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VIDEO + RALLY

WHAT IS A RALLY?

A rally is not a race. Each car travels alone on a course laid out by the Rallymaster along largely untravelled public roads, usually out in the country, following a set of Route Instructions and travelling at speeds set out in those instructions. Every few miles the car encounters a "checkpoint" or "control" where it is timed and receives a score for that "leg" depending on how early or late it has arrived. The object of the rally is to stay on course and to stay on time; that is: to arrive at each checkpoint at the perfect time required to travel that precisely-measured distance at the speeds given. That time is calculated by the formula $60D(\text{distance in miles}) = S(\text{speed in MPH}) \times T(\text{time in minutes})$.

A perfect score on each leg is \emptyset points, with cars being penalized one point for each .01 (one-hundredth) minute early or late (100 points per minute against you.) The maximum penalty per leg, called simply a "max", is 200 points. If a car gets lost (goes off course) it will almost always "max the control" (get penalized a full 200 points.) At the end of the rally, the car with the lowest score wins. They have demonstrated the most course following skill and navigating accuracy.

Following the course is not easy. It requires a logical mind, since many factors must be weighed at each intersection. VIDEO RALLY is not an easy computer game. It is an actual simulation of a rally on the National Championship level, and was written with the assistance of the 1978 SCCA (Sports Car Club of America) National Rally Champion for use as a training aid for rallyists wishing to run the National circuit. It's very difficult. It may be the ultimate video game in its complexity of logic and time pressure. You must read and understand these instructions fully before you attempt to run the Video Rally.

THE FORMAT

VIDEO RALLY simulates an actual TSD (time-speed-distance) sports car rally. There are ten "legs," and therefore ten checkpoints. The computer serves as your navigator. Your elapsed time and distance travelled per leg are displayed on a simulated rally computer readout in the lower left-hand corner of the screen. Three figures will be displayed. The upper figure is elapsed time in hundredths of a minute (approximated). The second figure is your odometer, showing distance travelled in hundredths of a mile. The bottom figure is called a "null readout." As long as it reads " \emptyset " you are on perfect time. If it shows a negative figure, you

are late and must speed up. If it shows a positive figure you are early and must slow down.

Your assigned speed for the entire rally is 60 miles per hour. (That's not illegal in the computer's world: there are no speed limits, gasoline shortages, safety hazards or traffic cops.)

The car is a flashing square which always begins at the bottom of the screen. It is steered by the joystick of control handle #4 (plugged into port #4, of course.) To proceed forward at 60 miles per hour, press the knob forward. To go left, press the knob left and to go right, press the knob right. The same is true for reverse should you make a mistake at an intersection and need to back up, but you must remember that a rally vehicle is never required to go back the way it came. The road behind you, if you are on course, does not exist.

The trigger is your accelerator. To accelerate to 120 miles per hour, press the knob in any direction and pull the trigger. You will gain time. To stop or pause, return the knob to the center position. The car will stop and you will now lose time. SO: you have your choice of four different directions of travel at two different rates of speed, plus stopping capability.

Due to memory limitations, there are certain conventions you must abide by. You must never leave the road. Driving skill is important in rallying. You must also never pull the trigger when the knob is in the neutral (center) position: this is the equivalent of flooring the accelerator in neutral, thereby blowing up your engine!

THE COURSE

There will be two types of intersections: crossroads and T's. The intersections will appear on the screen one at a time in a random manner. You must drive through the intersection, turning, if necessary, in the correct direction, and continue driving off the edge of the display. If your direction is correct when you reach the edge of the display, the screen will clear and another intersection will appear with your car at the bottom of the screen again. BUT...if your direction of travel is incorrect, the words "OFF COURSE!" will appear on screen. Too bad: you've "maxed" the leg and picked up a 200 point penalty. The display will freeze for about 15 seconds so you can study it and find your mistake. The checkpoint information will then appear and you will begin the next leg with a clean start.

Assuming you stay on course all the time, the checkpoints will automatically appear now and then. You never know exactly when you will come to a checkpoint (just like a real rally!) so it is wise to stay on time. A good strategy is to arrive at the intersection early to give you a few seconds to think, but always leave the edge of the display at a perfect "Ø" since all checkpoints are located off screen between two intersections.

So much for steering the car, staying on time, checkpoints and scoring. Now for something a little harder.

FOLLOWING THE COURSE

You will soon see why we say that VIDEO RALLY is possibly the ultimate video game.

