Arthur Giroux & Valentin Richoz -Introduction to Computer Graphics-Prof. Pauly

Project Proposal (introduction to computer graphics)

What:

Real time snow storm simulation.

Why:

In old video games, snow wasn't really something that you could make a part of the game.

For Example in Super Mario 64, you can see snow falling but it's really minimalistic and doesn't add much to the game.

Now that we have much more power in our consoles and computers, there's a lot of particle effects in video games like fire, smoke, explosions, etc.

You could expect to have realistic snow simulation as well but in reality snow is something that you don't encounter very often in video games, and (we think) that's a shame.

You'd expect a good snow falling effect in games such as SSX (a snowboard game) but there's none !

Even in the latest games like Arkham City, there are some snow effects but it's really simple:

http://www.youtube.com/watch?feature=player_detailpage&v=HcubG6kePH8#t=95s

In Need For Speed there's some snow circuit http://www.youtube.com/watch?feature=player_detailpage&v=ddedQc5UwUM#t=56s

But the snow isn't part of the gameplay, it doesn't shorten your sight as it should or get stuck on your windshield etc. It's a good start but not used as it should be.

The best snow effects that we've seen so far are in Uncharted 2

http://www.youtube.com/watch?feature=player_detailpage&v=rrCKbhaKAp4#t=78s

Modern Warfare 2 :

http://www.youtube.com/watch?feature=player_detailpage&v=TcE5xo847nY#t=220s

And of course in Skyrim:

http://www.youtube.com/watch?feature=player_detailpage&v=3Bm2qU2MlhI#t=90s

The snow is part of the gameplay as it should be in real life by shortening your sight, slowing you down etc. But the storm effect isn't really here or it's simulated by addition of fog.

We focus on snow storm because that's something you should encounter during a heavy snowfall and it should have a real impact the gameplay.

So how come it's rarely or poorly done in video game whereas it could really add something to the experience?
Is it because it's too costly in terms of computations, if so, how it's different than smoke or explosion that we see very often ?

We will try to implement a quite realistic effect and see if it's not too costly to be incorporated in real-time in a video game.

How (Milestones) :

15.11.2012: First milestone.	General conception planning (i.e Classes and attributes, etc.) + Simple one snowflake generation
22.11.2012: Midterm milestone.	By then, we will have implemented a basic particle engine in the framework that generates random snowflakes, varying according to parameters such as rate, scattering, density etc.
29.11.2012:	You recommended to use some sort of vortex equation that compute the acceleration of a particle to generate the storm effect and to add random offset for a “leaf falling” effect on the snow.
06.12.2012	Wind Generation, relative to different possible patterns (random wind, directional wind, combination of winds, etc.)
13.12.2012	Texture and shading of the snowflakes. Lighting effects.
17.12.2012: Joker Milestone	Depending on the progress of our project and the time left, several possibilities : ● snow accumulation on grounds and objects ● reaction to heat sources