Final Project Summary

# What the Program is Supposed to Do

The program is supposed to simulate a small-town emergency room.

* Each person in the town has an equal chance of ending up in the emergency room.
* When a person arrives, they are assigned a priority number (1-20) and placed in a priority queue based on that number.
* The probability of each priority being assigned is as follows:
  + Priority 1-10: 70%
  + Priority 11-15: 20%
  + Priority 16-20: 10%
* The emergency room has two categories of caregivers:
  + Doctors
    - Can treat Priority 1-20
    - Take 1-20 minutes to treat a patient
  + Nurses
    - Can treat Priority 1-10
    - Take 1-10 minutes to treat a patient
* The program simulates 1 week (10080 minutes) of time.
* The user inputs the following values:
  + Average hourly arrival rate
  + Number of doctors
  + Number of nurses
* The simulation calculates the average wait time and keeps track of who visits, how often they visit, and the severity of each injury.

# What the Program Actually Does

* When each person arrives, they are assigned a priority number and placed in one of two queues:
  + Low priority queue: Priority 1-10
  + High priority queue: Priority 11-20
* The high priority queue is treated by doctors, and the low priority queue is treated by nurses.
* The probability is assigned as follows:
  + Priority 1-10: 70% chance
  + Priority 11-15: 20% chance
  + Priority 16-20: 10% chance
* The emergency room has two categories of caregivers:
  + Doctors treat the high priority patients.
  + Nurses treat the low priority patients.
* The program simulates 1 week (10080 minutes) of time.
* The user inputs the following values:
  + Average hourly arrival rate
  + Number of doctors
  + Number of nurses
* The simulation creates the average wait time and displays the number of patients treated.

# Explanations of Key Areas

## The queues

We were planning on using a priority queue to keep track of the patients, but we couldn’t figure out how to implement it in time, so we went with two regular queues based on the priority number.

## The Caregivers

Doctors are supposed to be able to treat all patients, whereas nurses are supposed to be restricted to lower priority patients. In our implementation, we set it up so that the doctors treat the high priority queue and nurses treat the low priority queue. At least, that’s how we *think* it works. We don’t know how to verify that one way or another.

## The Statistics

We’re pretty sure that the statistics that we’re getting are not completely correct. Specifically, we used some questionable formulas to get the result for average wait time. Also, we’re pretty sure that the number that we’re getting for total patients treated is wrong. That being said, we’re not sure how to check the math without getting into a lot more detail than we have time for.