1. The MAIN ROAD.

Highway designers usually intend for most intersections in the country to have a MAIN ROAD that takes the heaviest traffic. The designers use stop signs, directional arrows and road surfaces to tell drivers which way the MAIN ROAD goes, and to cause other traffic to stop or yield.

On the VIDEO RALLY you must figure out whether each intersection has a MAIN ROAD leaving it. Many do not have a MAIN ROAD, but if you come to one that has a MAIN ROAD you must LEAVE THE MAIN ROAD at that intersection IF POSSIBLE. Course Following Priority number one is therefore:

1. LEAVE THE MAIN ROAD IF POSSIBLE.

A MAIN ROAD can never go in two directions at once, and it never goes back the way you came. (You never count the bottom road as a possibility for leaving the intersection.) So, there are only four possibilities: The MAIN ROAD goes right, it goes straight, it goes left, or there is no MAIN ROAD.

To LEAVE THE MAIN ROAD means there must be one, and only one other road you can take. Now, that's easy at a "T" where the MAIN ROAD goes, let's say, to the right. You would leave it by turning left. That's simple enough. But how about a crossroad where the MAIN ROAD goes right? Which way do you LEAVE it: left or straight? We must add another rule:

YOU CANNOT LEAVE THE MAIN ROAD BY GOING STRAIGHT.

There. That answers your question; you must go left in the above example.

What if the MAIN ROAD goes straight? Well, you've got two choices again, right or left. Since you cannot go both ways at the same time, you CANNOT leave the MAIN ROAD at that intersection. It is NOT POSSIBLE, and the Priority says "...IF POSSIBLE."

So, you must drop down to your second Course Following Priority:

2. TURN RIGHT AT T.

Okay, if you cannot leave the MAIN ROAD either because there is none or because there is no one way to leave it (called a "unique direction of travel" in rallying), then look to see if you are at a T intersection (an intersection shaped like the capital letter T when approached from the bottom.) If you are, TURN RIGHT.

But suppose you're at a crossroad? Then drop down to the third (and last) Course Following Priority:

3. GO STRAIGHT.

Easy enough. You also see that if the intersection is a crossroad, and if there is a MAIN ROAD, and if the MAIN ROAD goes straight, then you must also go straight (by the third Priority) because you cannot execute either of the first two Priorities.

Whew! Let's stop for a moment. We told you that this was possibly the ultimate video game. You see that it is based on what computer people call "conditional branches": a lot of IF...IF...IF...THEN type decisions. It will be good for you to learn to think this way, since it will help you as a computer programmer in the long run.

Now for the really hard part:

THE MAIN ROAD RULE

We've talked a lot about the MAIN ROAD. How do you decide if there is a MAIN ROAD at an intersection, and how do you tell which way it goes? You must apply the DEMOCRATIC MAIN ROAD DETERMINANTS. (Help!!!) No, no...you can understand this; just read slowly...

Okay, what are the Democratic Main Road Determinants (gulp)? They are:

- STOP SIGNS (called PROTECTION, abbreviated PROT.)
- ARROWS
- SURFACE (paved or unpaved, abbreviated SURF.)
- RIGHT AT T (abbreviated R AT T)
- LEFT AT T (abbreviated L AT T)

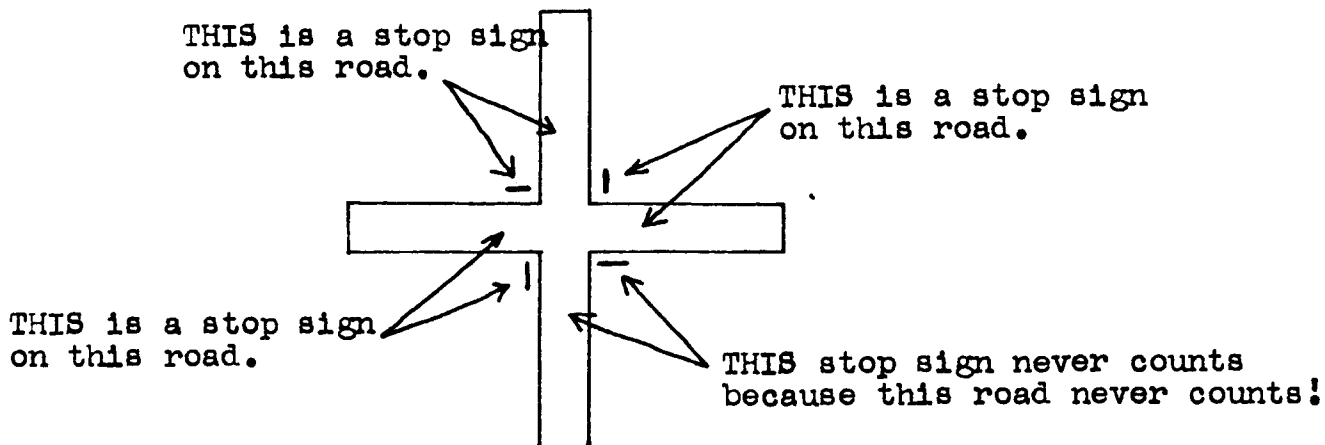
Now, here's the democratic part:

