Autonomous Maze (Mine Shaft Rescue): GPI, TI, API

DESCRIPTION: Autonomous programming of the robot.

Rules

1. Participants will have up to 90 seconds to complete each course (or total time in 5 minutes).
>   **Elementary** must do "Mine Shaft Maze" and "Fire in the Hole"
>   **Middle School** must do "Mine Shaft Maze" and "Fire in the Hole" or "Find the Miners"
>   **High School** must do "Mine Shaft Maze" and "Fire in the Hole", and "Find the Miners"

Note: All courses must be completed in 5 minutes for full credit.

2. Participants may modify the robot to assist in completion of tasks.

3. Participants will be given the exact dimensions of the course and the tasks prior to the event so that it can be programmed to complete the tasks.

4. The robot will begin at the starting area of each course and work its way around the course.

5. Participants will be allowed to restart the course as many times as they can during the allotted time.

6. The best score and time will be used for final scoring and ranking.

7. In case of a tie the team that completes the course in the shortest amount of time will be the winner.

Three courses - see map. Each field represents 10' X 10'.

1. Once the robot begins a course, it should not be touched.

2. All wheels must remain in contact with the ground. (Judges discretion)

3. If the participant chooses to move the robot for a slight course adjustment, the student must first inform the judge of the adjustment and the judge will change it.

4. For each adjustment, the following penalties will be enforced: 1st course adjustment -20 sec. penalty, 2nd adjustment- 30 sec. penalty, 3rd adjustment- start over.

5. Participants will have the opportunity to complete the course a second time after all teams have had the opportunity to complete it (If time permits based on how many teams sign up).

Mine Shaft Maze:

1. Robot must begin at the start and end at the stop box.

2. The robot must make contact with each 2'X 2' square to score points. Each square scores a 1 point. 25 points possible. Total points win with time as a tiebreaker.

Fire in the Hole:

1. This challenge requires precision placement of a stick of dynamite in each blast zone.

2. There will be three strategic blast zone areas of varying degrees of difficulty.

3. The sticks of dynamite will be ¾" dowels that are 3" in length. One end will have a flat bottom. The

other end will have a 1" wick.

4. Students will have to engineer an apparatus to carry one stick of dynamite into the mine and release it in each blast zone. (5 points if the stick is in the green area. 8 points if the stick is in the center of the blast zone without touching green area.) After the drop is made, students will retrieve their robot back to the starting point, students will load another stick of dynamite and proceed to the next blast zone and same procedure to the final blast zone. The clock will stop once the dynamite is dropped at the blast zone. Scoring is based on total points, as well as time of completion for EACH blast zone. 1 bonus point for getting all three sticks of dynamite in a scoring zone. Total points win with time as a tiebreaker.

Find the Miners:

1. This challenge requires students to program their robot to follow a white line (approx. 1 ½" wide) in order to locate the miners who are trapped inside the mine.

2. Each team that registers for this challenge will be provided with the proper sensor to accomplish this task.

3. Each checkpoint will receive 5 points and time will be recorded at each checkpoint. The team that get their robot to the miners the most points and with fastest time is declared the winner.

Mine Shaft Maze

Red - start
Green - end
25 - 2' square boxes
Red lines will have ½"
PVC pipe taped down

Fire in the Hole
10'
10'

Ramp 8'
long
from 12"
height to
floor -
24" wide

Platform
2' X 2' X 1' tall

8' Thicker lines
represent
barrier to go
around

Find the miners

1' square
boxes red box
represents
starting spot