Minefield Challenge Design Specifications

Challenge Overview:

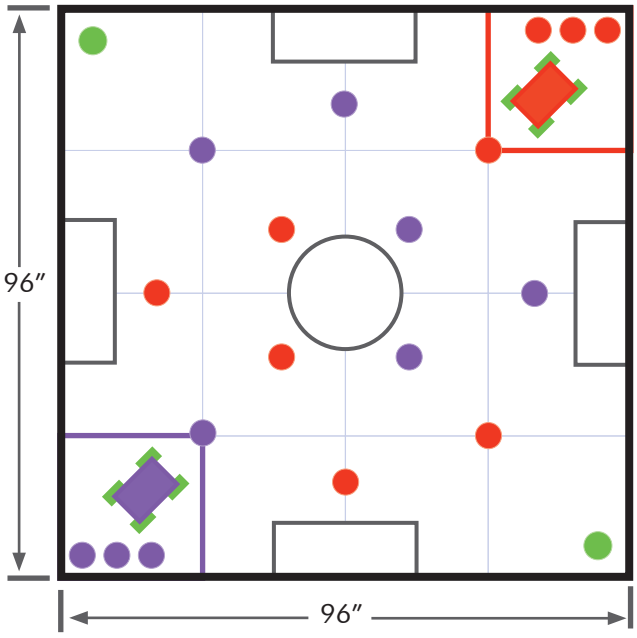
In this challenge, 14 "mines" have been placed on the board. Two robots compete on the field at a time. Each robot's task is to safely disarm and transport its set of mines to the disposal areas. A match lasts a total of **2 minutes**, broken down into a **30 second Autonomous Period** followed by a **90 second Remote Control Period**. Points are awarded based on how many mines are safely collected and disposed of during each period, with bonuses for the any points scored during the Autonomous Period.

Field Overview:

The field is an 8′ by 8′ solid frame with 6″ high walls. The central playing area is covered by sixteen 2′ x 2′ foam tiles.

A mine consists of a plastic ball resting atop a pedestal (cardboard tube or PVC pipe). Two sets of 6 mines are placed at set locations around the board, with two multiplier mines are placed at opposite corners of the field. Each team is started with three disarmed mines in base.

Four small rectangular bins (small storage bins or additional walled-off sections) are centered on each side of the field, designated as disposal points. One circular bin is centered on the field, serving as a higher-value disposal point.



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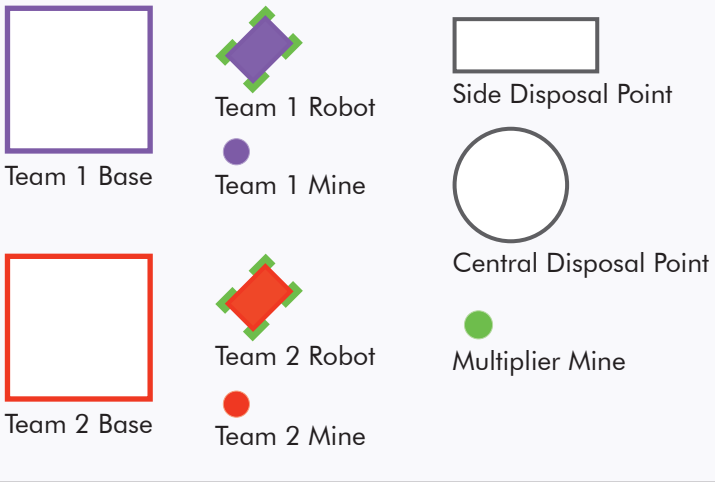

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General Scoring:

To score, teams remove their mines from the trigger pedestals and transport them to any of the designated disposal bins on the board. A team that knocks over a trigger pedestal with their own mine **sets off** that mine, and incurs a point penalty. Knocking over a pedestal with the other teams mine results in a point penalty and a timeout period. **"Multiplier mines"** double the point value of all mines scored the bin with the multiplier, regardless of who scored the multiplier mine.