THE MAIN ROAD IS THAT ONE ROAD LEAVING THE INTERSECTION, NEVER COUNTING THE ROAD AT THE BOTTOM, DIRECTED BY THE MAJORITY OF THE APPLICABLE DETERMINANTS IN EFFECT (ON THE SCREEN) AT THE TIME. IF NONE OF THE DETERMINANTS APPLY, OR IF THERE IS A TIE VOTE, THEN THERE IS NO MAIN ROAD.

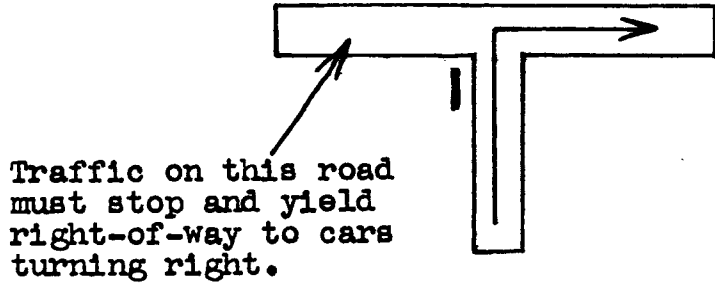
Okay, if you understand that, you're over the hill and it gets easy and fun from here on in.

Let's look at each Determinant:

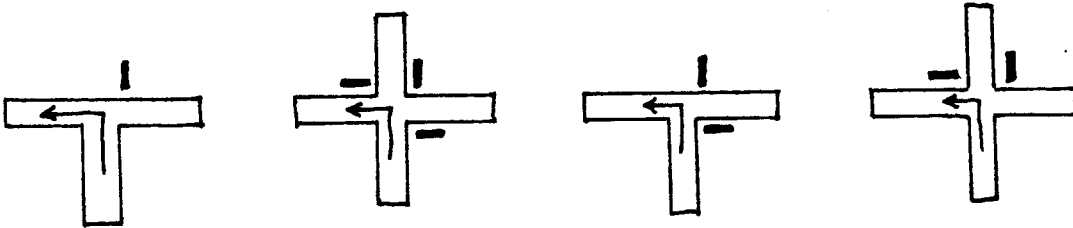
1. PROTECTION (PROT.): Stop Signs.



This next intersection is protected to the right by the stop sign.

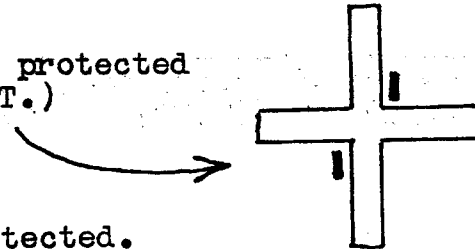


All of these next intersections are protected to the left.

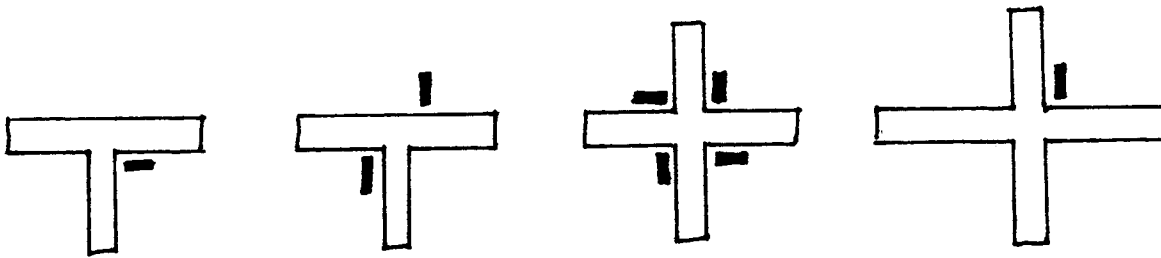


See? The road leaving the intersection is the ONLY ONE WITHOUT A STOP SIGN! (The bottom road never counts.)

Which direction is this intersection protected in? (Answer: It is protected STRAIGHT.)



