Manufacturing (4 students) A manufacturing system contains 3 machines, each subject to randomly occurring breakdowns.

Each machine operates for random amount of time, which is exponentially distributed random variable with mean 8 hours before breaking down.

There are 2 repairmen (a fixed, positive integer) to fix the broken machine; and it takes a repairman an exponential amount of time with mean 2 hours to complete the repair of a broken machine.

No more than one repairman can be assigned to work on a broken machine.

If 2 machines are broken down at a given time (i.e. getting repaired), and the third machine fails (which means the production stops), the third machine will be kept in an area until the first repairman becomes available.

Furthermore, a repairman works on a broken machine until it’s fixed, regardless of what else is happening in the 2 system.

Assume that it costs the system $50 for each broken machine and $10 per hour to employ each repairman.

The company is planning to get extra 1-3 more machines to make sure the production running without any disruptions (i.e., if all machines are down, production halts inevitably).

Simulate the system for exactly 800 hours.

Should the company purchase more machines? If so, how many?

Assume that at time 0 all machines have just been “freshly” repaired this is the project idea can you explain what should be done with any ideas on it