

# Junior Botball® Challenge 1

## *Tag, You're It!*

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

**Skills:** Learning to drive the robot forward and reverse a set distance. Learning to drive a straight and 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.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot's drive wheels must completely leave the starting box (crossing over and no longer touching the black line marking the starting box).
4. The teacher/volunteer must be able to see or hear the robot touch the can (the can moved or the robot made a noise when it touched the can).
5. The can must not tip over and some part of the can must remain in the circle for the team to achieve completion.



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# Junior Botball<sup>®</sup> Challenge 2

## *Ring Around the Can*

**Setup:** Use Surface-A. Place a 12 oz. 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.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The entire robot must go around the far side of the can.
4. The can must not tip over and some part of the can must remain in the circle for the team to achieve completion.



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# Junior Botball® Challenge 2B

## *Ring Around the Cans, Sr.*

**Setup:** Use Surface-A. Place a 12 oz. empty soda can in circles 12, 11, and 10.

**Skill:** Learning to turn.

**Goal:** The robot will drive out and around the cans in circles 12, 11, 10, and return to the starting area.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The entire robot must go around the far side of the cans.
4. The cans must not tip over and some part of each can must remain in the circle for the team to achieve completion.



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# Junior Botball® Challenge 2C

## *Back It Up*

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

**Skill:** Learning to turn and drive in reverse.

**Goal:** The robot will drive backwards, (reverse) around the can in circle 6, and return to the starting area.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The entire robot must go around the far side of the can in reverse.
4. The can must not tip over and some part of the can must remain in the circle for the team to achieve completion.



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# Junior Botball<sup>®</sup> Challenge 2D

## *Ring Around the Can and Back It Up*

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

**Skill:** Learning to turn and drive in forward and reverse.

**Goal:** The robot will drive around the can in circle 6. After returning to the starting area it will go in reverse around the can in circle 6, and return to the starting area.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The entire robot must go around the far side of the can in forward and in reverse.
4. The can must not tip over and some part of the can must remain in the circle for the team to achieve completion.



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# Junior Botball® Challenge 3

## *Precision Parking*

**Setup:** Use Surface-A.

**Skill:** Making precision turns and movements.

**Goal:** The robot will successfully park in at least two of the garages. .

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The team/student must declare which garage they intend to park in before starting a run, **only attempting** one color of garage per run. If they attempt to park in both garages in one run they must go back to the start line and then continue to the second garage.
4. The robot may **not touch** the solid 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.



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# Junior Botball<sup>®</sup> Challenge 3B

## *Parallel Parking*

**Setup:** Use Surface-A.

**Skill:** Making precision turns and movements.

**Goal:** The robot will successfully parallel park on the side of at least two of the garages. .

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The team **must declare** which garage they intend to parallel park by before starting a run, **only attempting** one color of garage per run.
4. The robot may **not touch** the solid lines marking the 3 sides of the garage the team intends to parallel park by. All lines from undeclared garages will be ignored.
5. **A successful parallel park occurs when the robot moves past the garage (all parts of the robot must go past the end) and then backs into the “space” with less than 2” between the line of the garage (wall) and the entire length of the chassis without touching any part of the solid line of the garage.**



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# Junior Botball<sup>®</sup> Challenge 3C

## *Quick Get Away!*

**Setup:** Use Surface-A.

**Skill:** Making precision turns and movements.

**Goal:** The robot will successfully park by driving out to the garage and turning 180 degrees and backing into the garage. It must successfully park in at least two of the garages.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The team **must declare** which garage they intend to park in before starting a run, **only attempting** one color of garage per run. If they attempt to park in both garages in one run they go back to the start line and then continue to the second garage.
4. The robot may **not touch** the solid 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.
5. The robot must stop in front of the garage and then turn 180 degrees and back up into the garage.



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# Junior Botball® Challenge 4

## *Figure Eight*

**Setup:** Use Surface-A. Place 2 empty 12 oz. soda cans in circles 4 and 9.

**Skill:** Precision robot driving, recognizing repeated actions.

**Goal:** The robot will weave in and out of the cans in the pattern of a figure 8 going out **AND** coming back. The robot must end with all parts back **BEHIND** the starting line.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The entire robot must weave around the cans in a figure 8 pattern going out AND coming back. The robot must end with all parts back **BEHIND** the starting line. The cans are placed on circles 4 and 9.
4. The cans must not tip over and some part of each can must remain in the circle, or that team does not complete that run.



