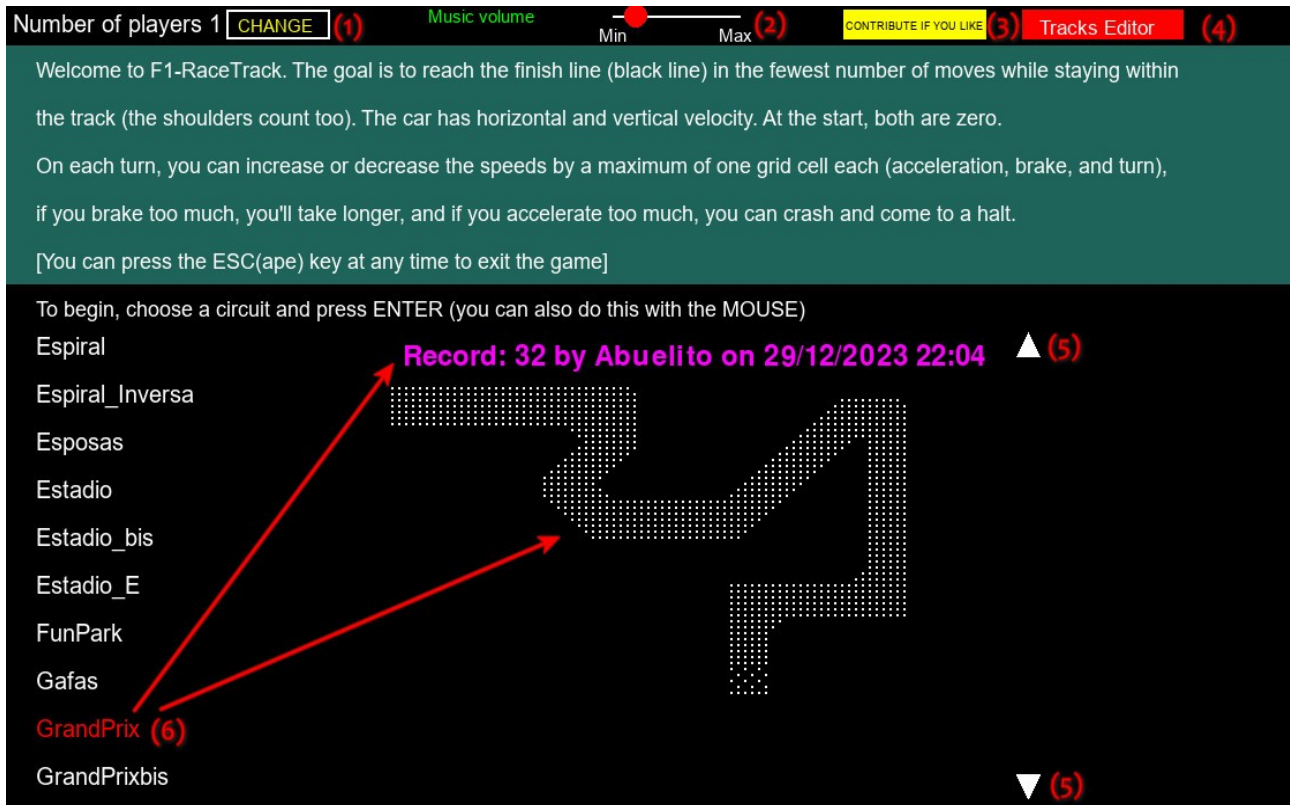




F1-RaceTrack (a mathematical racing game with vectors)

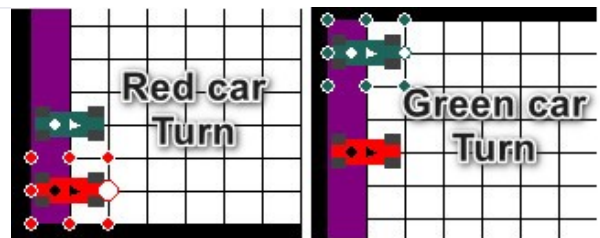
When the game is launched, we will see a presentation screen with a brief explanation of the game, allowing us to choose between 1 player or 2 players using the **CHANGE** button (1), the slider (2) to increase or decrease the volume of the music, button (3) **CONTRIBUTE IF YOU LIKE** to make a contribution if you like the game (thank you in advance), and button (4) to open the **Tracks Editor**.



