running on the robot.
9. Robots do not have to follow the line back once they have retrieved a can.
10. After retrieving a can, the robot can be repositioned for the next run (can) as long as it is behind the vertical projection of the starting box.
11. Time will stop when the first upright can has stopped moving and is behind the start line.
12. The cans must not tip over and each can must remain behind the starting line touching the surface, or that can does not score in that run.

Completion: Participants will receive a completion award when 1 can is placed upright behind the starting line.

JBC – Challenge 9 *Keep it Straight*

Ability Level: Introductory

Setup: Use Surface-B.

Skill: Driving the robot in a straight line.

Goal: The robot will drive in a straight line without touching the Line B (blue line) with either wheel.

Scoring: The fastest time to drive out past the black line and drive back past the starting line without touching Line B (blue line) wins.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start with the wheels straddling the blue line (Line B) and completely behind the vertical projection of the inside of the green “Start” line.
8. The robot must drive to the end of the mat (indicated as past the black line) and come back past the green “Start” line without any drive wheels touching Line B (blue line). While turning the robot wheels may touch Line B as long as it is on the outside of the black line.
9. Time will stop when all of the robot passes the black line before turning around to come back.

Completion: Participants will receive a completion award when the robot drives to the end of the mat (past the black line) without any drive wheels touching Line B (Blue line).

JBC – Challenge 10 *Serpentine*

Ability Level: Developing

Setup: Use Surface-A.

Skill: Make precision turns <90° and >90°.

Goal: The robot will drive on the surface touching each of the numbered red circles with at least one of the robot's wheels in sequential order (1, 2, 3, etc.).

Scoring: Teams will first be ranked by the number of circles completed. If more than one team should complete all of the circles (1 - 12 in the correct order) ties will be broken by the time taken to touch circles 1 - 8.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The robot must touch each circle with at least one drive wheel in the correct order.
9. Time will stop when the last circle (#8), is touched by the robot's drive wheel.

Completion: Participants will receive a completion award when the robot drives through (touches with at least one drive wheel) circles 1-8 in the correct order in one run.

JBC –Challenge 11 *Trace the Outline*

Ability Level: Developing

Setup: Use Surface-B.

Skill: Precision robot driving.

Goal: The robot will drive on the surface outside of the black line, touching each of the colored lines (A, B, C, D) with at least one of the robot's drive wheels in alphabetical order (A, B, C, D). If you touch the black line with any wheel the run ends.

Scoring: Teams will first be ranked by the number of lines touched. If more than one team should complete touching all of the lines, ties will be broken by the fastest time to touch the line C.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start with the wheels outside the black line and completely behind the vertical projection of the inside of the green "Start" line.
8. The run ends if any of the robot's wheels touches the black line(s).
9. The robot must touch each colored line (A, B, C, D) with at least one drive wheel in the correct order.
10. Time will stop when the robot's drive wheel touches Line C.

Completion: Participants will receive a completion award when the robot drives around the black line and touches the first three of the colored lines with at least one drive wheel in the correct order (A, B, C).

JBC – Challenge 12 *Clean the Mat*

Ability Level: Developing

Setup: Use Surface-A. Place 5 empty 12oz soda cans in circles 2, 5, 8, 10, and 11.

Skill: Precision robot driving, engineering effectors (blades, claws etc.).

Goal: The robot will find cans and push them into a single colored garage.

Scoring: Teams will first be ranked by the color of garage they push cans into with orange scoring more than blue and blue more than green. If more than one team should complete pushing cans into the orange garage the team with the most cans in the garage will win. If the number of cans in the orange garage is a tie than the shortest time to push 4 cans into the garage is the winner.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The team must declare which garage (green, blue or orange) they are going for.
9. Cans count as being in the garage when they are upright and inside or touching the colored lines (including the dashed line) of the declared garage
10. Time will stop when the fourth can is pushed into the declared garage.

Completion: Participants will receive a completion award when they have pushed at least 4 cans into the declared garage in one run.

JBC – Challenge 13 *Off the Line*

Ability Level: Developing

Setup: Use Surface-B. Place 6 empty 12oz soda cans approximately centered on the dashed blue line (line B) starting at the first dash on the mat by the Finish line and on every 3rd dash thereafter.

Skill: Precision robot driving, engineering effectors (blades, claws etc.).

Goal: The robot will find cans that are placed on dashed blue line (line B) and push them until they are on or touching a black line.

Scoring: Teams will first be ranked by the number of cans touching the black line, if there is a tie the shortest time to have 4 cans touching the black line will be the winner.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-Mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the green start line with the robot wheels straddling the black line.
8. Cans count as being on the black line when they are upright and the can is touching the black line.
9. Time will stop when the fourth can is touching a black line.

Completion: Participants will receive a completion award when they have at least 4 cans touching a black line.

JBC – Challenge 14 *Add it Up*

Ability Level: Developing

Setup: Use Surface-A.

Skill: Precision robot driving and using a servo.