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# Junior Botball<sup>®</sup> Challenge 4B

## *Barrel Racing*

**Setup:** Use Surface-A. Place 3 empty 12 oz. soda cans in circles 8, 9, and 5.

**Goal:** The robot will start behind the starting line and take a path to go;

- around the can in circle 8 (clockwise)
- around the can in circle 5 (counter clockwise)
- around the can in circle 9 (counter clockwise)
- go back across the start/finish line

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot will go around cans on circles 5 ,8, and 9 and then return across the start/finish line. The robot will start behind the starting line and take a path to go around the can in circle 8 (clockwise), around the can in circle 5 (counter clockwise), around the can in circle 9 (counter clockwise), and back across the start/finish line.
4. The cans **must not tip over** and some part of each can must remain in the circle, or that team does not complete that run.



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# Junior Botball<sup>®</sup> Challenge 5

## *Dance Party*

**Setup:** Use Surface-A. No game pieces required.

**Skill:** Motor and servo control and movement.

**Goal:** The robot must “dance” along with the music.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The students must provide their own music clip that plays loud enough for the judges to hear. Music clips can be played from a cell phone or the students can provide live music (singing).
4. The robot must leave the starting box before completing the dance moves and must complete all of the following moves:
  - a. Must complete at least one 360 degree clockwise turn
  - b. Must complete at least one 360 degree counter clockwise turn
  - c. Must move forward
  - d. Must move backward
  - e. Must wave the servo (up and down at least once)



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# Junior Botball® Challenge 5B

## *Line Dance*

**Setup:** Use Surface-A. No game pieces required.

**Skill:** Motor and servo control and movement.

**Goal:** The students and the robot will line dance.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The student's verbally call and do the line dance with the robot.
4. The robot must leave the starting box before completing the dance moves and must complete all of the following moves:
  - a. Must complete at least one 360 degree clockwise turn
  - b. Must complete at least one 360 degree counter clockwise turn
  - c. Must move forward multiple times (more than 5)
  - d. Must move backward multiple times (more than 5)
  - e. Must turn to the right multiple times (more than 5)
  - f. Must turn to the left multiple times (more than 5)
  - g. Must wave the servo (up and down at least three times)
  - h. Be creative and have fun



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# Junior Botball<sup>®</sup> Challenge 5C

## *Synchronized Dancing*

**Setup:** Use Surface-B. No game pieces required.

**Skill:** Team work, motor and servo control and movement.

**Goal:** Two robots must synchronize dance.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The students must provide their own music clip that plays loud enough for the judges to hear. Music clips can be played from a cell phone or the students can provide live music (singing).
4. Using the Surface-B, one robot must be stay on each side of the mat (blue line divides mat) and must dance together.
5. The robots must complete the dance moves together and must complete all of the following moves:
  - f. Must complete at least one 360 degree clockwise turn
  - g. Must complete at least one 360 degree counter clockwise turn
  - h. Must move forward
  - i. Must move backward
  - j. Must wave the servo (up and down at least once)



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# Junior Botball® Challenge 6

## *Load 'Em Up*

**Setup:** Use Surface-A. Place 3 empty 12 oz. 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.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The team must declare which garages they intend to put cans in before starting a run.
4. 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 count towards completion.
5. The robot may be touching cans at the end of the round.



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# Junior Botball® Challenge 6B

## *Pick 'Em Up*

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

**Skill:** Precision robot driving, engineering an effector to pick up cans.

**Goal:** The robot will pick up the can in front of each garage and then place them into the a garage. Pick up the can from circle 2 place it into the green garage, the can from circle 9 into the blue garage, and the can from circle 10 into the yellow garage. You will attempt all cans in a single run. The cans must be upright (vertical) after placement. .

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. **The team must state which garages** they intend to put cans in before starting a run.
4. 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 count towards completion.
5. The robot may be touching cans at the end of the round.



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# Junior Botball<sup>®</sup> Challenge 6C

## *Empty the Garage*

**Setup:** Use Surface-A. Place 3 empty 12 oz. soda cans in garages.

**Skill:** Precision robot driving, engineering an effector to pick up cans.

**Goal:** The robot will pick up the can in each garage and place it on the circle in front of the garage. The cans must be upright (vertical) after placement. At least two cans need to be placed in front of the garages.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The cans must not tip over and some part of the can must be touching the circle in front of the garage.
4. The robot may be touching cans at the end of the round



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# Junior Botball® Challenge 7

## *Bulldozer Mania*

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

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

**Goal:** The robot will manipulate at least **three** upright cans behind the starting line in one run.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot's drive wheels must completely leave the starting box (crossing over and no longer touching the black line marking the starting box).
4. The cans must not tip over and some part of each can must touch the surface and be behind the start line (actual or virtual within the 8' enclosure), or that can does not count towards completion.
5. The robot may be touching cans at the end of the round.



