

In a small manufacturing facility, two distinct electronic devices, each composed of parts A and B, undergo a multi-step production process. Part A arrivals follow a Normal distribution, proceeding to the drill press area upon reaching the factory. The combined operation time for drilling adheres to a Triangular distribution.

On the other hand, Part B arrivals have Exponential interarrival times, and they come in batches of two. These parts are directed to the punching area, where a machine perforates holes in them. The processing time for this operation follows a Normal distribution.

Subsequently, both Part A and Part B move to the sealer area, equipped with Sealer 1 and Sealer 2 machines. Here, electronic components are inserted, and the case and cap are assembled and sealed. The total processing time varies for each part type, following a Triangular distribution for Part A and a Normal distribution for Part B. The order of processing on Sealer 01 and 02 machines is determined by the smaller queue number.

Following the sealing operation, the parts undergo heat treatment, characterized by a Uniform Distribution. Afterward, the parts take six minutes to reach inspection stations. At the inspection stage, 90% of the parts successfully pass quality control and proceed directly to shipping. Meanwhile, 3% are rerouted to malfunctioning shipments, and the remaining percentage is directed to the scrap department.

The distribution time of each operation is presented in the following table (Units in minutes)

Inter Arrival of Part A	NORM (18,0.04)
Inter Arrival of Part B	EXPO (23)
Drilling Operation	TRIA (8,8.5,10)
Punching Operation	NORM (6,0.2)
Sealer Processing time 1	TRIA (6,7,8)
Sealer Processing time 2	NORM (5,0.02)
Heating Processing time	UNI (5,7)

Develop a model for the given scenario and ensure its accuracy through verification. Implement this model for three separate replications. Consider that the working hours are structured as follows: each shift lasts for 5 hours, and a full day comprises 8 hours. Your analysis should focus on assessing the utilization of each machine within the system.

**Please submit the following documents:**

1. The Model: Provide the developed model.
2. Verification: Document the process and results of your model's verification.
3. Report: Present a comprehensive report of your findings.
4. Utilization Analysis: Discuss the utilization of each machine based on your model's outcomes.