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CS Fundamentals

Due: 3/10/22 @ 11:59

**CS3360 Programming Assignment 1**

Submitted Files/Programs w/descriptions:

**PA1\_Q1.cpp**: This is a C++ file containing Problem 1 in the project. This program uses a pseudo random number generation function, **rand()**, that will generate uniformly distributed random numbers and will generate a workload for a system that is composed of 1000 processes. Assume that the processes will arrive with an expected average arrival rate of 2 processes per second that follows a Poisson Distribution and the service time for each process follows an Exponential Distribution with an expected average service time of 1 second. This program will print out the results a list of tuples in the format of *<process ID, arrival tie, requested service time>*. It is safe to assume that these processes arrive that they start at 1. After printing out the tuples, the program will print out the **actual** average arrival rate and **actual** average service time generated.

**PA1\_Q2.cpp**: This is a C++ file containing Problem 2a and Problem 2b in the project. Also using a pseudo random number generation, this program will generate synthetic data showing the failure and restoration times for the two servers the first part of the problem (Server A and Server B). It is safe to assume that it is always exactly 24 hours per day and exactly 265 days per year. In the second part of the problem, this program will also print out how long it would take until the whole computing system fails within the 10 hours restoration time.

**README**: This is a text file containing the programming language I used for this project, the specific instructions/commands on how to log into the CS Department Linux Server (zeus.cs.txstate.edu), and how to compile and run both cpp files for the project.

Program Results (Screenshots):

**Problem 1:** What are the **actual** average arrival rate and **actual** average service time that were generated? The actual average arrival rate will be around 0.5. The actual average service time is about 1. (3 runs)

Graphical user interface, text

Description automatically generated A picture containing graphical user interface

Description automatically generated

Text

Description automatically generated with low confidence

**Problem 2:** Showing the failure and restoration times for each server over 20 years. Find out how long it would take until the whole computing system fails. (3 runs)

Text

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A picture containing text, window

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