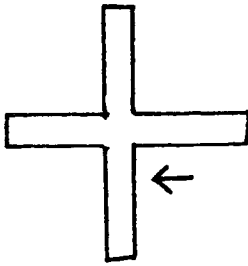
These next intersections are NOT protected. PROT. does not apply, therefore.



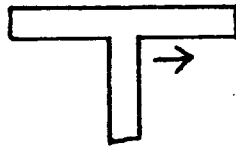
So, if PROT. was the only determinant showing on the screen, and the intersection is protected left, right or straight, then the protected road is obviously the MAIN ROAD. (It gets one vote and wins!)

Unfortunately, there will usually be more than one determinant on the screen (in effect, or active.) Let's look at the rest.

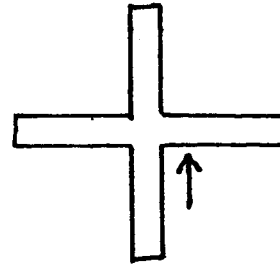
2. ARROWS. Here's an easy one:



LEFT.

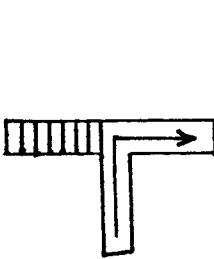


RIGHT.

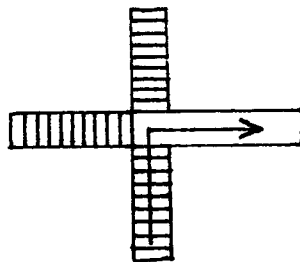


STRAIGHT.

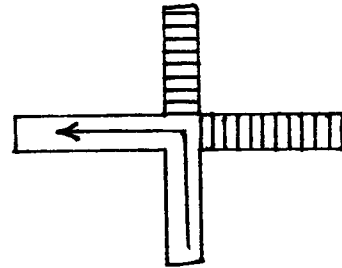
3. SURFACE (SURF.) The single paved road leaving an intersection (not counting the one at the bottom...remember!) is superior to the unpaved roads. Examples:



RIGHT.

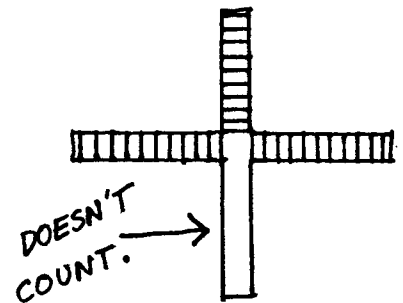
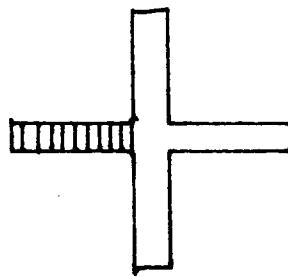
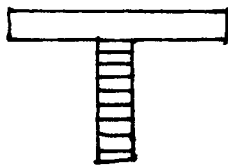
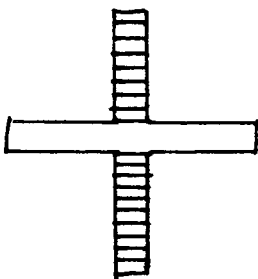


RIGHT.



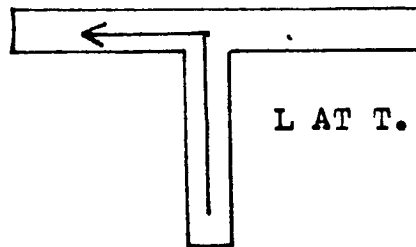
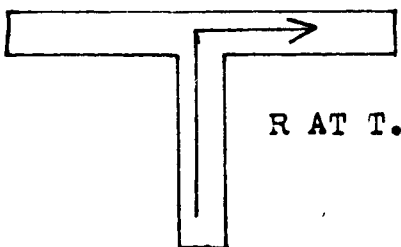
LEFT.

But SURF. doesn't count (does not apply) at these next intersections because there is no single paved road leaving the intersection:



4. R (right) AT T. The determinant goes right if the intersection is a T.

5. L (left) AT T. Same thing, only the determinant goes left.



So, to determine whether there is a MAIN ROAD and if so, which way it goes, follow these steps:

1. Look at the list of DETERMINANTS in the upper left-hand corner of the screen. The DETERMINANTS printed there are the only ones you need to consider. (For example: there may be lots of stop signs at the intersection, but if PROT. doesn't appear as an active DETERMINANT on the list, you can ignore them.)

