Independent Study - Class Proposal

Advanced Game Development

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There are many subjects to cover in the field of game development. The introductory class does a good job of touching on a large range of these topics. However, due to its time constraints and a large emphasis on the completion of a semester long project, it cannot cover everything or go into full detail of every concept. Advanced Game Development should teach advanced Unity concepts, online multiplayer games, and some general advanced game development topics.

Advanced Game Development should teach about advanced Unity tools. Unity has some very advanced features that, when used correctly, enhance games significantly. One example of this is how Unity can perform light mapping. In graphics, students learn about diffuse and specular lighting and Unity has a specific way of using these effects to render scenes. Additionally, there are many image effects that this game engine can perform. It can create internal lens reflections. This makes the scene look more like someone is taking a picture of it. It will allow the rays of light to be captured and everything is more realistic. Additional enhancements are layer based boom and sun shafts. Unity also has advanced audio capabilities that allow the programmer to specify how much of which sound is heard where. Lastly, Unity can do occlusion culling, which would be a great thing to teach.

This class could also touch on the most popular type of games being played, online multiplayer games. It could address the game’s server and how to create them. The class could teach about how to join an existing host. Also, the class could teach about maintaining gameplay with network communications, possibly by state synchronization and remote procedure calls.

Lastly, there are some topics that could be researched into even more. Path finding is an advanced algorithm in most games and a very important concept. Collision detecting is also important because it is so vital to gameplay. Lastly, artificial intelligence can always make enemies more realistic and more responsive.

Advanced Unity tool usage, online multiplayer games, and tough general game development concepts would make this a very well rounded class. It would also benefit from a project that spanned a large portion of the semester. This study would be very useful to students at Rose-Hulman who are going into the game development field.

Possible Syllabus:

Week 1:

* Course kick off
* Go over Unity tutorial
* Start simple game (such as a character can move on a square)

Week 2:

* finish simple game movements
* introduce light mapping - <https://www.youtube.com/watch?feature=player_embedded&v=suxujCszLnk>
* add advanced lighting into simple game, such as diffuse, specular… etc

Week 3:

* introduce image effects - <https://www.youtube.com/watch?feature=player_embedded&v=wc1vJ-FixM8>
* how to image effects - <http://www.burgzergarcade.com/blogs/petey/images-effects-and-going-blind>
* add image effects

Week 4:

* Introduce occlusion culling - https://www.youtube.com/watch?feature=player\_embedded&v=-cksCNeH8b8
* Add occlusion culling

Week 5:

* Introduce audio - <https://www.youtube.com/watch?feature=player_embedded&v=PPJNLFySBCU>
* Add advanced audio, several different types such as behind objects – muffled and other types

Week 6-8:

* Talk about multiplayer online games
* Possibly attempt to create one or migrate the current game into one

Week 9-10:

* Cover remaining advanced topics
  + A.I.
  + Path finding
  + Collision detecting