TOP10 Go-Kart track editor

User Manual

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Introduction

A track in top10 is more than just a 3d model. It also contains information useful for the physics and the racing engines. The complete list of all elements making up a track is:

- A 3d model of the track itself, borders, grass and sand areas, and scenery objects.

- Initial positions of go-karts.

- Checkpoints. They are used for timing purposes, and for ensuring players don't cheat by cutting corners too much.

- The list of objects within the 3d model making up the ground, as opposed to the scenery.

- The physical properties of all surfaces of the ground.

Before we go further, I would like to give a few details about the distinction between "the ground" and "the scenery". Methods of handling collisions are different. In the first case, it is designed to allow contacts and friction, meaning that wheels should neither penetrate not bounce on the ground. However, it is has some limitations: polygons must not overlap, and they should be mostly horizontal. The second type of collision handling is simpler, but not suitable for contacts. Hence the need to differentiate between the ground and the scenery (podiums, fences, ads...)

Dialogs and windows

The track editor is made of the following elements:

- The main window. It shows a 3d view of the track. This is the only element visible after the track editor has been launched.

- The mesh dialog. It is used to rotate and scale the 3d model.

- The checkpoints dialog. It allows you to add, delete and modify checkpoints. A checkpoint is a segment through a section of the road that go-karts must cross. The first checkpoint is the starting/final line. In order for a lap to be validated, all checkpoints must be passed in order.

- The starting area dialog. It is used to initially place go-karts on the track.

- The decorations picker. It is used to select meshes (3d objects) that are part of the scenery, not the ground.

- The surfaces dialog. Used to assign physical properties to surfaces of the ground.

Different widget toolkits

This track editor exists in several variants. One of them uses QT from Trolltech, a half-free GUI toolkit. While it is freely available on Unix systems, it requires a paying license on MS Windows. Therefore there is another version of the editor using a simpler GUI toolkit working on top of OpenGL: pui from the PLIB game library. The QT version is probably more user-friendly, but is available only for Linux. The PLIB version works on both Linux and MS Windows, but is a bit harder to use.
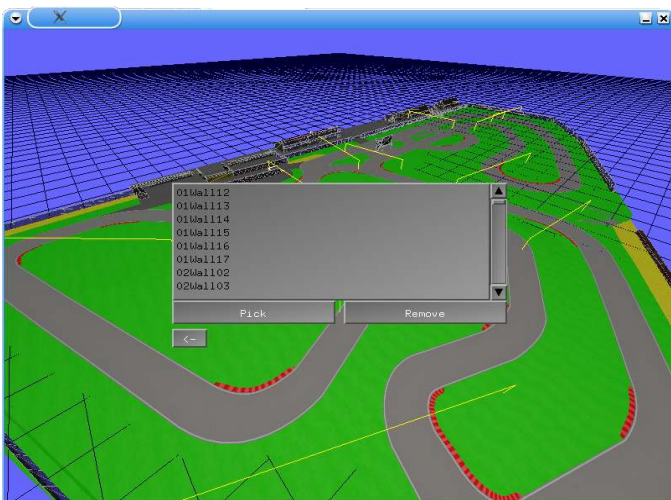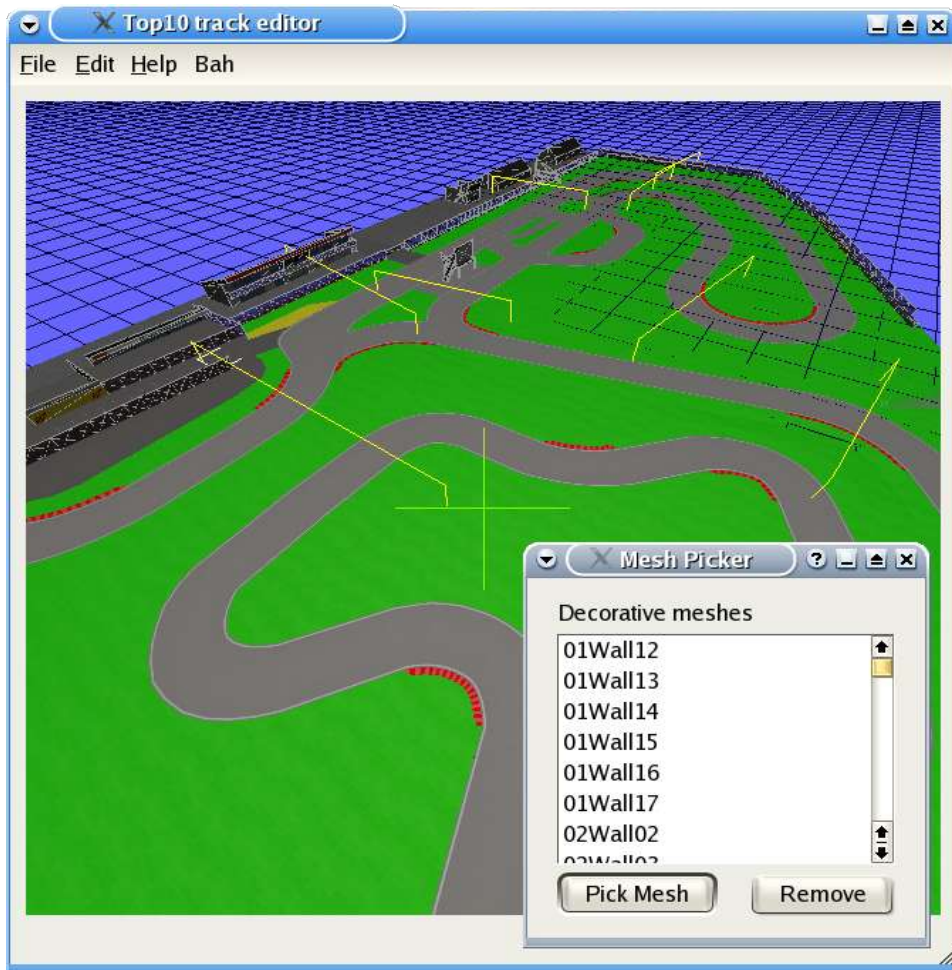