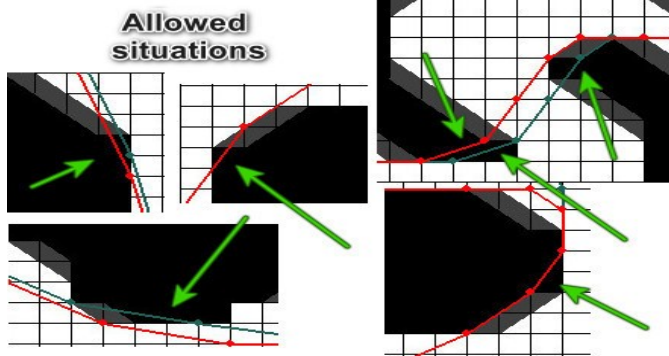
To play, we must choose a circuit. If there are many circuits and they don't fit on the screen, arrows (5) will indicate this. We can select the track using the keyboard arrows and **ENTER** or with the mouse (the mouse wheel or the keyboard arrows allow us to view the tracks below or above). There is also a thumbnail of the selected track (6) and a mention of the player who holds the record for the track (if there is one), with the movements used and the date. When the game requests it, the driver's nickname for each car must be entered (max. 15 characters). For 2 players, the **[T]** key can be used to change the turn of the starting car. If the name of the green car driver is entered as: Alonso or Amateur (a non-professional driver), it is possible to play against the computer.

If two players are selected, the option to play online is available (refer to the appendix)

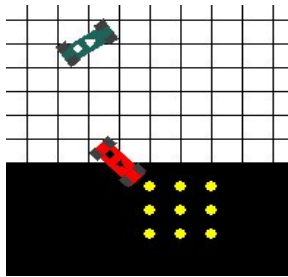
At the start of the game, the cars will be randomly placed along the starting line, with the one whose turn it is surrounded by the intersections they can go to, with the selected one blinking. To move forward, two methods can be used: select the intersection with the keyboard arrows and move to the selected (blinking) one with **ENTER**, or use the Left mouse button to select the intersection to go to (with two players on the same computer, each can use a method).



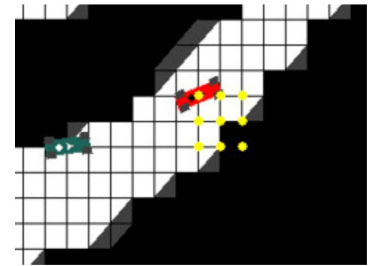
We cannot move to the position of the other car nor move backward at the start of the game.



The shoulders are also valid track, and to not be as fussy as the FIA, occasionally crossing a black square is also allowed (as long as the square is not surrounded by other black squares). In any case, there will be no doubt if there are intersections that are not valid plays, they will appear in yellow, and we will not be able to select them as destination.

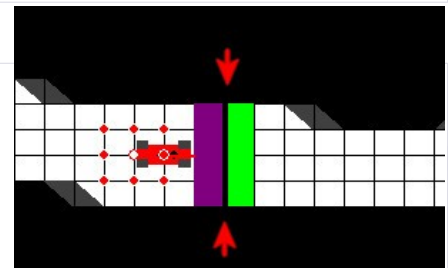


If the only available position left for us is occupied by the other car, we will have a 'collision.' We will continue from where we are but starting with zero speed. The same will happen if all the positions we can move to are off the track, but in addition, we will lose a turn.



The second situation will occur when we play above our capabilities, carry too much speed, and cannot stay on track. The first when the only intersection that would not leave us off the track is occupied by the other car.

The finish line is the black line next to the green squares, and touching or crossing it is valid as arrival.

