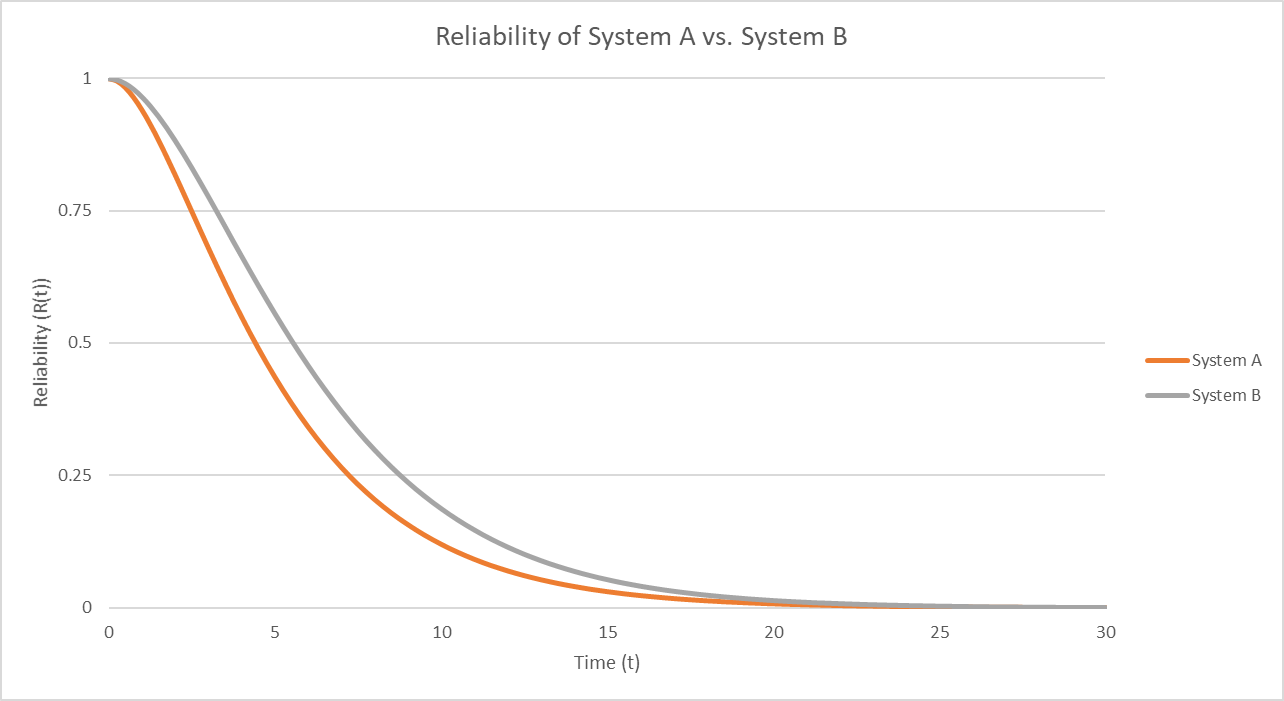
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ECE 4930-004

**HW1**

1. Derive a reliability function R(t) for each system.
   1. System A
   2. System B
2. Determine which system is more reliable. (MTBFcpu = 9hrs, MTBFmem = 6 hrs)

*plot 1-(1-(e^(-((1/9)t+(1/6)t))))^2, (1-((1-e^(-((1/9)t)))^2))\*(1-((1-e^(-((1/6)t)))^2)), t=0 to 25*

