Module 5 – Practice Solutions

Security check

SC1. Probability to make it past the gate: 0.5*0.1*0.7=0.035

SC2. Probability to board: 0.035*0.05*0.01 (those are the bad guys that are inspected, but not caught) + 0.035*0.95 (those are the bad guys that are not inspected) = 0.0000175 + 0.03325 = 0.0332675

Cardiac ICU

CICU1. An average patient will spend 0.8*5 + 0.2*13 =6.6 days in the ICU during their first visit.

For 95% of the patients, there is no additional visit. For the other 5%, we have to add another 13 days = > 6.6 + 0.05*13=7.25 days

CICU2. To find the bottleneck, we have to look at m/p.

For the ICU: 12/7.25 = 1.6551

For the ward: 18/4.2= 4.2857 (note: since 5% of the patients will be going through the ward twice, the processing time there is 4.2 on average: 0.95*4 + 0.05*8)

So the bottleneck is the ICU (lower capacity).

CICU3. The hospital can have an average of 1.65 surgeries a day in the OR.

CICU4. Answer: (b). If you factor in variability, that number goes down, because you have to hold some safety capacity.

Assembly Tolerances

AT1. Capability Score = (110.55-110.45) / (6*0.05) = 0.333

AT2. What is the probability that the part is too large? This is
1- Normdist(110.55,110.5,0.05,1)=0.1586

What is the probability that that the part is too small? This is
Normdist(110.45,110.5,0.05,1)=0.1586

So the defect probability is: 2*0.1586 = 0.3173

AT3. To get the new standard deviation, we solve: (110.55-110.45) / (6*stdev) = 5/3 => stdev = 0.01