جامعة حلوان HELWAN UNIVERSITY	Operating Systems 2 (Fall 2023) Project Discussion	كلية الحاسبات والذكاء الإصطناعي Faculty of Computers & Artificial Intelligence

Project Number: **Number 1**

Project Name: **The Sleeping Teaching Assistant**

Team Members :

	Team Member ID	Team member name (**in Arabic**)	Grade
1	**201900436**	**عبدالرحمن محمد نراج (Team leader)**	
2	**201900427**	**عبدالرحمن عمرو محمد عبدالعزيز**	
3	**201900226**	**بسنت محمد حسن محمد**	
4	**201900469**	**عبدالوهاب علي عبدالوهاب**	
5	**20180476**	**محمد ايهاب محمود ابراهيم**	
6	**202000816**	**محمد محمود حسن**	
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Evaluation Criteria

General Criteria

Criteria		Grade
Multithreading (5)	No multithreading (2 out of 5)	…….
	Threads in serial (3 out of 5) and Correct usage of threads, synchronization mechanisms	
	Multithreading (4 or 5 out of 5) and Correct usage of threads, synchronization mechanisms	
GUI (2)	No GUI (0 out of 2)	…….
	GUI without thread communication or realtime update (1 out of 2)	
	GUI with correct I/O and Thread communication or realtime update (2 out of 2)	

Documentation (1)		
Understanding (2)		

[1] 1st team member should be the same one in project schedule

إسم العضو الأول في الفريق يجب أن يكون نفس الاسم المعلن في جدول المناقشة

1. Introduction:

The project envisions a simulation system where students, Teaching Assistants (TAs), and chairs are modeled as threads and mutex/semaphore constructs. The underlying logic involves students attempting to enter the TA(s) room. If a TA is available, the student receives assistance; otherwise, the student attempts to wait in one of the chairs. In the event that no chair is available, the student decides to leave and plans to return later, repeating the same logic. The synchronization between students, TAs, and chairs is managed through mutexes and semaphores, ensuring orderly access to shared resources and preventing race conditions.

In terms of implementation, the project leverages multithreading to represent the concurrent actions of students, TAs, and chairs. Each student thread attempts to acquire a seat in the TA room, utilizing semaphores to manage access. TAs and chairs are modeled as mutexes to ensure exclusive access and synchronize interactions. Real-time updates are facilitated by the continuous execution of threads, dynamically reflecting the changing state of the system.

For the graphical user interface (GUI), the system takes input parameters such as the number of students, chairs, and TAs. The output is presented in real-time, displaying the number of TAs actively assisting, the number of TAs sleeping, the count of students waiting on chairs, and the number of students planning to return later. This project not only simulates a practical scenario of student-TA interactions in a dynamic environment but also provides a visual representation of the system state through the GUI, enhancing the understanding of concurrent processes and resource management.

2. Features:

Scheduled Teaching Sessions: Plan and schedule specific times for teachers.
Analytics Dashboard: Monitor progress and receive insights into the effectiveness of sleep learning sessions.
A solution that coordinates the activities of the TA and the students.

3. Installation:

JDK 11 , Netbeans.

4. Usage:

Plan and schedule teaching sessions based on your preferences. Specify the subjects, content types, and duration of each session. The Sleeping Teaching Assistant will then deliver the selected content during designated sleep periods.

5.Class Diagram: