PLL LAB 2020 | PROBLEM 1

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What is the role of concurrency and synchronization in the system of Problem 1?

Concurrency: Role of concurrency in the system is the ability to perform different parts or units of a program to be executed out of order or in partial order without affecting the final outcome. In case of Problem 1, concurrency comes into picture when different robots pick up different color socks and give it to the matching machine, this task could be done in parallel or concurrent without really affecting the final result.

Synchronization: Role of synchronization in the system is the ability in which the parallel processes changing a particular variable do so in correct sequential order and thus does not alter the final result. In case of Problem 1, synchronization comes into picture when the matching machine adds the socks given by the robots into their respective color shelves, since many parallel robot hands would be bringing the sock, so we need synchronization for the matching machine to add these socks into correct shelves one by one.

How did you handle it?

The **concurrency** and **synchronization** were handled in the system using **Java Threads** and **synchronized** blocks for each of the sock color.

Given N number of robots, and total socks to be S, then the socks were distributed almost equally to each of these robots, i.e. for each robot has a crate having S/N socks to pick in parallel, now we apply Java Threads on each of these robots to pick sock from their crates and pass it to the matching machine, where each addition of sock to a particular color is done under synchronized blocks, and then whenever the number of socks in a colored shelf goes more than 2, a pair is formed with that color by the matching machine and is passed to the Shelf manager which simply puts the sock in the colored sock shelf.