MGT 40750 – Quantitative Decision Modeling Fall 2013

**Solution to End-of-Chapter Exercise: Process Simulation**

Please work on the following question *individually*.

Consider a small process that is part of a larger manufacturing process. Jobs enter this small process, one at a time. The time between arrivals of jobs is 1.5 minutes, on average, according to an exponential distribution. These jobs are temporarily put into a large storage area (s*torage 1*). The jobs are then processed, one at a time, through a work center, which takes 1.8 minutes per job, on average, according to a normal distribution (with a standard deviation of .3 minutes). After passing through the work center, jobs are put into another large storage area (*storage 2*). The next step in the process is a quality check, which is performed on the jobs, one at a time, at a single station. The check takes 30 seconds per job (on average, according to an exponential distribution). 5% of the jobs fail the check and are returned to the first storage area in the process (*storage 1*), where they must pass through the work center and quality check again. The rest of the jobs pass this check and are placed in another large storage area (*storage 3*), from which they are later taken to another part of the larger process; we don’t worry about these departures in this model.

a. Using the elements of SimQuick, draw below a process flow map that models this process.

Entrance

Arrivals

Buffer

Storage 1

WS

Work Center

Buffer

Storage 2

WS

Quality Check

Decision Point

DP

Buffer

Storage 3

b. Management wants to simulate an 8-hour time period of this process. Let’s do 40 simulations. Fill in the following SimQuick tables accordingly. (*You may not need to use them all.*) Let time units represent *minutes*.

**Entrances:**



**Buffers:**



**Work Stations:**



**Decision Points:**