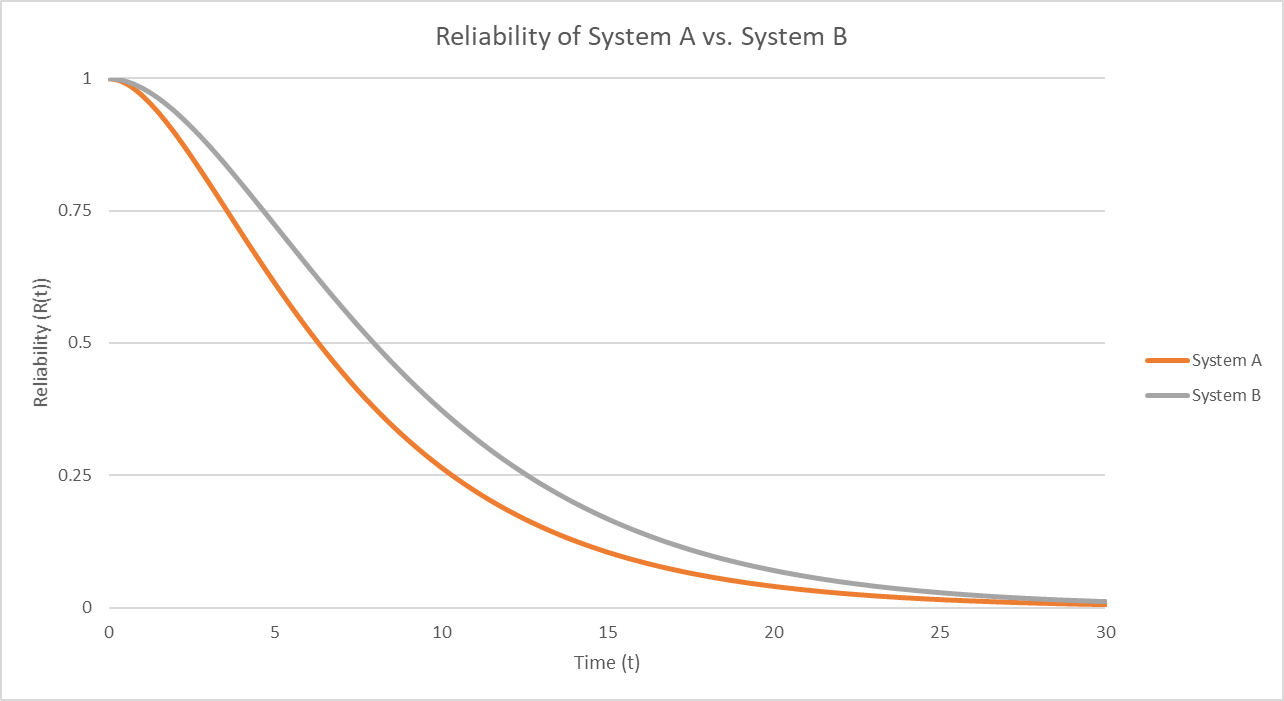


**Figure 1: Plot of reliability functions from System A and System B; λcpu = , λmem =**

After replacing λcpu with and λmem with  in the appropriate places, the plot of the two reliability equations is shown in Figure 1. We can see that the reliability of System B decreases slightly slower than that of System A. Therefore, we can say that System B is the more reliable of the two based on the given MTBF values.

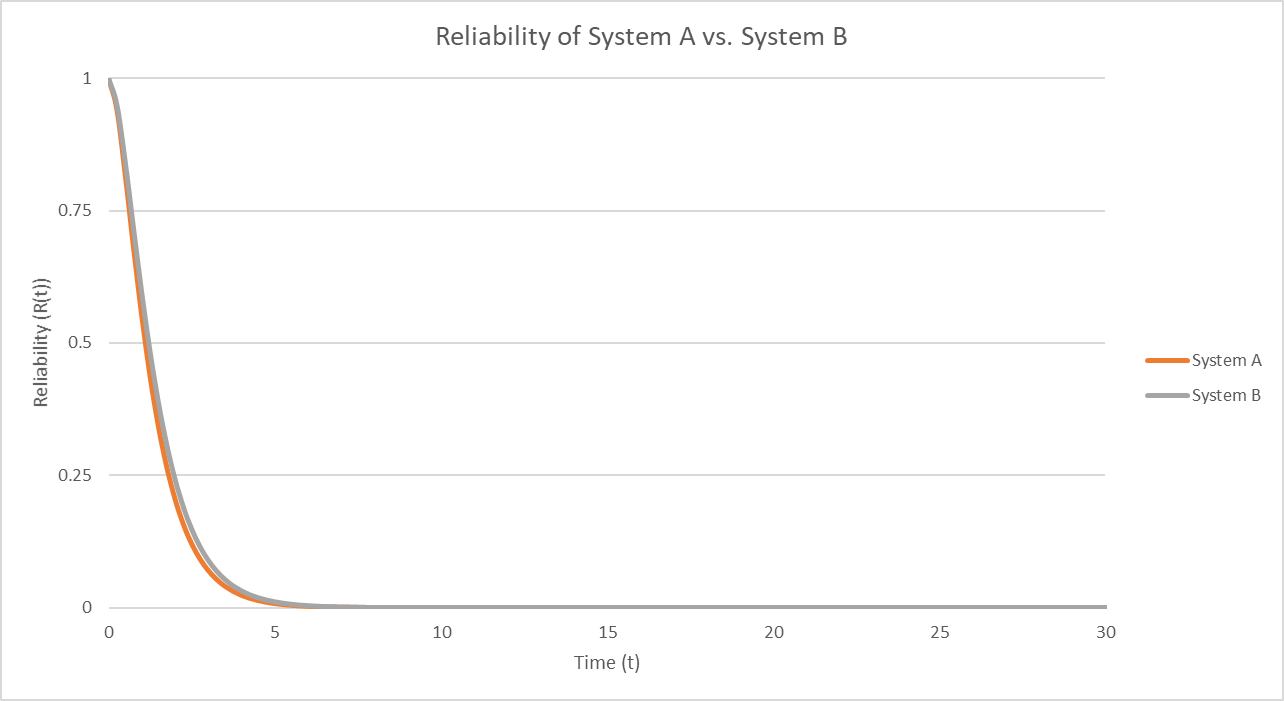
1. What would the MTBF of a memory module need to be to change your decision (if at all)? Explain.

To determine what MTBF for memory modules may make System A more reliable, first I tried doubling the original. Plugging in for λmem gives the following result:



**Figure 2: Plot of reliability functions from System A and System B; λcpu = , λmem =**

Since System B is even more reliable than System A in this case, I tried reducing the MTBF for memory modules to 1, plugging in 1 for λmem, which gives us the following:



**Figure 3: Plot of reliability functions from System A and System B; λcpu = , λmem = 1**

After testing these two extreme alternatives, I still conclude that System B will be more reliable than System A regardless of the MTBF for memory modules.