

**Q.6** Suppose that the following processes arrive for execution at the times indicated. Each process will run for the amount of time listed. In answering the questions, use nonpreemptive scheduling, and base all decisions on the information you have at the time the decision must be made.

Process    Arrival Time    Burst Time

*P1*        0.0                8

*P2*        0.4                4

*P3*        1.0                1

- a. What is the average turnaround time for these processes with the FCFS scheduling algorithm?
- b. What is the average turnaround time for these processes with the SJF scheduling algorithm?
- c. Compute what average turnaround time will be if the CPU is left idle for the first 1 unit and then SJF scheduling is used. Remember that processes *P1* and *P2* are waiting during this idle time, so their waiting time may increase.

**Q.21**            A number of cats and mice inhabit a house. The cats and mice have worked out a deal where the mice can steal pieces of the cats' food, so long as the cats never see the mice actually doing so. If the cats see the mice, then the cats must eat the mice (or else lose face with all of their cat friends). There are **NumBowls** cat food dishes, **NumCats** cats, and **NumMice** mice. Your job is to synchronize the cats and mice so that the following requirements are satisfied:

No mouse should ever get eaten. You should assume that if a cat is eating at a food dish, any mouse attempting to eat from that dish or any other food dish will be seen and eaten. When cats aren't eating, they will not see mice eating. In other words, this requirement states that if a cat is eating from any bowl, then no mouse should be eating from any bowl. Only one mouse or one cat may eat from a given dish at any one time. Neither cats nor mice should starve. A cat or mouse that wants to eat should eventually be able to eat. For example, a synchronization solution that permanently prevents all mice from eating would be unacceptable. When we actually test your solution, each simulated cat and mouse will only eat a finite number of times; however, even if the simulation were allowed to run forever, neither cats nor mice should starve.