

PA11: Custom Coaster

In this assignment, you have the opportunity to modify *coaster* in an original way. This document lists several possible changes with point values. For full credit, you need to implement at least five points' worth.

- a. [2 points] Change the track. It must continue to be a B-spline, but must have additional control vertices at different positions. The path will change, but must still remain "believable":

- It cannot intersect itself.
- It cannot pass through the ground.
- It cannot pass through the teapot (or whatever replaces the teapot), although it *could* pass through the finger hole in the teapot.

Extra fun: Make it a corkscrew or loop-the-loop.

- b. [3 points] Apply some kind of texturing to the cars or the teapot (choose one).
- c. [1 point] Replace the teapot with an "*.obj" model (like the car). ("teapot.obj" not allowed!) (not compatible with (e))
- d. [2 points] Replace the teapot with a procedurally-defined object. It must appear to "rest" on the ground. (not compatible with (d))
- e. [2 points] Replace the cars with "*.obj" models. Be sure they are positioned and move above the track realistically.
- f. [2 points] Add "rings" to the supports so that cars pass through them.
- g. [1 point] Change the "skybox" (several are available on-line).
- h. [4 points] Change the coaster to a night scene with lit globes on poles attached to the supports and working headlights (spotlights) on the cars.
- i. [3 points] Add gravity-controlled firework explosions.
- j. [2 points] Creatively modify vertex and fragment shaders. (e.g., Make the cars stretch or bounce.)
- k. [3 points] Put physically-correct spinning wheels on the cars.
- l. [3 points] Use environment mapping to make the track or the cars (pick one) appear with a chrome finish.
- m. [2 points] Make the car "leap" an empty section of track (also omitting ties and supports).
- n. [3 points] Put bump-mapped "rivets" on the car's faces.

Feel free to propose other customizations. The instructor will award them appropriate point values.

To ensure that each assignment is unique, email your preferred customizations to the instructor for approval. If they are not unique, he will inform you of the need to change them. If they are unique, he will send you the message "You are approved." You should not begin work until you get this message.

The instructor will expect to see the project you propose. If you do not implement everything you say you will, you will not get full points, no matter how ambitious your project is. For the the sake of your grade, it is therefore not recommended that you propose more than five or six points total. You may resubmit your proposed project at any time (perhaps making it less ambitious) but doing so runs the risk of being similar to an approved project and not getting (re)approved as a result.

Remember that this programming assignment is to be entirely the work of individual students. No teams are allowed.