Goal: Drive the robot to the numbered circles on the mat (doesn't have to be sequential), and then use a servo to touch the circles.

Scoring: Each circle touched by the use of a servo will score the circle number in points (1 - 12). Points are summative for the run. Teams will first be ranked by the total number of points they accrue. If there is a tie, the shortest time to touch circles cumulatively worth 20 points wins.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-Mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. Robots must use a servo to lower an effector to touch the circle (it cannot be something that is always dragging or always touching the surface)
9. To count as touching a circle part of the robot must be lowered by a servo and touch either inside the red circle or on any part of the red circle line itself.
10. You can only touch one circle at a time. Any robot that touches two or more circles at the same time will not get points for the touch.
11. Time will stop when a circle is touched that brings the total sum of touch points to 20 or more for that run.

Completion: Participants will receive a completion award when they have accrued 20 or more touch points in one run.

JBC – Challenge 15 *Rescue the Cans*

Ability Level: Advanced

Setup: Use Surface-A. Place 4 empty 12oz soda cans in circles 2, 9, 10, and 12. Place a standard 8.5" x 11" ream of paper in the starting box.

Skill: Precision robot driving, engineering effectors utilizing two servos.

Goal: The robot will find the cans, pick them up and place them on top of a platform.

Scoring: Teams will first be ranked by the number of cans on the platform. If the number of cans on the platform is a tie then the shortest time to rescue the first 2 cans is the winner.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-Mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The students will position a full ream of standard 8.5" x 11" copy paper inside the boundaries of the starting box lying flat.
9. Cans are retrieved and count as placed on the platform when they are upright and touching the top of the ream of paper but not touching the mat, tape, or floor surface.
10. Robots can hold the can(s) in place.
11. Students can reset their robot in the starting box after it has successfully placed a rescue can on the platform to go for additional cans.
12. Time will stop when the second can is counted as touching the surface of the platform.

Completion: Participants will receive a completion award when they have at least 2 cans upright and touching only the top surface of the platform.

JBC – Challenge 16 *Mountain Rescue*

Ability Level: Advanced

Setup: Use Surface-A. Place a full ream of standard 8.5" x 11" copy paper inside the blue garage so that it is touching the solid side and back lines of the garage and extends over the dashed line. Place 3 empty 12oz soda cans on top of the ream of paper.

Skill: Precision robot driving, engineering effectors utilizing two servos.

Goal: The robot will get the cans off of the platform and bring them to the starting box.

Scoring: Teams will first be ranked by the number of cans rescued. If the number of cans rescued is a tie than the shortest time to rescue the first can is the winner.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-Mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The 3 empty cans will be placed by the students onto the top of the ream of paper prior to the start of their run.
9. Cans are considered to be on the top of the platform if the cans are upright, touch the top surface of the platform, and do not touch the surface of the mat, tape, or floor.
10. Cans are rescued and count as placed in the starting box the when they touch the surface of the starting box.
11. Once a can is rescued, students can remove the can set it aside and reset their robot in the starting box to go after additional cans.
12. Time will stop when the first rescued can is touching the surface of the starting box.

Completion: Participants will receive a completion award when they have rescued at least one can and brought it back to the starting box.

JBC – Challenge 17 *Tag and Bring Home*

Ability Level: Developing

Setup: Use Surface-A. One empty 12oz soda can randomly placed in circle 2, 6, or 11.

Skill: Precision robot driving, using a touch sensor.

Goal: The robot will go out, sense the can, and then return it to the starting box.

Scoring: Teams will first be ranked by the number of cans returned. If the number of cans returned is a tie than the shortest time to retrieve the first two cans is the winner.

General Rules:

1. All robots must be autonomous (no remote controls, wireless communication, or touching the robot after starting a run).
2. Robots may drive off the mat during a run. Non-Mat surface will be specified (size, carpet, etc.) on the local event page.
3. Only 1 robot is permitted to run at a time. Teams may change parts or robots between runs or challenges, but only 1 robot may be on the challenge surface at a time.
4. Teams will have 5 minutes to complete as many runs as they wish. Time will start after checking in with the judges and will include all set up time.
5. At any point during a run the team may forfeit the score for the run by picking up their robot. Teams are then allowed to start a new run, time permitting.
6. Only the highest scoring run from each team with in the 5-minute time limit will be counted toward the challenge and overall awards.

Challenge Rules:

7. The robot must start completely behind the vertical projection of the inside of the start line.
8. The students must have their robot lined up and ready to go before the judge places the can on the mat.
9. Once the can is placed, the team starts the robot (team cannot reposition, change program, etc.).
10. If the robot brings the can back to the starting box (can must break the vertical projection of the inside outside boundary of the starting line) the team can remove the can and reposition their robot for another run.
11. The judge will take the can and place it again at random in circle 2, 6, or 11 (except not in the same circle as any previous successful runs).
12. Time will stop when the first two cans have been returned.

Completion: Participants will receive a completion award when they have returned at least two cans and brought them back to the starting box.