

## **Simulation Lab Questions**

- 1. Create a GPSS model and program to simulate a barber shop for a day(8 am to 5 pm), where a costumer enters the shop every  $10 \pm 2$  minutes and a barber takes  $13 \pm$  for a haircut.**
- 2. Consider a machine tool in a manufacturing shop is turning out parts at the rate of one every  $5 \pm 2$  minutes. As they are finished, the parts go to an inspector, who takes  $7 \pm 3$  minutes to examine each one and rejects about 10% of the parts. The factory has 3 inspectors. Develop a block diagram and write the code and implement for simulating the above problem for a) 1000 parts and b) 7 hours using GPSS.**
- 3. Model a barber shop with the following qualities with block diagram and code in GPSS:**
  - The shop contains one barber and one barber's chair, open for eight hours in a day.**
  - Customers arrive on average every 18 minutes, with the arrival time varying between 12 and 24 minutes.**
  - If the barber is busy, the customer will wait in a queue.**
  - Once the barber is free, the next customer will have a haircut.**
  - Each haircut takes between 12 and 18 minutes, with the average being 15 minutes.**
  - Once the haircut is done, the customer will leave the shop.**

**Based on above scenario answer the following questions:**

- How utilized is the barber through the day?**
  - How long does the queue get?**
  - On average, how long does a customer have to wait?**
- 
- 4. Parts are being made at the rate of one every 10 minutes. They are of two types, A and B. And are mixed randomly with about 10% being type B. A**

separate inspector is assigned to examine each part. Inspection of part A takes  $6 \pm 2$  minutes while B takes  $10 \pm 2$  minutes. Both inspectors reject 10% of parts they inspect. Draw GPSS block diagram to simulate the above problem for 100 parts.

5. Define and develop a Poker test for four-digit random numbers. A sequence of 10,000 random numbers, each of four digits has been generated. The analysis of the numbers reveals that in 5120 numbers all four digits are different, 4230 contain exactly one pair of like digits, and 560 contain two pairs, 75 have three digits of a kind and 15 contain all like digits. Use Poker test to determine whether these numbers are independent. (Critical value of chi-square test for  $\alpha=0.05$  and  $N=4$  is 9.49)