**Example 1 (H): Doubling The Arrival Rate**

FCFS; First Come, First Serve

- \( \lambda \) is the average arrival rate (jobs/sec)
- \( \mu \) is the average service rate (jobs/sec)

In this particular example, each job needs \( \frac{1}{5} \) sec of service.

The system is not overloaded, but \( 3 \leq 5 \)
Let $E(T)$ be the mean response time of the system, i.e., the time from when a job arrives until it completes service.

**Question:** Starting tomorrow, the arrival rate ($A$) will double, but you want the mean response time ($E(T)$) to stay the same. By how much should you increase the CPU speed?

- (a) Double it ($\mu = 10$)
- (b) More than double ($\mu > 10$)
- (c) Less than double ($\mu < 10$)

The correct answer is (c).

In fact, doubling $A$ and not doubling $\mu$ together cuts the mean response time in half!