

# The Racecar Game!

Have fun playing this simple game in which you get to be a racecar driver, competing to reach the finish line first. If someone tries to tell you that it has something to do with *math*, tell them not to be silly since games obviously have nothing to do with math.

## 1 What you will need

- A blank sheet of paper (completely blank paper with no lines works best, but lined or graph paper is OK too)
- A pencil
- A protractor
- A ruler
- 2–4 players

## 2 Setup

Begin by drawing a race track on the sheet of paper. For maximum fun, make sure it has plenty of bends. An example race track is shown in Figure 1.

Have each player draw an X somewhere behind the starting line.

Use a corner of the paper outside the racetrack to keep track of each player's current *speed*. All players start off with a speed of zero.

## 3 How to play

Players alternate turns. On your turn, you draw a line to represent the movement of your car. Your current speed indicates how many quarter-inches your car travels on each move.

You can always keep going at the same speed and direction as your previous move, but the interesting thing is how you can change speed and direction.

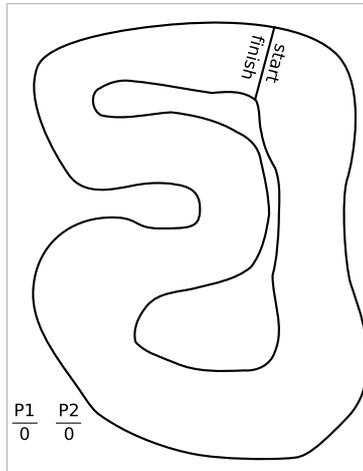


Figure 1: A sample race track.

- You can continue in the same direction as your previous move, or you can turn *up to*  $30^\circ$  in either direction.
- You can increase or decrease your speed by one.
- You cannot turn while stopped (while your speed is zero).

In particular, this means that:

- You cannot make abrupt turns such as  $90^\circ$ . It will take you at least three turns to turn  $90^\circ$ .
- You cannot stop abruptly. If you are driving at a speed of 3, for example, it will take you 3 turns to stop.

Driving backwards is allowed (just decrease your speed to zero and then decrease it again to  $-1$ , and so on).

If you go off the edge of the race track, you must re-enter the track somewhere *before* the place where you left it. This obviously takes a long time (you might have to stop and back up)!

If you go off the edge of the *paper*, you are dead! (There are, um, giant lava-snakes.)

Figure 2 shows an example of racing a car around the racetrack. On the first move, the driver increased the speed to 1 and went  $1/4$  inch (on the

first turn you can go in whatever direction you like). On the second move, the driver increased their speed to 2 and went  $1/2$  inch, turning a little bit to the right (they were careful to measure the angle and make sure it was less than  $30^\circ$ ). On the next move, they sped up again, to 3, and went  $3/4$  inch, again turning a bit. On the fourth move they sped up again. On the fifth move, the driver didn't turn much, but decided they needed to start slowing down in order to make the turn without going off the track. On subsequent moves they made it around the first turn successfully but then decided to speed up a bit. Will they make it around the next turn?

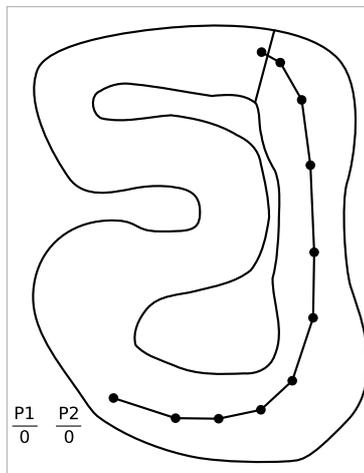


Figure 2: Racing a car around the racetrack

Of course, in a real game, there would be multiple cars on the track at the same time, racing each other; this is just an example showing one car.

## 4 How to win

To win, have your car be the first to cross the finish line! However, keep in mind that everyone should get an equal number of turns; for example, if there are three players and player 2 crosses the finish line, player 3 still gets one more move. If multiple players cross the finish line on the same move, measure the distance from each player's previous position to the finish line; whoever had the shorter distance wins.

## 5 More fun

Here are some ideas for variations on the game:

- Put “oil slicks” at various points on the track; if you hit an oil slick you have to go straight for the next two moves. Or use your imagination to make up your own hazards or power-ups.
- Use cars with different turning angles, acceleration, or braking.
- Make the race two laps long instead of just one. (You could do more than two, but at some point it gets hard to tell which lines are which.)