

GreaseMonkey Technology Demo

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Printed in Canada.

Overview

At a race-track, various vehicles test the limits of their handling.

GreaseMonkey¹ may look like a car-racing game, but it is actually an interactive test-bed that demonstrates the power of the MathEngine's Dynamics and Collision Toolkits to simulate a wide range of vehicles and behaviors in real time.

GreaseMonkey is part of the MathEngine Motorshop suite, a collection of resources and documentation designed to suit the needs of the vehicle games programmer.

We call it GreaseMonkey because, like a grease monkey (mechanic) at a real racetrack, you can roll up your sleeves and retune any of the cars yourself. And you can also drive any of the vehicles yourself (while the rest race under computer control), or you can watch all the vehicles

1. GreaseMonkey is rendered using RenderWare3 from Criterion Software Limited. For more information on Criterion products visit www.integra.com.au.

System Requirements

Suggested minimum requirements to perform a thorough evaluation of the MathEngine technology are as follows:

- PlayStation 2 with standard controller

Or:

- Windows 98
- PII 466 celeron
- 256MB RAM (less RAM yields acceptable performance)
- DirectX 7
- Hardware Graphics Acceleration
- Logitech Wingman Formula Force steering wheel (recommended)

Configuring GreaseMonkey

GreaseMonkey is highly configurable. You construct your vehicles and their properties by creating and editing configuration files—not by writing custom code.

Reconfiguring Both Cars and Game

GreaseMonkey presents a dialog box that allows you to choose how to play your game. You can edit the GreaseMonkey configuration files via the dialog box and reset the game to try different behaviors. You can also modify the attributes of the cars used in the game.

NOTE: Refer to the README file in the GreaseMonkey directory for detailed information about the configuration file parameters.

Every time you press the Reset key (**R**), GreaseMonkey rereads its configuration files. This means that if you use an external editor to change your files, you can change the game's behaviour on the fly.

Initially Configured for Speed and Collisions

The emphasis in GreaseMonkey is on how the cars drive, how good the collision is, and how stable the dynamics are. In real life you wouldn't have a 30-foot jump in the middle of a figure-8 racetrack. Who cares? Our cars take 30-foot jumps very well, and they flip quite nicely: we've learned this is what game developers want.

Similarly, in real life you wouldn't likely have a hotrod racing against a luxury sedan, a sub-subcompact, and a roadster. Nor would you have some cars racing in the opposite direction to others. But these features allow us to demonstrate the power of MathEngine Toolkits.

For example, our cars recover from head-on collisions by getting back on their wheels in a very convincing way. (If a car ends up lying on its roof or otherwise hopelessly stuck, it resets itself automatically after a brief delay.)

How the Cars Are Initially Configured

GreaseMonkey is an evolving demo. The version of GreaseMonkey that is shipped with the current release may have cars with distinctive appearance and handling. Or it may have cars that look alike. As of our most recent writing, here are some of the different car types that we have implemented:

The **sub-subcompact** is slow, skids easily, but is easily recovered from the edge.

The **luxury sedan** sticks to the road a bit better and accelerates more quickly. It lets you know when it's about to let go, and you can recover if you're good.

The **hotrod** has severe understeer, like a front-end-heavy V8 powered monster; you really need to saw at the wheel to drive it quickly through the corners. But, once you get the trick, it's a very predictable handler, and quite quick too.

The **roadster** is a mid-engined, light, powerful sports car. It sticks to the road like glue, but once you exceed its limits the back end will come around on you very fast. It is very unforgiving, which is a characteristic of many real roadsters.

These differences become clear if you drive each of the cars in turn.

NOTE: Cars can be easily added and removed from GreaseMonkey, and the handling is easy to reconfigure (see ["Reconfiguring Both Cars and Game" on page 5](#)): the version that you are looking at may be different from the version documented.

Usage

To race a car, run the executable, then press P to start the race. GreaseMonkey starts up in pause mode. You can press P at any time to pause and then restart a race. Unlike most racing games, in GreaseMonkey cars can roam freely across the track and terrain. The car attributes allow them to behave realistically; the suspension and handling mimic real-life vehicles.

Only one car can be controlled by the player. the rest are computer controlled, and use artificial intelligence to navigate the track, attempt to avoid collisions, and so forth. Assuming that the game begins with all cars under computer control, you can take control of any of the cars by pressing the appropriate keys.