Illustration 1Tracked using PLIB

Illustration 2 Tracked using QT

Notice the yellow cross in the centre of the screen, used to select objects.

The main view

The main view is used to view the track. You can move the view using the mouse:

- Left button and drag: Translate the camera in the horizontal plan
- Right button and drag: Rotate the camera
- Middle button and drag: Move the camera in the vertical axis

Note the presence of a yellow + in the center of the screen. This cross is used to aim at meshes, textures or points in horizontal plane. Later on you will see that several dialogs have "pick" buttons. These buttons are used to select objects from the scene. The selected object is the one in the center of the screen, under the cross.

The track mesh dialog

The track mesh dialog is used to specify the 3d mesh composing the ground, i.e. The track, the grass, the borders, the sand boxes...

In Top10, axes Z and X are horizontal, Y is vertical. Your mesh may use a different orientation. The mesh dialog allows to transform your mesh so that its orientation matches Top10's. You can also resize uniformly your mesh so that one size unit is 1 meter.

Illustration 3 Track mesh dialog

The track mesh dialog is composed of the following elements:

1. The scaling factor. This scaling is uniformly applied on the mesh in all directions to modify its size.

2. The upward axis. This is the axis in the mesh space pointing up.

3. The file select button. Clicking on this button will bring up a file selector that will let you select a file describing the mesh. Note: the mesh file must be located in <Top10 path>/data/meshes/. Even though the file selector lets you choose any file from any directory, you will not be able to reload this track if the mesh is not in the location mentioned above.

4. The "go back" button. This button is present in most dialogs in the PLIB version. It takes you to the main menu.

The Surface chooser

Each polygon composing the ground must have physical properties depending on whether it represents grass, sand or tarmac. As assigning these properties on a per-polygon basis would be too inconvenient, textures are used instead. This dialog lets you assign physical properties to each texture.

1. This menu lets you choose the physical properties. It can be "Road", "Grass", "Border", "Sand", "Dusty Road" or "Dirt".

2. This button picks the surface of the triangle currently aimed at in the main view.

3. This list show you all textures that have the physical properties selected in 1.

A given texture can not have several physical properties.
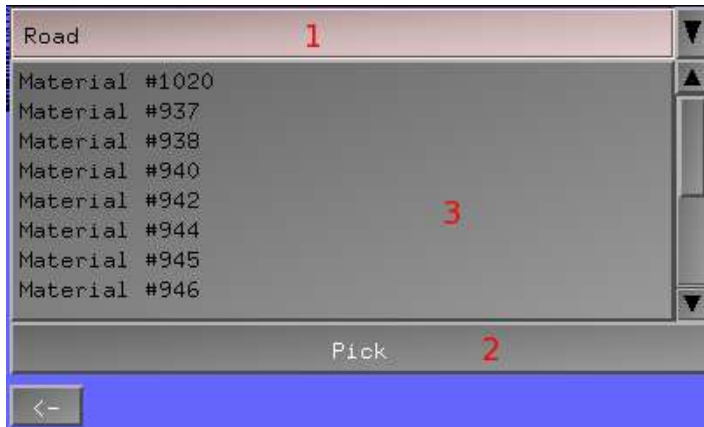

