**August 2011 - Logical Hospital**



Running an emergency room (ER) requires the careful planning and management of resources in order to efficiently meet the demand for services.  Appropriately designing the ER can mean the difference between profit and loss.

Suppose patients arrive at a waiting room with an interarrival time of 6 minutes (normally distributed with a standard deviation of 2).  Each patient is prescreened and classified into one of three severity types: High, Medium, and Low.  The severity types are evenly distributed at 33.3% each.

The prescreening station determines the following: For the High severity patients, 80% will need to go to an ER station and 20% will be discharged without requiring any treatment.  For the Medium severity patients, 50% will need to go to an ER station and 50% will be discharged without requiring any treatment.  For the Low severity patients, 20% will need to go to an ER station and 80% will be discharged without requiring any treatment.

There are two ER stations available to treat patients.  Treatment times, on average, take 21 minutes (normally distributed with a standard deviation of 4).  An open ER station will take the highest severity patient first from the waiting room.  Once a patient is admitted to an ER station, they cannot be bumped out by a higher priority patient.  An ER station can only treat one person at a time.

**Question:  What is the average wait time in minutes for each of the three patient types (high, medium, and low)?**