Operating System II (Tut-Test 1)

Exercise 02: The Swimming Pool

A user of a swimming pool (swimmer) must first find a free **basket** and **cabin**, store their clothes in the basket, free the cabin, and finally deposit the basket at the checkroom. When they have finished swimming, they will retrieve their basket and wait for a free cabin to change. There are **nb** baskets and **nc** cabins (**nc << nb**).

1. Define the synchronization points.
2. Define the conditions for crossing these synchronization points.
3. Write the program for a swimmer using the semaphores.

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Scenario:

1. Synchronization Points:

1. Entry to the Pool:

a. Request a basket *

b. Request a changing cabin *

c. <Change clothes>

d. Free up the cabin *

e. Deposit the basket at the checkroom

<Swim>

2. Exit from the Pool:

a. Retrieve the basket from the checkroom

b. Request a changing cabin *

c. <Change clothes>

d. Free up the cabin *

e. Return the basket *

2. Synchronization Constraints:

1. Request a basket: number of free baskets < number of swimmers requesting a basket
2. Request a changing cabin: number of free cabins < number of swimmers requesting a cabin.

3. The program for a swimmer using the semaphores

nb: number of baskets

nc: number of cabins

Use two synchronization semaphores:

Sb: semaphore initialized to (nb);

Sc: semaphore initialized to (nc);

```
Begin
   P(Sb)

        P(Sc)
                <Change clothes>
        V(Sc)

                < Swim >

        P(Sc)
                <Change clothes>
        V(Sc)

   V(Sb)
```