Illustration 4 Surface chooser

In the main view, surfaces will appear coloured as follows:

- •"Road": grey
- •"Dusty Road": dark grey
- •"Border": red
- •"Grass": green
- •"Dirt": dark red
- •"Sand": yellow

The starting area dialog

Top10 needs to know the initial location of go-karts. A starting area is defined by a left and a right point. The kart will be oriented so that the left point is on its left, the right point on its right.

The first kart is placed on the front left, the second slightly behind, on the right, the third is on the left behind the first kart, and so on...
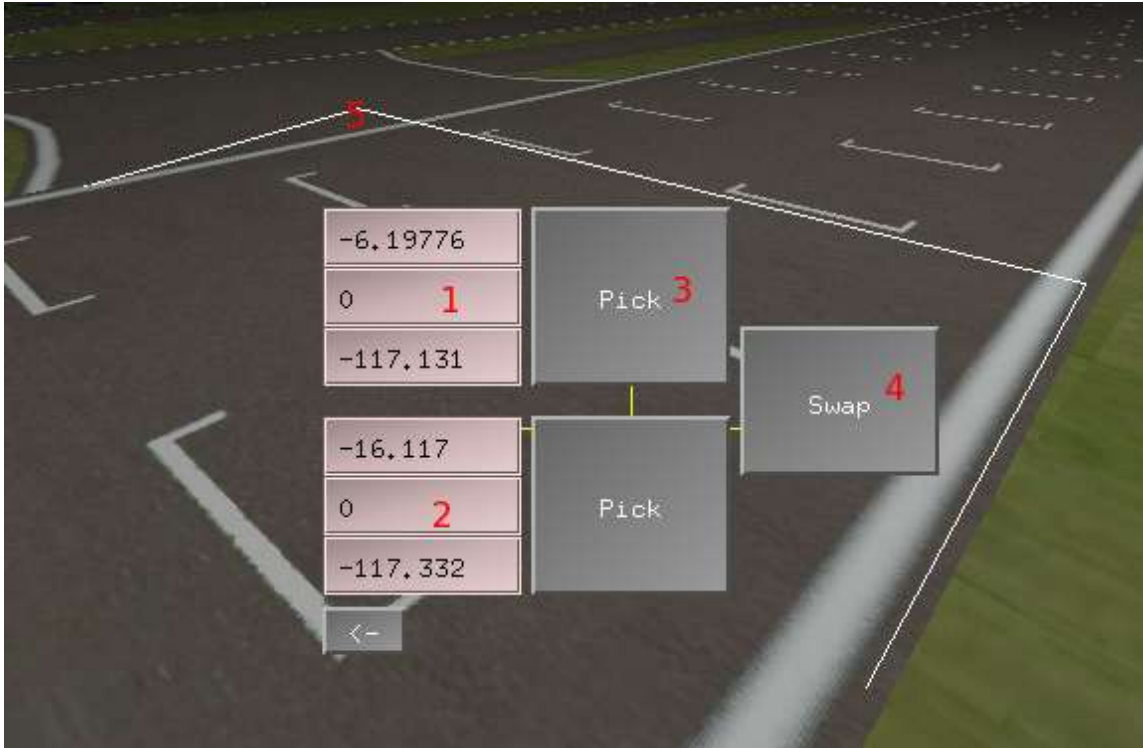
Illustration 5 The starting area dialog

1. Those are the X, Y and Z coordinates of the left point

2. Coordinates of the right pointing

3. Click on this button to pick the point currently aimed at by the cross.

4. Click on this button to swap the left and right points, thus changing the orientation of the kart

5. Wire frame helping to visualize the starting area. The open part of the frame points toward the front. This frame should be slightly over the ground. To elevate the starting area, edit manually the Y components of the left and right points

The decorations dialog

Meshes can be classified into two categories: The ground and the scenery, or decorations. It is important to set all fences, obstacles, podiums, buildings... as decorations. Note: borders are not decorations, but walls are. Intuitively, everything that you can be expected to drive on is part of the ground, the rest belongs to decorations. Collision handling in Top10 makes it impossible to drive on decorations, and impossible to "fall" through the ground. Note that only objects that are flat and mostly horizontal may belong to the ground. Ground objects should not overlap each other.

