Subject : CSCI420 - Computer Graphics

Assignment 2: Simulating a Roller Coaster

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Description: In this assignment, I use Catmull-Rom splines along with OpenGL core profile shader-based texture mapping and Phong shading to create a roller coaster simulation.

Core Credit Features: (Answer these Questions with Y/N; you can also insert comments as appropriate)

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1. Uses OpenGL core profile, version 3.2 or higher - Y

2. Completed all Levels:

Level 1 : - Y

Level 2 : - Y

Level 3 : - Y

Level 4 : - Y

Level 5 : - Y

3. Rendered the camera at a reasonable speed in a continuous path/orientation - Y

4. Run at interactive frame rate (>15fps at 1280 x 720) - Y

5. Understandably written, well commented code - Y

6. Attached an Animation folder containing not more than 1000 screenshots - Y

7. Attached this ReadMe File - Y

Extra Credit Features: (Answer these Questions with Y/N; you can also insert comments as appropriate)

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1. Render a T-shaped rail cross section - N

2. Render a Double Rail - N

3. Made the track circular and closed it with C1 continuity - N

4. Any Additional Scene Elements? (list them here) - N

5. Render a sky-box - Y - I made a sky box with metallic texture

6. Create tracks that mimic real world roller coaster - N

7. Generate track from several sequences of splines - N

8. Draw splines using recursive subdivision - N

9. Render environment in a better manner - N

10. Improved coaster normals - N

11. Modify velocity with which the camera moves - N

12. Derive the steps that lead to the physically realistic equation of updating u - N

Additional Features: (Please document any additional features you may have implemented other than the ones described above)

1. I speed up the camera to mimic a realistic feeling of rollercoaster.

2.

3.

Open-Ended Problems: (Please document approaches to any open-ended problems that you have tackled)

1. When calculating the normal for triangles, I spent a lot of time to figure out how did I label the 8 vertices and which three to chose when making a triangle.

2.

3.

Keyboard/Mouse controls: (Please document Keyboard/Mouse controls if any)

1.

2.

3.

Names of the .cpp files you made changes to:

1. hw2.cpp

2. pipelineProgram.cpp

3.

Comments : Very interesting assignment