Quiz # 4

21/04/2025

Total Marks: 10

Time: 30 minutes.

Student id:_____ **Section:**_____

Question 1: **5 marks**

You are developing a multi-user digital library system. In this system:
Users can view and browse multiple books at once, which means they can read books concurrently without any issues.
Authors update the content of the books. While an author is updating a book, no one else should be allowed to view or modify that book.
Authors need exclusive access to the books when making changes to them. While an author is working on a book, it cannot be accessed by other authors or users.
Multiple users can read the same book simultaneously, but no user or author should access or read a book if an author is currently updating it
Given this scenario, identify the classical synchronization problem that best fits the situation. Then, write the pseudocode to manage concurrent access to the books using semaphores or mutexes.

Question 2: 3 marks

Use semaphores only to synchronize two threads so that:

Thread A prints "Hello"

Thread B prints "World"

Ensure "Hello" is always printed before "World". Write the pseudocode including semaphore initialization and thread actions.

Question:

In the context of process synchronization, answer the following precisely in one line each (no code required):

What is busy waiting?

What is one major drawback of busy waiting?

Name and briefly describe one alternative synchronization mechanism that avoids busy waiting.

Provide a one-line example where busy waiting would be efficient.