CS 392 Online Final

Fall Semester, 2020

Create a document with the answers in some common format
Feel free to identify answers by question number; You do not need to retype the questions.
Upload your answers to the class website.

All Questions all refer to the november 16 version of the engine

Question 1: *(10 points)* Why are objects represented with a list of locations, rather than simply using multiple instances of a particular object (StoneBlock, etc)?

Question 2: *(10 points)* Why isn't the helping cat hit by its own projectiles?

Question 3: *(10 points)* What is the maximum CPU use possible for the November 16 engine? (Make sure you are looking at the version of the engine with the separate collisions thread)

Question 4: *(10 points)* What are two ways the game engine is inefficient regarding main memory usage with the locations vector? Assume that the number of most types of item is known when load_level is run.

Question 5: *(10 points)* Name three common game features our engine is missing.

Question 6: *(10 points)* Alignment issues often appear when moving data from main memory to the video card, and vice-versa. Explain one place this affects our game engine.

Question 7: *(10 points)* Some objects, like helping cats and fragments, have more than a single vec4 for each place the object occurs, such as activation status or velocity. Our engine uses parallel arrays for this, but could use something like the following:

```
struct instance_info {
vec4 location;
vec4 velocity;
bool active;
};
vector<struct instance_info> instances;
```

This has the potential to be more convenient inside our code. What extra step would be needed whenever the object locations were updated on the video card for this to work?

Question 8: *(10 points)* Why does HelpingCat have a vector of model matrices, rather than simply storing locations like all the other objects?

Question 9: *(10 points)* Suppose you were adding a telescope features. Where is the field of view determined?

Question 10: *(10 points)* Since all blocks are cubes, some structures which could be made from an irregularly-shaped block are instead made from many cubes. How does this contribute to low performance?