Aum Amriteswaryai Namah

**19CSE205 – Program Reasoning – Assignment – 10**

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1. Write down the safety, liveness and fairness criteria in plain English in the following table.

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| **Problem** | **Safety** | **Liveness** | **Fairness** |
| **Traffic lights** | Not more than 1 signal should be **Green** at a time. | Not all signals turn **Red** at any time. | Every **signal changes** accordingly at a particular time. |
| **Dining Philosophers** | When **Two adjacent Philosophers** are not in **Eating** State | When All the Philosophers are in **Hungry State** then each will be having only **1 Chopstick** which should be avoided. | If **Philosopher** is in **Hungry State** then, he/she has to go to **Eating State** in a bounded time. |

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| **Bounded buffer (buffer instead of queue)** | Its safe When **both inserting and taking happens simultaneously.**  There are some cases where,  **Thread 1** **overwrites** the **values** in the buffer without **Thread 2 reading** it.  **Thread 2 Reading** the old value without the t**hread 1 writing** a new value | Both **Thread 1** and **Thread 2** should not stop the **Insertion and Deletion** simultaneously .  If **Thread 1 stops writing** then the **buffer** will be empty and **Thread 2** wont be able to **read the data.** | **Thread 2** should **read** the value only after the **Thread 1** **writes** it and **thread 1** should **write** the **new value** only after the **thread 2** reads the **existing value.** |

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| **Sleeping barber** | Barber **cant attend more than 1** customer at a time | Barber **shouldn't sleep if customers** are there or customers keeps on coming.  (or) Barber should wake up when customer comes. | Each customer should be called in according to the order of their entry. **FIFO** **Queue order.** |