Period and Round Time Limits:

The game is divided into two phases: the **Autonomous Period** and the **Remote Control Period**.

Autonomous Period

The game will begin in the **Autonomous Period**, which will last for 30 seconds. During this time, the human operator **may not transmit any commands** through the Remote Control, with the exception of a single button press used to signal the start of the game.

Three **Autonomous Period mines** will be in play during this period only. They start in base with the robot, and can be manually loaded onto the robot while in base. They count for the same number of points as any other mine scored during this period, but will be removed before the Remote Control Period begins.

After 30 seconds of Autonomous function, a signal will be given to mark the end of the Autonomous Period. All robots must come to a **complete halt** and **accept no driving commands** from the Remote Control. Any robot moving or responding to commands during this break will be disqualified from the round. Once the robot stops, the field will be evaluated by judges and referees to determine the number of points earned during the Autonomous Period. The **Autonomous Period mines** and **any other scored mines** will be removed once any scored points are tallied.

Autonomous Period Scoring

The following point values will apply to any actions **completed** during the Autonomous Period:

- Mines properly disposed of: +50 points each
- Pedestals with mines knocked over: - 10 points each
- Pedestals without mines knocked over: 0 points each
- Knocking over opponents mines: - 10 points each, timeout remainder of period time

All scoring is determined based on the state of the board at the end of the 30 second Autonomous Period. Mines in the robot's possession (but not in a disposal bin) are worth no points. Note that the Autonomous Mode mines will be **removed from play** after the Autonomous Period, **even if** they are still in the robot's possession. These mines cannot be carried into the Remote Control round and used to score points. Other mines can be carried over if they are in the robot's possession.

Note also that there is effectively no penalty for attempting to score a mine during this period. Even if you knock over a mine, the +5 "disarm" and the - 5 "set off" cancel out to 0 points. There's **nothing to lose** by trying!

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Remote Control Period
After scoring is finished for the Autonomous Period, a signal will be given to resume play and begin the Remote Control Period. Full use of the Remote Control will be allowed during this time. A single button press may be used to signal the start of this period on the robot.

After 90 seconds of Remote Control function, a signal will be given to mark the end of the round. All robots must come to a **complete halt** and **accept no commands** from the Remote Control. Any robot moving or responding to commands during this break will be disqualified from the round. Once the robot stops, the field will be evaluated by judges and referees to determine the number of points earned during the Remote Control Period.

Remote Control Period
The following point values will apply to any actions **completed** during the Remote Control Period:

- Mines properly disposed of: +20 points each
- Pedestals with mines knocked over: - 10 points each
- Pedestals without mines knocked over: 0 points each
- Knocking over opponents mines: - 10 points each, 30 second timeout

All scoring is determined based on the state of the board at the end of the round. Mines in the robot's possession (but not in a disposal bin) are worth no points.

The multiplier mines may be scored by either team. Regardless of which team disarmed the multiplier mine, the point value of each mine in a disposal bin is doubled. Knocking over a multiplier mine will result in a loss of 10 points, with no timeout period.

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Additional Notes and Rules:

- **No movement** by the robots (even accidental) is allowed **prior to the start of the match**. Once on the field, any movement other than the "startup twitch" will result in the offending robot being disqualified for the round.
- Any physical contact between a human and the robot once the round has started will result in a 10 point **"touching penalty"** being assessed against the human's team. This includes touching the robot to turn it on after the starting signal.
- **"Chain reaction"** point loss may occur if a knocked-over pedestal or mine causes other pedestals to fall over.
- When a measurement dispute occurs, "on top of the line" will count in the team's favor.
- Time permitting, every team will be allowed to run their robot three times ("rounds") with the ability to make changes between every round. The team's final score will be the best of their three individual round scores.
- Once a mine is knocked over, that mine may still be dropped off to a disposal point and scored, if the robot has the mechanical ability to do so.
- **Be respectful** of your opponent. Robot bullying and unfair play (as determined by the referees and judges) can result in disqualification.