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# Junior Botball® Challenge 7B

## *Cover Your Bases*

**Setup:** Use Surface-A. Place 7 empty 12 oz. soda can anywhere on the black starting line.

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

**Goal:** The robot will manipulate at least 5 upright cans back to the circles 1-7.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The cans are to be placed by students anywhere on the black line of the starting box.
4. The robot cannot be touching a can before starting.
5. The robot's drive wheels must completely leave the starting box (crossing over and no longer touching the black line marking the starting box).
6. The cans must not tip over and some part of each can must touch the circle.
7. Only one can per circle.
8. The robot may be touching a can at the end of the round.



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# Junior Botball<sup>®</sup> Challenge 8

## *Serpentine*

**Setup:** Use Surface-A.

**Skill:** Make precision turns  $<90^\circ$  and  $>90^\circ$ .

**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.) through 8.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot must touch each circle with at least one drive wheel in the correct order through 8 for completion.



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# Junior Botball<sup>®</sup> Challenge 8B

## *Serpentine Jr.*

**Setup:** Use Surface-A.

**Skill:** Make precision turns

**Goal:** The robot will drive on the surface touching or straddling each of the numbered red circles with at least one drive wheel (straddle-a wheel on each side of the circle)

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot must touch or straddle each circle with at least one drive wheel (straddle- a wheel on each side of the circle) in the correct order through 5 for completion.



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# Junior Botball<sup>®</sup> Challenge 9

## *Add it Up*

**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.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. 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) and **accrue 20** or more points.
4. 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.
5. 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.



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# Junior Botball® Challenge 9B

## *Balancing Act*

**Setup:** Use Surface-A.

**Skill:** Precision robot driving and using a servo.

**Goal:** Drive the robot to the numbered circles on the mat and then use a servo to touch the circles to create a balanced equation.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. 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).
4. 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.
5. 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.
6. You can not repeat circles.



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# Junior Botball<sup>®</sup> Challenge 10

## *Solo Joust*

**Setup:** Use Surface-B. Place one empty 12 oz. soda can on the black line between the text “Line B” and the B in “Botball<sup>®</sup>”.

**Skill:** Driving the robot in a straight line, and manipulating a can.

**Goal:** The robot will drive without touching Line B (blue line) with either wheel and knock over a can on the other side of the blue line.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot must start with the wheels on the green line side of the blue dotted line (Line B) and be completely behind the vertical projection of the inside of the green “Start” line and the blue dotted line. The arm may not project over the solid line or blue line until after the entire robot has crossed the start line.
4. The robot must drive to the end of the mat (indicated as past the black line) and tip over the can without any drive wheels touching Line B (blue line).



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# Junior Botball® Challenge 10B

## *Solo Joust Jr.*

**Setup:** Use Surface-B. Place empty 12 oz. soda cans on the intersection of the colored lines (purple, yellow, red, green) with the Black lines on the B mat.

**Skill:** Driving the robot in a straight line.

**Goal:** The robot will drive, straddling line B (blue line) without either wheel touching the line and knock over at least 2 cans (2 of the 4) on the colored A-D lines.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot will start off the mat. It will straddle the blue line without touching the blue line until it reaches the far end of the mat.
4. Cans will be placed on the intersection of the black and colored lines.



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# Junior Botball® Challenge 11

## *Be Happy*

**Setup:** Use a 2' x 4' sheet of butcher paper. Attach a marker to the robot.

**Skill:** Driving and operating a servo.

**Goal:** The robot will drive on the butcher paper while manipulating the marker to draw a smiley face ☺

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot must make at least 3 separate marks that could be construed as a smiley face – two eyes and a mouth.



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# Junior Botball® Challenge 11B

## *Tis the Season*

**Setup:** Use a 2' x 4' sheet of butcher paper. Attach a marker to the robot.

**Skill:** Driving and operating a servo.

**Goal:** The robot will drive on the butcher paper while manipulating the marker to draw a seasonal object (Ghosts, jack-o-lantern, leaf, pumpkin, umbrella). This will be determined and posted before the Challenge day. Rules will be provided to say what makes the object that object (constraints of the drawing).

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. If the team doesn't complete the challenge, they may leave the enclosure area and can return and retry the challenge later.
4. The robot must make the marks that represents the desired seasonal object.
5. **Teams must provide their own marker and effector** to hold it.
6. Additional Rules will be given when posted as a Challenge Day.



