

LINE FOLLOWER

✳ *Autonomous Line Following Robot is a new event for the WCRG in 2002!*

CONCEPT:

The line follow is a classic introductory robot design and requires a minimal amount of resources. (Go to your favorite search engine and enter "line following robot"). These robots can use microprocessor control or simple digital or analog control systems and are highly visual and entertaining to watch! A great event for re-programmed Mini-Sumos!

DESCRIPTION:

This event is intended to showcase basic sensor design and robot control systems in the form of a small autonomous robot which must follow a black line over a white surface. Points are awarded based upon the distance covered and the speed of the overall robot.

ROBOT SPECIFICATIONS:

The robots have no restrictions on size or power sources, but must be able to operate without cues or input from owner/operator. We recommend keeping your robot under 12" square, to fit past some of the obstacles with room to spare - aim for 9" or smaller. Penalties may be awarded to robots which are fundamentally unmodified retail kits: Kudo's to those whose robots are scratch-built and totally custom. Robots build from robot construction kits, like Lego Mindstorms or Meccano, are NOT penalized.

THE RING:

The arena of operation consists of a white painted surface with a black line made from standard electrical tape. Lighting levels are unpredictable and the robot must be able to operate over a wide range of lighting conditions.

There will be several stages, each of increasing complexity. Completion of each stage adds to that competitors points score.

The Rules:

Follow the line as far and as fast as you can. The robot will be placed at a pre-assigned starting point and may be started by hand as directed by the judge. Once started your robot must navigate along a black line as quickly as possible.

As the course progresses the complexity of the line becomes more difficult and may include (but is not restricted to) the following distractions.

- Gentle rounded corners
- Sharp rounded corners
- Sharp obtuse angles (greater than 90 degrees)
- Sharp acute angles (less than 90 degrees)
- Dark tunnels (make sure your robot can see in the dark and fit through the tunnel)
- Gaps in the tape (robot might leave line and have to find it again)
- Hills (both up and down)
- Bumps (small cracks may exist on surface)
- Distractions

Robot operators are allowed to replace an errant robot on track but will suffer a penalty for each replacement.

Each stage must be completed before the next is started.

The course layout will not be made available until the day of the event.

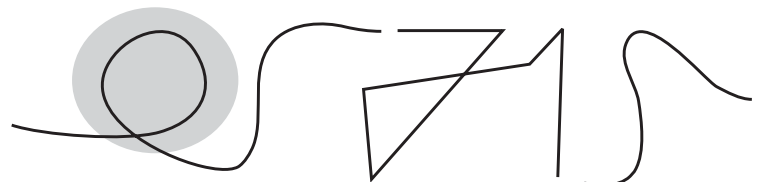
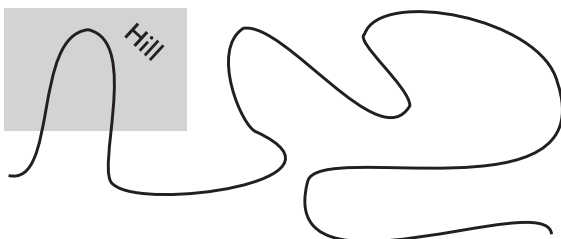
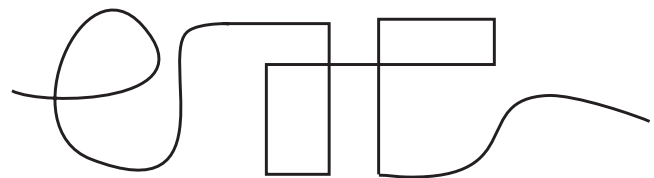
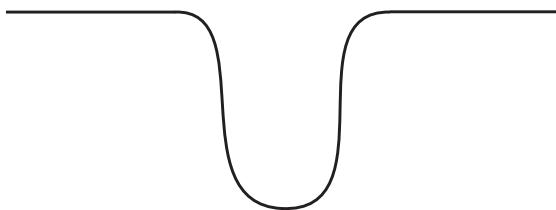
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SCORING:

Each stage consists of approximately 3 m length of black tape.

POINTS AWARDED/PENALIZED	DESCRIPTION	EXAMPLE
$100 \text{ POINTS} \times (\text{ROBOT-DISTANCE} / \text{TOTAL-STAGE-DISTANCE})$	A PERCENTAGE OF 100 POINTS IS AWARDED DEPENDING ON AMOUNT OF EACH STAGE COVERED (TO NEAREST 10 CM).	ROBOT TRANSITS 30% OF STAGE 1:30 POINTS
50 POINTS	AWARDED FOR SUCCESSFUL UN-INTERRUPTED COMPLETEION OF ENTIRE STAGE.	ROBOT NAVIGATES TWO STAGES TO COMPLETEION... BONUS 100 POINTS.
500 POINTS/ (TIME TO COMPLETE STAGE IN SECONDS)	POINTS AWARDED TO REWARD QUICKER ROBOTS. TIMER RUNS EVEN WHEN ROBOT LEAVES LINE AND IS REPLACED.	ROBOT COMPLETES STAGE AFTER 25 SECONDS: AWARDED 20 POINTS.
JUDGEMENT POINTS BELOW		
50 POINTS PER STAGE ATTEMPTED	ROBOT IS UNMODIFIED KIT. DESIGNER SHOULD HAVE A SIGNIFICANT HAND IN DESIGN AND PROGRAMMING.	STORE-BOUGHT UNMODIFIED KIT DEDUCTED 50 POINTS.
50 POINTS PER VIOLATION	PICKING UP ROBOT AND REPLACING ON LINE (AT POINT WHERE ROBOT LEFT LINE)	OPERATOR DECIDES ROBOT, WHICH HAS LEFT LINE, IS UNABLE TO RE-ACQUIRE. HE/SHE MOVES ROBOT BACK TO LINE: 50 POINTS PER VIOLATION.

Potential line following stages...



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