I am planning to do my final project using the hospital simulation prompt. For my usage of polymorphism, there will be doctor and nurse versions of providers. The provider class will mainly be used to track if the provider is available for another patient. The nurses and doctors will have different functions for treating patients based on their capabilities and average time to treat. The use of a map will come in the form of the town’s citizen list. I will use a map instead of a list because I will only need to run through the list to see if any citizen needs to go to the hospital, rather than pulling citizens from it. For the queue, I will use a priority queue as a patient list. The queue will keep track of a priority number that will determine which patients the providers will attempt to attend to first weighted by the severity of the visit and the time the patient has been waiting.

A basic idea of how the simulation will work is that each second, each citizen will have a random chance of needing to visit the hospital (if they aren’t a patient already). If they are selected a severity will randomly be determined. They are then placed into the patient queue, which will sort the patients based on their priority. The priority will be determined to start on a value based on the patient’s severity and will increase each second. When a provider becomes available and will search through the patient queue until they find a patient they can treat. They will then be marked as non-available for another patient and the patient they are treating will be removed from the queue. A random treatment time will be determined and the provider will be occupied for the random number of seconds. Once the treatment is finished, the provider will be flagged as available and the patient will be added to the record vector, which stores the treatment number, level, and time.