NED UNIVERSITY OF ENGINEERING AND TECHNOLOGY

BE (CS)   Batch: 2015-16
Spring Semester 2019 (24-05-2019)   Computer Systems Modeling (CS-417)

Assignment III

Q1. A communication line linking devices A and B is operating at a rate of 4000 bps. The device A sends an average of 22,000 characters of 8 bits each down the line each minute.

a. Utilization of the line per unit time
b. Average number of characters waiting to be transmitted
c. Average number of characters in the system
d. Average character transmission delay (in msec)
e. Average queuing delay for each character (in msec)
f. Probability that a character will be immediately transmitted
g. Probability of at most two characters in the systems
h. 90th percentile waiting time in the system
i. 90th percentile waiting time in the queue

Q2. Suggest appropriate reliability metrics for the following classes of software system. Give reasons for your choice of metric. Predict the usage of these systems and suggest appropriate values for the reliability metrics:-
   a) A system that monitors patients in a hospital intensive care unit
   b) A word processor
   c) A flood warning system to give early warning of flood dangers to sites threatened by floods
   d) Book issuance system at a library

Q3. Consider a space shuttle (with Mission Time = 8 hours) that consists of two subsystems A and B joined in series as follows:-
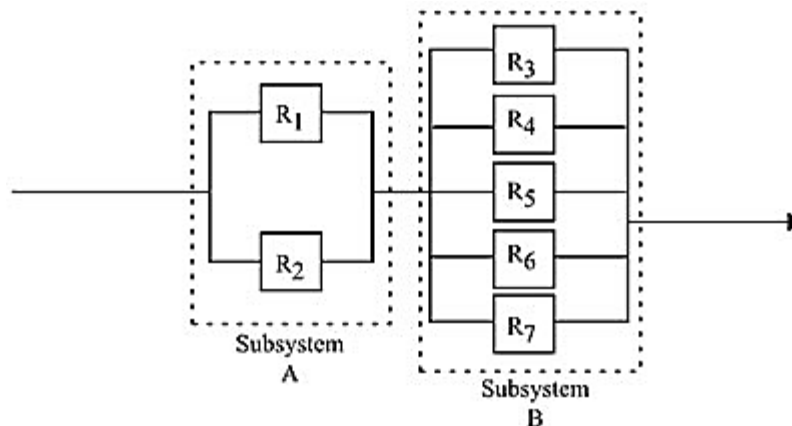
Subsystem A is a parallel whereas B is a 3-out-of-5 configuration. Both the components in A are identical with Failure Rate (λ_1) = 8 every 1000 hours whereas the components in B are also identical with each other having Failure Rate (λ_2) = 12 every 1000 hours. Compute the reliability of the space shuttle.

NOTE
   i. Assignment is on individual basis and to be prepared by hand
   ii. Last date of submission: **Thu 20th June, 2019**

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