If you are not using a steering wheel or joystick, you can play the demo using only the mouse and keyboard. But you won't have as much control (or as much fun).

NOTE: GreaseMonkey does not use the MathEngine Viewer, and does **not** support the standard user interface for MathEngine demos and example programs.

To see a summary of the commands available to you on your screen, press F1. Here is amore detailed explanation of each command:

Key	PlayStation 2	Action and Description
L/R arrow or mouse	L Analog L/R	Steering The left and right arrow keys steer the active car left and right. You can use the mouse to steer the car.
U/D arrow or left mouse button	Cross/Square	Accelerator/ Brakes The up arrow key is the accelerator, or press and hold the left mouse button. The down arrow is the brakes, or lift your finger off the left-mouse button.
1		Fixed View (Cycle through) In this view of the race, the camera is positioned at one of several fixed positions located to the rear of the car. Pressing F1 repeatedly cycles through the positions available.
2	Right	Drive-by View The camera positions itself where it can view the active car as it drives by. When the car drives far enough away, the camera repositions itself automatically.

Key	PlayStation 2	Action and Description
3	Left	Spectator View The camera positions itself in the imaginary spectators' seats, keeping the active car in the centre of the screen, and repositioning itself when necessary for a better view.
4	Down	Towed View The camera behaves as if it were being towed behind the active car.
5		Helicopter View (<Ctrl>/ <Shift> + Arrow to move the camera) The camera behaves as if were on a helicopter tracking the active car. You can press the following keys to control the camera position and and orientation: <Ctrl> + Left Arrow: Orbits the camera clockwise around the active car. <Ctrl> + Right Arrow: Orbits the camera counter-clockwise around the active car. <Ctrl> + Up Arrow: Raises the camera. The limiting position is the camera positioned directly over and pointing directly at the active car. <Ctrl> + Down Arrow: Lowers the camera. The limiting position is just above the ground; as the terrain rises and falls, the camera rises and falls with it. <Shift> + Up Arrow: Moves the camera in closer to the car. Press and hold down the key to keep moving closer to the car. <Shift> + Down Arrow: Moves the camera away from the car. The extent of the movement depends on how long you hold down the key.
6	Up	Player Driver View The camera shows what the driver of the active car is seeing. This is probably the best view for controlling the active car yourself.

Key	PlayStation 2	Action and Description
P or F10	R1	Toggle PAUSE When the program starts, the race is paused. Press P to start the race. Thereafter, press P to pause the race, then press P again to resume the race.
N	Triangle	Cycle through cars Press N shift your view to a different car. Press N repeatedly to cycle through each car in turn. What happens if you were in control of a car when you shifted your view to a new car? The previously active car automatically goes back to computer control. When you shift your view to a different car, you do not automatically take control of the car: the car continues to run under computer control. To take control of the car you are viewing, press M (below).
B		Return to player's car When you press N to shift your view to a different car, the car you left behind is still the player's car, that is "your" car (unless and until you press M to take control of the new car). Press B to return your view to the player's car.
R	R2	RESET viewed vehicle Press R to reposition the active car 90 degrees. This is useful if you are playing the car and the car has got stuck against a barrier. (You can also reverse by shifting down to first gear and then into reverse: R also causes GreaseMonkey to reread the script files; if you changed the script files (for example by changing the mass of the chassis or the radius of the wheels), the changes will take effect. If the active car is stuck so that it can't move forward, you can press R to reposition it 90 degrees. Alternately, you can downshift all the way to Reverse, and back out of the difficult position.
F1	L1	Toggle INFO. Displays Help on screen.
<Space>	L Analog Up	SHIFT UP (Wheel R Paddle) Press <Space> to shift up one gear. This works even if your car is using automatic transmission.

Key	PlayStation 2	Action and Description
X	L Analog Down	SHIFT DOWN (Wheel L Paddle) Press X to shift down one gear. This works even if your car is using automatic transmission. If you are in first gear, pressing X puts you into Reverse.
L	Circle	Toggle Auto/Manual transmission
M	L2	Toggle Player Control of Viewed Car When GreaseMonkey begins, all cars run under program control. This means that they drive themselves around the track, try to avoid collisions, and automatically get themselves out of any trouble that they might fall into. One of the cars is the active car, that is, the car that the camera follows. If you press L, then you will take control of the active car. If you press L again, the computer will retake control of the active car.

Press **F1** (or **L1** on PlayStation 2) to display Information (Help) on the screen. Press it again to hide the information.