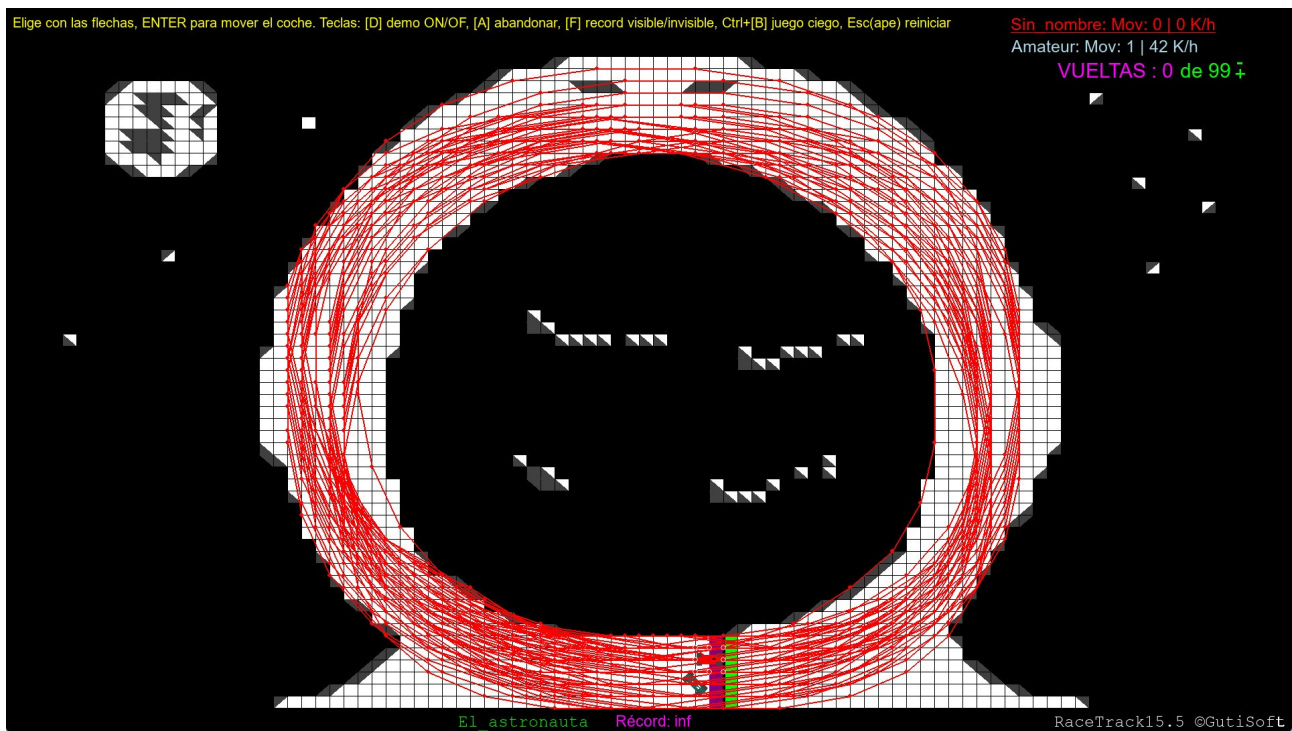


Pressing the **[D]** key at any point during the race will enter (or exit) DEMO mode, in which Carlos Sainz competes against Fernando Alonso. If it is the first race for a track and there is no activity for 30 seconds, DEMO mode will be entered (it can be canceled with the SPACE key). It can be momentarily paused by pressing the left mouse button and to resume it, select with the mouse one of the intersections of the car that has the turn. NOTE: if we have just made a maximum braking and want to put DEMO mode, we should select the intersection we want to go to before activating it.

If the track has continuity, we can compete in several laps by pressing the \pm keys up to a maximum of 99. Letting the cars compete in DEMO mode for several laps, we will see that in the replay they behave like real cars in a real-time competition. Don't stop trying it; you will have fun!!

If we want to see something as close as possible to a Formula 1 race, we just need to set the Demo mode with two players (who will follow optimal trajectories) and watch the replay once the race is finished!

