**Quiz 2 Solution**

Manufacturer's specifications for a solenoid states that the failure rate is 0.0012 failures/hr. Assuming CONSTANT failure rate, calculate the MTTF (in hrs) of this solenoid.

Solution: MTTF=1/ λ = **833.3**

What is the median time (in hour units) for this component (to 1 decimal place)?

Solution: Tmed=-ln(0.5)/ λ = 0.693\*83.3=**577.7**

What is the probability that the solenoid**will fail** within the first 50 hrs of operation following installation (to 2 decimal places).

Solution: The probability that the failure will not occur within 50 hr is

R(t) = exp(-λt) = exp[-0.012(50)] = 0.942~0.94

So the probability that the failure will occur with 50 hr is the complement:

F(t = 50) = 1- R(t = 50) = 1- 0.94 = **0.06**

Given that the solenoid has not failed within the first 50 hrs of operation, what will be its reliability after **another** 50 hrs of operation (to 2 decimal places)?

Solution: Reliability does not change due to memoryless property. R(50|50)=**0.94**

What is the value of Tmode (the time, in hrs, when reliability is the highest)?

Solution: 0 (CFR has an exponential distribution, so the highest reliability is at time t=0