Final Project

Due: May 1st & May 13th

Overview: For the final project there are three options. Option 1 is a cumulative final coding project on a novel topic. Option 2 involves revisiting an existing project. Option 3 involves no coding, rather you will learn how to use an existing tool for physical simulation or motion planning. Options 1 & will receive full credit. If you choose Option 3, the highest grade you can get in the course is a B+. Option 3 is intended for those considering taking the course S/N, but you are welcome to choose it for any reason (I know everyone is very busy right now!).

Team Size: You may work either alone, or in teams of 2-3 people. Projects will be graded on the same standard regardless of team size.

Option 1 - Course Project *(Teams of 1-3)*

For this option choose anything you want to do related to our class. The only restriction is there must be some form of "motion" in the project. It is okay if the project does not run in real-time, or is not directly related to games -- though making a game that uses ideas from the class is also great!

Some example project ideas:

- -Use PCG ideas to make a puzzle-like game or a video game level
- -Make your own 2D physics engine
- -Animate a virtual character (in 2D or 3D) using IK
- -Implement skinning of a 3D character
- -Make a 2D or 3D SPH fluid simulator
- -Make a game using concepts from this class
- -Simulate natural phenomena (e.g., thunder and lightning, or an eroding landscape)
- -Simulate a musical instrument

Discuss in your report:

- -What is some comparable state-of-the-art?
- -How does your implementation come to the state-of-the-art?
- -What were the key algorithms you used?
- -What where the computational bottlenecks to your approach? What would be the limiting factor to scaling it up 10x or 100x bigger than what you turned in?

Due: Friday, May 1

A one paragraph summary of what you intend on doing, and how it's related to the class.

Due: Thursday, May 13

A link to a webpage with:

- -The names of everyone in your group
- -Videos and images of your project
- -A 2-3 page report detailing your approach, what worked, what didn't, and what your future work might be.

Option 2 - Revisit a Previous Assignment *(Teams of 1-3)*

For this option choose one of our previous assignments (HW 1-3), and re-do it. Try to target something in the 130-150 points range. In particular, we will be looking for high levels of polish on your final submission. Your score on this final project will be based in part on the difference between your score on the original assignment and how well you did on the project. That means, 1) probably it's a good idea to revisit your worst project and 2) if you aced all three HWs, this is not the final project for you. =)

You may work with either your original partner, or with someone different than you did the HW submission with. The baseline score will be the highest one scored on that assignment by anyone in the team.

Discuss in your report:

-What is some comparable state-of-the-art?
-How does your implementation come to the state-of-the-art?
-What were the key algorithms you used?
-What where the computational bottlenecks to your approach? What would be the limiting factor to scaling it up 10x or 100x bigger than what you turned in?
-What are the key improvements between your final project and your original submissions (show visual comparisons)

Due: Friday, May 1

A one paragraph summary of what project you'll be improving along with a screenshot that can serve as a "before" picture.

Due: Thursday, May 13

A link to a webpage with:

-The names of everyone in your group
-Videos and images of your project
-A 2-3 page report detailing your approach, what worked, what didn't, and what your future work might be.

Option 3 - Learn a Simulation Tool *(Teams of 1-2)*
This option involves no coding. Instead you will learn how a simulation tool works and then make a novel simulation. The new simulation should be 10-20 seconds long.

Note: if you take this option, the highest grade you can get in the class is a B+.

Discuss in your report:
-What is some comparable state-of-the-art?
-How does your simulation results compare to the state-of-the-art?
-What key algorithms do you think the simulation tool is using?
-How is the simulation imperfect? What are some simulation artifacts?

I highly recommend using Blender if you choose this option. You can download Blender for free from here: https://www.blender.org/download/releases/2-80/

There are many, many blender tutorials. Here is just a few to get you started:
- Fluid Simulation: https://www.youtube.com/watch?v=4du7KFnhoPU
- Fluid Simulation: https://www.youtube.com/watch?v=zmw-BTCbWMw
- Smoke and Fire: https://www.youtube.com/watch?v=_2m_xkSZrvc
- Rigid Body: https://www.youtube.com/watch?v=KtjJfWlQ8oE
- Water: https://www.youtube.com/watch?v=wVuoKJRsJTY
- Cloth: https://www.youtube.com/watch?v=-vVoQ-1U0SY

Due: Friday, May 1
A collection of links to tutorials you are following (or plan to follow) before making your novel simulation, along with a plan how your new simulation will be different from these tutorials.

Due: Thursday, May 13
A link to a webpage with:
-The names of everyone in your group
-Videos and images of your project
-A 2-3 page report detailing your approach, comparing your simulation to the tutorials, and discussing what worked, what didn't, and what your future work might be