Opening Discussion

- What did we talk about last class?
- Minute essay comments
  - Looking at stats in the code.
  - Is it common for an event to trigger a chain?
  - Entities in the simulation.
Steps in Simulation Study

- It isn't just about writing code and running that code.
  - Formulate problem
  - Collect data/define model
  - Check validity of assumptions
  - Write program and verify it
  - Do pilot runs
  - Check if simulated behavior is correct
  - Design experiments
  - Do production runs
  - Analyze data
  - Document/present results
Other Types of Simulation

- Continuous simulation
  - Typically differential equations.
- Combined discrete-continuous simulation
  - You have a continuous system where certain thresholds can trigger events in a discrete manner.
- Monte Carlo Simulation
  - Lots of random events.
  - Static simulation.
- Spreadsheet Simulation
Drawbacks of Simulation

- Stochastic simulations give estimates in a single run.
- Can be expensive to develop.
- It is easy to put too much faith in a simulation.
Pitfalls of Simulation

- Poorly defined objectives
- Inappropriate level of detail
- Failures in communication/understanding
- Acting like it is just programming
- Lack of experienced team members
- Poorly collected system data
- Inappropriate software
- Misuse of animation
More Pitfalls

- Using arbitrary distributions
- Treating answers of a single run as the “true answers”
- Failure to move past transient behavior
Linked Storage

- These are basically linked lists.
- One variation that you might not be familiar with is “static linking” where you use ints instead of pointers.
- If you use static linking you can use a pool of element and keep a free list. This can be more efficient because memory allocation is often a fairly slow operation.
Linked Lists for Events?

- The author states that linked lists will often have advantages over arrays in simulations.
- He uses a sorted linked list for doing the event queue.
- What might be a better data structure?
The author has developed a small bit of C code in order to help with building simulations. This code really just focuses on playing with lists.

While it is interesting to see what type of functionality he puts in, I think that we might benefit more from creating our own similar type of framework that is more object-oriented.
Do you have any questions about what we did today?

How well do you think that the code we put together today will extend to other models?