In the graphic on the next page, we can see a screenshot reflecting a race in DEMO mode with the trajectories followed by the cars after 99 laps:



Pressing this mode, the trajectories that the cars will follow will be chosen randomly among the optimal ones (those that require the fewest number of movements to reach the finish line. These trajectories are calculated before starting to move and are the algorithm that uses the most resources of the processor since it examines many possibilities to find them (a less powerful computer can take more than 10 seconds, while a latest-generation one will not take more than 2 or 3 seconds). Once the trajectory is chosen, it will be followed by the car until it passes the finish line again and is recalculated; there are circumstances that require a new calculation, such as when the point of the trajectory to which the car has to go is occupied by the other car (more common on narrow tracks and with the cars very close together). There will also be circumstances in which an optimal trajectory cannot be followed, for example, when we put DEMO mode and the cars are in a compromised position and it is not possible to avoid going off track or when the car in front occupies positions that divert us from the optimal trajectory. "Alonso" will also follow optimal trajectories when we play against the machine, so our only chance will be to go ahead, play very well, and step on the positions that are optimal for him, let's be real like life itself in a car race! Fortunately for us, the trajectories followed by the "Amateur" driver, especially close to the finish line, will not be entirely optimal, which will give us some chance to win.

For a deeper understanding of the optimal trajectories, I recommend reading the instructions of the Track Editor.

Whenever a race is won in a single lap, there will be a record set for the track (DEMO mode does not count), which will display the nickname, date, and time it was achieved, and its trajectory will be saved in a file named after the track with a .tray extension (the yellow car in the replays). If the record is matched or exceeded, a new record will be established.

If it is a single player, the red car is driven. If 2 players are chosen with the **[T]** key (change of turn), it can be chosen (before starting the race) who will start it, the red car or the green car.

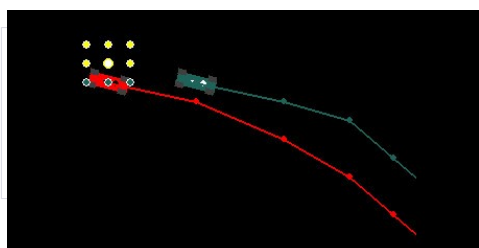
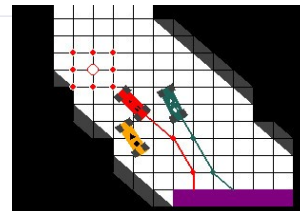
If we want to increase or decrease the volume of the music, we can also do it with the **[+ and -]** keys while holding down the **CTRL** key at the same time.

At any time during the game, pressing the **[R]** key (replay) will allow viewing the trajectories of the cars in the last race of the current game. If it is at the start of the game, the replay will show the race

of the auxiliary cars: Max Verstapen (purple car), the one with the record if there is one (yellow car), and another car (light green) that will normally follow the shortest trajectory in length to the finish line but not necessarily the optimal one (fewer movements). If it has been a race of several laps, the auxiliary cars will only be present in the first lap. If the **SPACE** key is pressed during a replay, it will be interrupted. (The replay will start automatically at the end of a race or if there is no activity at the start for 30 seconds).

Any of the players can leave the game by pressing the **[A]** key during their turn. If we press the **[Q]** key, we will restart the race.

We can also press the **[F]** key at any time to make visible (or invisible) the record car (if there is one), which will act as a ghost car (yellow color) since it does not occupy a physical position.



If we want to develop our memory, there is a blind game mode that is activated and deactivated by pressing the **[Ctrl]** and **[B]** keys, which will only show the track when the total number of movements (both cars) is a multiple of 5.

Online Game Appendix

Choosing 2 players also gives us the option to play Online. The Online game is designed to be played with friends or family on different computers connected to the internet, either on the same network (same location) or in different locations. One of the players will act as the Server and the other as the Client by pressing the **[C]** or **[S]** keys. [Radmin VPN](#) must be installed, select Network, Join Network +Private Network, and enter: F1-RaceTrack and password: GutiSoft

Eventually, we'll need to allow the Firewall to not block the connection.

Once connected, an IP address will be

assigned. The Server will enter the IP of their network (it can be copied from **Radmin VPN** and pasted with **ctrl v**) and will wait for the Client to connect by also entering the same IP (the one from the Server's network, which will have it in the list of connected). Once the connection is established, the Client will see the menu of available tracks and must choose one for the race. If the chosen track is not available to the Server, it will be sent and saved in their Tracks folder along with auxiliary files. All of this happens automatically. The Server will always drive the red car, and the Client the green car, but the turn (which can also be changed at the start of each race) and the laps must be selected by the Client. If either of the two presses the **Esc(ape)** key, the game will restart on both computers, and the process will have to start over. NOTE: In Online mode, playing against the computer or DEMO mode is not available.

