	Benha University	Grade: 3rd	
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	Benha Faculty of Engineering	**Measured CLOs: CLO3**	
	All Electrical Engineering Programs		
	Semester: 1st (2024/2025)	**Project #1**	
	Course Title:	**Examiners:**	
	Microprocessor based system (a)	**Dr. Ahmed El-Awamry**	
	Course Code: E1321		

Project Assignment: Basic Microcontroller-Based System Design

Description:
In this project, students will design and implement a basic microcontroller-based system using the 8051 microcontroller. The project will involve simple input/output (I/O) operations, such as controlling LEDs through switches. Students will write assembly programs to interact with the hardware, performing operations such as reading input from switches and lighting up LEDs accordingly.

Objective:
This assignment aims to introduce students to:

1. The fundamental concepts of microcontroller hardware.
2. Basic I/O interfacing techniques.
3. Writing and understanding simple assembly language programs for the 8051 microcontroller.

Project Requirements:
   1. *Hardware Setup:*

       a. Use the 8051 microcontroller to design a system where:
           i. A set of LEDs is connected to one of the 8051's output ports.
           ii. A set of switches is connected to one of the 8051's input ports.
       b. The system should allow for basic user interaction, where pressing a switch turns on or off the corresponding LED.

   2. *Programming Tasks:*

       a. Write an assembly language program to:
           i. Continuously monitor the switches.
           ii. Turn on the respective LED when a switch is pressed.
           iii. Turn off the LED when the switch is released.
       b. Implement basic branch instructions and loops to handle the I/O interactions.

   3. *Basic Assembly Operations:*

       a. Use the assembly language to:
           i. Set and clear bits in the output port.
           ii. Read values from the input port.
           iii. Implement conditional branching (e.g., checking the status of switches).

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          iv. Use iteration loops if required (e.g., for debounce delays).

Project Deliverables:

1. Code Submission:

   a. Submit the fully commented assembly code for the 8051 microcontroller.
   b. The code should be structured and modular, with clear comments explaining each section.

2. System Schematic:

   a. Provide a simple schematic of the hardware setup, showing the connections between the 8051 microcontroller, the switches, and the LEDs.

3. Report:

   a. Write a brief report (1-2 pages) that includes:
      i. An overview of the project and its objective.
      ii. An explanation of how your code works, including any challenges faced during the implementation.
      iii. Screenshots or descriptions of the system in action (if applicable).