Illustration 6 Decorations

1. This list shows all meshes marked as decorations. To select a mesh, click on it.

2. Pick the mesh currently under the cross and mark it as decorations

3. Remove the selected mesh from the decorations

4. This mesh (a podium) is a decoration. Its frame is emphasized with grey lines.

The checkpoints dialog

Checkpoints are used to check that karts do not cheat and really complete each turn by going through all parts of the track. These checkpoints are ordered (i.e there is a first, second... and last). The first checkpoint acts as the final line. Here is a piece of advice: do not make these checkpoints to tight, they should the all width of the road, plus large margins. A pilot leaving the track because of a driving mistake should not be penalized by missing the checkpoint. Do not hesitate to leave large spaces even on the inside of a turn. Taking a short cut through the grass seldom gives any advantage, because of all the bumps and the lack of grip in the grass section. To prevent shortcuts, you can use additional meshes (walls, tyres...).
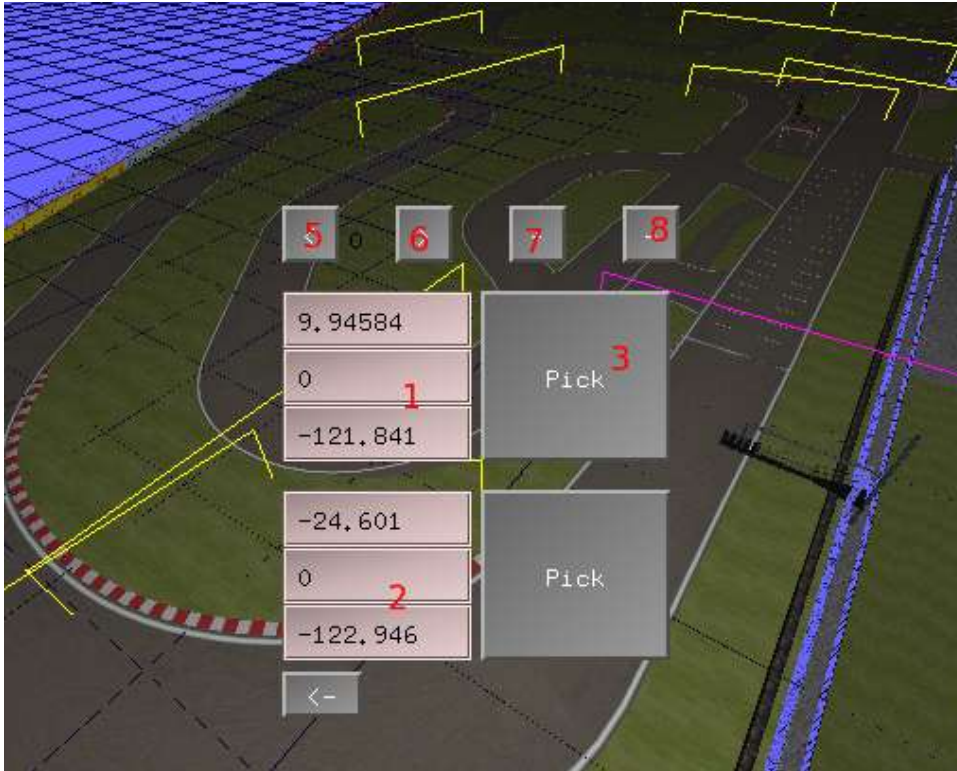
Illustration 7 Checkpoints

1. One of the edges of the current checkpoint

2. The other edge. Checkpoints are not oriented, it does not matter if a kart crosses it in one direction or the other.

3. Click on this button to pick the point under the aiming cross as the edge of the checkpoint.

4. Hmm, there is no 4 on this figure...

5. Move to the previous checkpoint

6. Move to the next checkpoint

7. Add a new checkpoint after the current one

8. Delete the current checkpoint

In the main view, checkpoints are shown as yellow gates. The current checkpoint is drawn in purple. Note: the first thing to do when editing checkpoints is to add a new one. Initially, there is no checkpoint. It is possible to make the checkpoint "before the first checkpoint" the current one, even though it does not exist! This allows you to add new checkpoints in the first position.

Showing and hiding data

The track mesh, the checkpoints, the starting area... are not visible by

default. To see them, select "Show/Hide data" in the main menu if you are using the PLIB version. If you are using the QT version, go into the "Edit" menu and select the dialog whose corresponding data should be hidden or shown. Note: in the QT version, you must show the mesh dialog to see your track.