2. Study the intersection, applying each of the active DETERMINANTS in order. Do any of them direct ONE road away from the intersection, either right, straight or left? If so, then that road gets one vote. Now go to the next DETERMINANT on the screen.

3. Total the votes. If any one road has more votes than any other road, then that road is the MAIN ROAD. But, if there are no votes for any direction, or if there is a tie vote between two or more directions, then there is no MAIN ROAD.

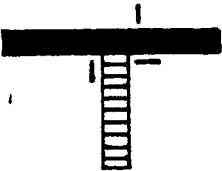
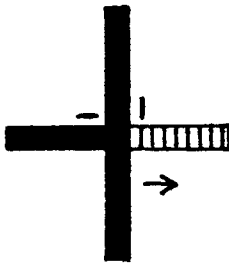
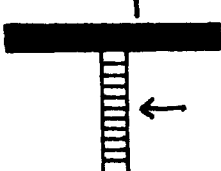
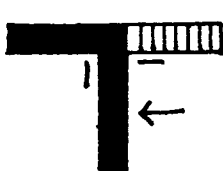
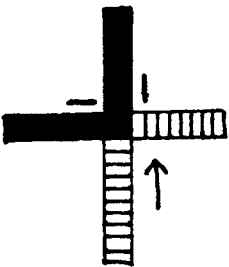
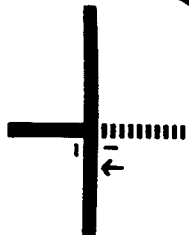
4. If there is a MAIN ROAD, you must now figure out whether you can leave it (you cannot leave it by going straight.) If there is no MAIN ROAD, or you cannot leave it, then drop to the next Priority. Let's review the three Course Following Priorities:

1. LEAVE THE MAIN ROAD IF POSSIBLE.
2. TURN RIGHT AT T.
3. GO STRAIGHT.

Okay, that's it. Got it all? We'll see. Study the intersections below, then answer these three questions about each:

1. Is there a MAIN ROAD?
2. Which way does it go: left, right or straight?
3. Which way do you have to go to remain on course?

The answers are on the last page. Good luck.

<p>PROT. ARROW</p>  <p>1</p>	<p>PROT. SURF. ARROW</p>  <p>2</p>	<p>PROT. SURF. ARROW</p>  <p>3</p>
<p>PROT. ARROW R AT T SURF.</p>  <p>4</p>	<p>ARROW</p>  <p>5</p>	<p>SURF. ARROW</p> <p>OFF-COURSE!</p>  <p>6</p> <p>99 84 -15</p>

ANSWERS:

1. There is no MAIN ROAD. PROT. does not apply: there is no road without a stop sign. ARROW does not apply because there is no arrow at the intersection. You cannot execute the First Priority, LEAVE THE MAIN ROAD IF POSSIBLE, so you drop to the second: TURN RIGHT AT T. Yes, it is a T so...you must turn right to remain on course.
2. There is no MAIN ROAD. The intersection is PROTECTED to the left, and ARROW goes right. SURF. does not apply because there is more than one paved road leaving the intersection. So: one vote for left (PROT.) and one vote for right (ARROW). Tie vote! That means there is no main road. And you cannot execute Priority 2, TURN RIGHT AT T, because you are not at a T. Drop to Priority 3: GO STRAIGHT. That's what you must do.
3. Yes, there is a MAIN ROAD. We have two votes for left: PROT. and ARROW. SURF. doesn't count. You can LEAVE THE MAIN ROAD by turning right.
4. Tie vote: two to the left (ARROW, SURF.) and two to the right (PROT., R AT T). There is no MAIN ROAD, so TURN RIGHT AT T by the second Priority.
5. The MAIN ROAD goes straight by ARROW. You cannot leave the MAIN ROAD because you have two possibilities: right or left, which is why you GO STRAIGHT by Priority 3.
6. SURF. doesn't apply. MAIN ROAD goes left by ARROW. You cannot leave the MAIN ROAD by going straight, so you LEAVE THE MAIN ROAD by turning right. This is a tricky one...we went OFF COURSE here.

Okay, you're ready to run the VIDEO RALLY. Stay on course and stay on time. Your score will tell you whether you're ready to go out and run the National Rally Championship Series!

∅ A perfect score! You're championship material!

1-199 No maxes, just timing penalties. You're in the trophy class.

200-600 Three maxes or less is about average for this event.

1000 or more: Practice, practice!

2000 You maxed all ten legs! Try again, and if your score doesn't improve, switch to something simpler like grand master level chess!

By the way, each situation is random-generated. You will run VIDEO RALLY many times before you ever see the same situation twice.