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# Junior Botball® Challenge 12

## *Unload 'Em*

**Setup:** Use Surface-A. Place one empty 12 oz. soda can in each of the three garages.

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

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

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The cans must be placed in each garage before starting a run.
4. The cans must not tip over and some part of each can must remain in the inside edge of the circle and be touching the surface, or that can does not score in that run.
5. The robot may be touching cans at the end of the round.



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# Junior Botball® Challenge 13

## *Clean the Mat*

**Setup:** Use Surface-A. Place 5 empty 12 oz. 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.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The team must declare which garage (green, blue or orange) they are going for before starting the program.
4. 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



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# Junior Botball® Challenge 14

## *Recycle & Make Friends*

**Setup:** Use Surface-A. Green, blue, and yellow paper of any size on the robot

**Skill:** Precision navigation and fine manipulation.

**Goal:** The robot will drive to each colored garage and deposit a matching colored piece of paper inside the garage.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot can drive over the garages.
4. Each paper should be labeled or colored to indicate the color of garage it matches.
5. The paper can be any size, but the robot can only start with one of each color.
6. The robot does not have to deposit all three colored papers in one run.



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# Junior Botball® Challenge 14B

## *Recycle Paper*

**Setup:** Use Surface-A. Green, blue, and yellow (8 x 11) crumpled paper

**Skill:** Precision navigation and fine manipulation.

**Goal:** The robot will drive to each colored garage, find the corresponding paper, and bring it back to the start area.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot can drive over the garages.
4. The robot does not have to deposit all three colored papers in one run.



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# Junior Botball® Challenge 15

## *Tag and Bring Home*

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

**Skill:** Precision robot driving, using a sensor.

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

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The students must have their robot lined up and ready to go before the judge places the can on the mat. **The students must be using a sensor to detect the cans. They may not change the program once they set down the robot.**
4. Once the can is placed, the team starts the robot (**team cannot reposition, change program, etc.**).
5. If the robot brings the can back to the starting box (can must break the vertical projection of the inside boundary of the starting line) the team can remove the can and reposition their robot for another run.
6. A second run will occur and a can will be placed at random in circle 2, 6, or 11 (except not in the same circle as any previously successful runs).



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# Junior Botball® Challenge 15B

## *Bump Bump*

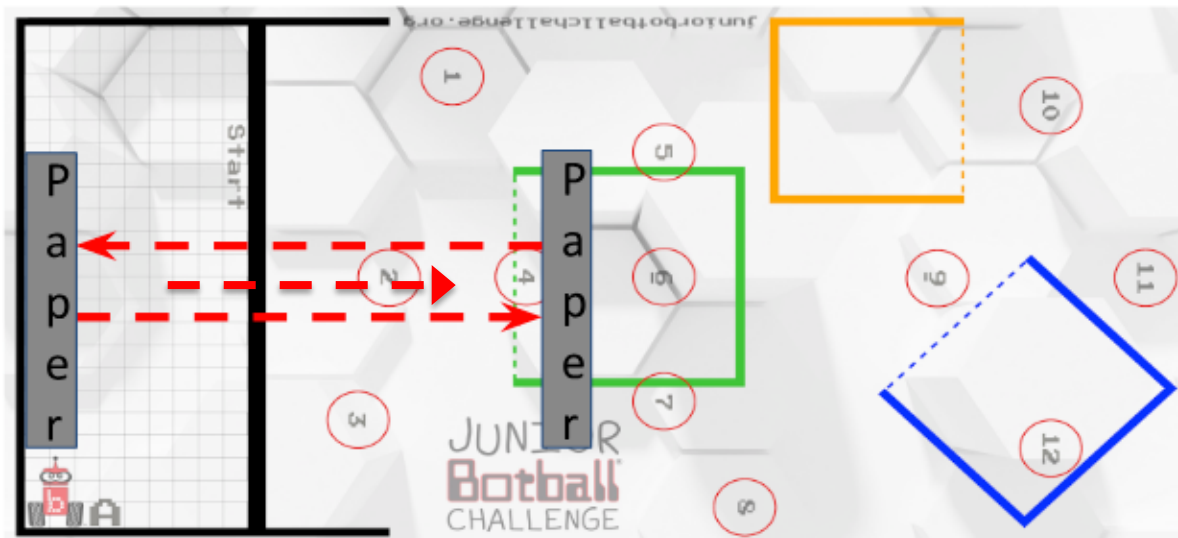
**Setup:** Use Surface-A.

