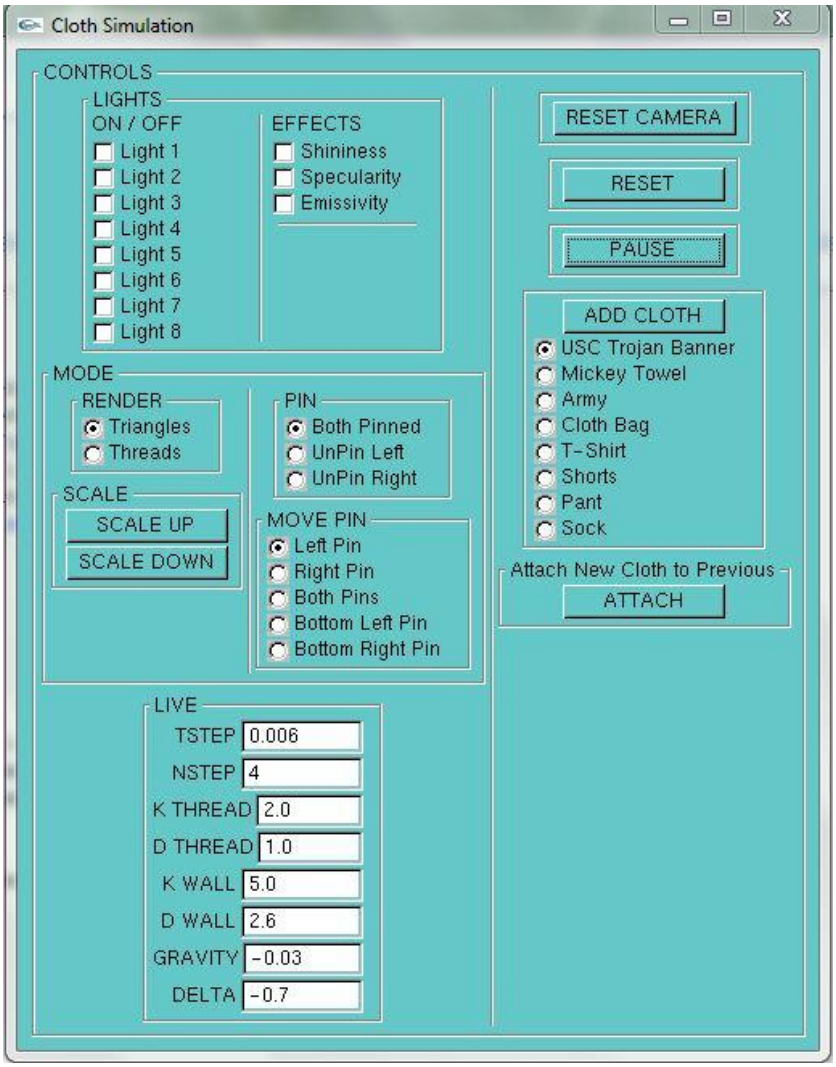
CLOTH SIMULATION - OPENGL

I have implemented cloth simulation using mass spring system.

- This system is completely dynamic and very fast. It is possible to create multiple cloth instances dynamically. Hence I call this simulation as "**CLOTHES SIMULATION**" instead of "CLOTH SIMULATION".
- I have used Runge Kutta 4 iterator for interating my cloth systesm along time. RK4 is sronger than Euler integrator hence to keep my clothes stable, I have implemented RK4.
- Followin are the runtime controls available for the user



1. There are **light** controls for the environment, allows the user to toggle all the 8 possible lights in OpenGL
2. Environmental effects for rendering like **Specularity**, **shininess** and **Emissivity** can be switched on/off.
3. Clothes can be rendered in **wireframe** mode and also in **texture** mode. Radio buttons provide the user an option to toggle between and see the output dynamically.
4. Clothes can be **scaled Up** and **scaled down** dynamically. Texture will be mapped according to the new scaled size of the cloth dynamically.
5. This system has the clothes hanging at the two pins. User can **pin** or **unpin** any of the pins of the cloth.
6. User can control the movement of the cloth by using the provided controls

   Select one of the pins or set of pins from the controls,

   For the move movement of the cloth using the above selected pins,

   I. **Left arrow key** – move the pin left along x axis
   II. **Right arrow key** – move the pin right along x axis
   III. **Up arrow key** – move the pin forward along z axis
   IV. **Down arrow key** – move the pin backward along z axis
7. There are a set of LIVE variables provided for the user to play with during the simulation. Variables like timestep, nstep, spring stiffness constant, spring damping constant, wall stiffness constant, wall damping constant, gravity and velocity damping factor(delta) .
8. Now lets find what we can do using the buttons,

   Reset camera button – User can reset the camera to the initial position just by clicking on to this button in the UI.

   Reset button – user can generate many clothes and he can move them and change everything in the environment. Finally if he wants to remove everything in the environment and start from the beginning then just click on to this button.

   Pause – This button is used to pause/unpause the simulation at any frame needed.
9. Finally we move onto the main control of adding a cloth to the simulation.

   User must first click the pause button because initially the system is under pause. Upon clicking the pause, user can see a defauly cloth “USC Trojans banner” hanging in a random location in the scene.

   User can select any cloth in the provided list and click onto the “**Add Cloth button**”. This will add a new selected cloth at a random position in the simulation.
10. **Attach cloth** – this button makes sure that the new cloth is always added at the bottom of the previous cloth.

These are the controls and it is fun playing with the virtual cloth.