**Skill:** Precision robot driving, using a sensor.

**Goal:** The robot leaves the starting box, touches the ream of paper using a touch sensor, visibly pauses, and backs up and then touches the other ream of paper, visibly pauses, and drive forward to circle 2.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The students must be using a sensor to detect the ream of papers. .





# Junior Botball® Challenge 16

## *Proximity*

**Setup:** Use Surface-A. One ream (500 sheets) of standard copy paper.

**Skill:** Students will learn how to use the rangefinder (ET) sensor to sense an object and stop before hitting the object

**Goal:** On two separate runs, the robot has to sense the wall (ream of paper) randomly placed on the mat and drive to it, stopping within approximately 4 1/4" (the width of a piece of paper folded in half lengthwise) of the wall without touching it.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. Once the robot is in starting position, a ream of paper is placed on edge (long side down and parallel to the starting line) at either circle 4, 6, 9, or 11.
4. Once the ream of paper is set, students can push "run" on their robot.
5. Robot must come to a complete stop within approximately 4 1/4" (the width of a piece of paper folded in half lengthwise) without touching the wall with any part of the robot.



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# Junior Botball<sup>®</sup> Challenge 16B

## *Search and Rescue*

**Setup:** Use Surface-A. One 12 oz. can

**Skill:** Students will learn how to use the rangefinder (ET) sensor to sense to find a can.

**Goal:** The robot must find the can that is randomly placed on any of the circles 1-8.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. Once the robot is in starting position, a can will be placed in a circle (1-8).
4. Robot must come to a complete stop in front of the can, pick it up, and bring it back to the start area.



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# Junior Botball<sup>®</sup> Challenge 17

## *Walk the Line*

**Setup:** Use Surface-B.

**Skill:** Using a reflectance sensor.

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

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot must be following the line using a reflectance sensor. Dead reckoning will not be allowed.
4. Lines are only counted as touched if all the driving wheels touch the colored line.



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# Junior Botball<sup>®</sup> Challenge 17B

## *Walk the Line II*

**Setup:** Use Surface-B.

**Skill:** Using a reflectance sensor.

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

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot must be following the line using a reflectance sensor. Dead reckoning will not be allowed.
4. Lines are only counted as touched if all the driving wheels touch the colored line.



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# Junior Botball<sup>®</sup> Challenge 18

## *I See Black*

**Setup:** Use Surface-A.

**Skill:** Using a reflectance sensor.

**Goal:** The robot will find the black line.

**Guidelines:**

1. The robot will randomly be placed on any of the 12 circles.
2. Robots may drive off the mat during a run.
3. The robot must find the black start line and stop.



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# Junior Botball® Challenge 19

## *Mountain Rescue*

**Setup:** Use Surface-A. Place a full ream (500 sheets) 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 12 oz. soda cans on top of the ream of paper.

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

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

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The 3 empty cans will be placed by the students on top of the ream of paper prior to the start of their run.
4. 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.
5. Cans are rescued and count as placed in the starting box when they touch the surface of the starting box and are upright.
6. 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.



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# Junior Botball® Challenge 20

## *Rescue the Cans*

**Setup:** Use Surface-A. Place 4 empty 12 oz. soda cans in circles 2, 9, 10, and 12. Place a standard 8.5" x 11" ream (500 sheets) 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.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The students will position a full ream of standard 8.5" x 11" copy paper (500 sheets) inside the boundaries of the starting box lying flat.
4. 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.
5. Robots can hold the can(s) in place.
6. Students can reset their robot in the starting box after it has successfully placed a rescued can on the platform to go for additional cans.



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# Junior Botball® Challenge 21

## *Foot\* Tall*

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

**Skill:** Grabbing and lifting objects.

**Goal:** The robot will drive out to the can and lift the can so that the lowest part of the can is over 11 inches above the mat.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. The robot must hold the can over 11 inches for 3 seconds so that the judges have time to measure.

\*A subway foot, so 11 inches.



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# Junior Botball® Challenge 22

## *Stackerz*

**Setup:** Use Surface-A. Place 2 empty 12 oz. soda cans; one in circle 5 and the other in circle 7.

**Skill:** Precision manipulating.

**Goal:** The robot will stack one can on top of the other.

**Guidelines:**

1. All parts of the robot must start **BEHIND** the vertical projection of the inside of the start line.
2. Robots may drive off the mat during a run.
3. If the team doesn't complete the challenge, they may leave the enclosure area and can return and retry the challenge later.
4. The robot's drive wheels must completely leave the starting box (crossing over and no longer touching the black line marking the starting box).
5. The bottom of the top can must be touching the top of the bottom can.
6. The robot may not be touching either can at the end of the round.



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