Computer Interface Course Project Report
4th Year Computer Engineering

Project Title:

RFID AttendanceSystem

Team ID: [4D]

Team Members:

SN	Student Name	Section Number
1	**Mohamed Yossri Ibrahim Fadl**	**Sec 4**
2	**Mahmoud Rabea Ahmed Abd-Elnaser**	**Sec 4**
3	**Hager Hassan Saber**	**Sec 4**
4	**Hager Salah Mohamed**	**Sec 4**
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1. Project Objective:

The objective of the RFID Attendance System is to automate the attendance process using RFID technology. The system aims to read RFID tags carried by users, verify their identities by checking against a database, and record attendance. The system will provide visual feedback through LEDs and communicate the attendance status to a graphical user interface (GUI) application.

1. **Initialization:**
   - The system is ready to read an RFID tag.
2. **User Interaction:**
   - When a user presents an RFID tag, the RFID module reads the tag data. And the white led is on..
3. **Data Processing:**
   - The ATmega32 microcontroller receives the RFID data and sends it to the GUI application via UART communication.
4. **Database Verification:**
   - The GUI application checks the received RFID data against a database of valid IDs.
   - If the ID is found in the database, the GUI records the user's attendance and displays a success message in the window.
   - The GUI sends a success flag to the microcontroller via UART.
5. **LED Feedback:**
   - Upon receiving the success flag, the microcontroller turns on the green LED for 1 second to indicate successful attendance.
   - If the ID is not found in the database, the GUI sends a failure flag to the microcontroller.
   - The microcontroller turns on the red LED for 1 second to indicate unsuccessful attendance.
6. **Ready for Next Interaction:**
   - After the LED feedback, both the white and green (or red) LEDs are turned off.
   - The microcontroller is then ready to read another RFID tag, and the system returns to the initial state with the white LED turned on.

Inputs:

1. **RFID Tag Data**: When a user presents their RFID tag, the RFID module reads the tag and sends the data to the microcontroller.
2. **Database**: Contains a list of valid RFID tag IDs.
3. **Flag from GUI**: Indicates whether the RFID tag ID is found in the database or not.

Expected Outputs:

1. **LED Indications**:
   - **White LED**: Turns on when read RFID tag and turn off when the operation of this tag is done.
   - **Green LED**: Turns on for 1 second upon successful attendance recording.
   - **Red LED**: Turns on for 1 second if the RFID tag ID is not found in the database.
2. **GUI Display**:
   - Display name ,id and date for the recorded user.
   - Sends a flag to the microcontroller indicating the status.
3. **UART Communication**:
   - Microcontroller sends RFID tag data to the GUI application.
   - GUI application sends a flag to the microcontroller based on database verification.

2. System Block Diagram:

2.1. Block Diagram:
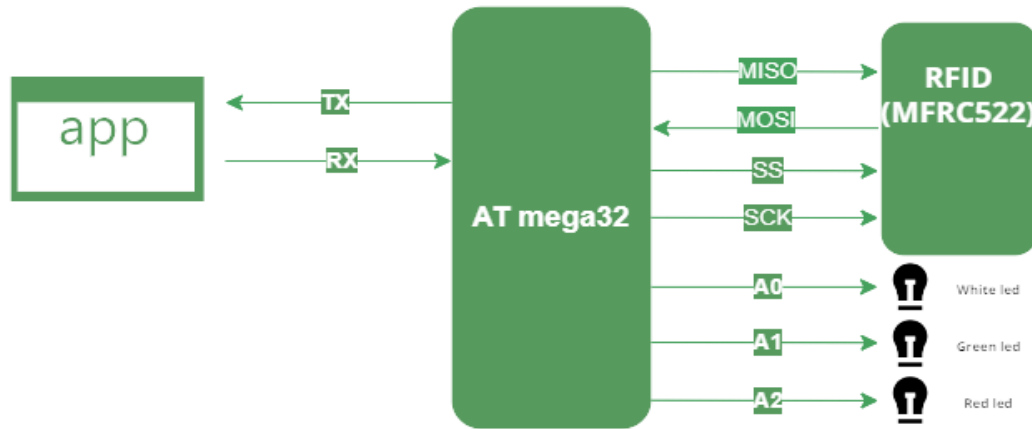
2.2. Block Diagram Description:

Blocks Description:

1. RFID Module:
- **Purpose**: To read RFID tags presented by users.
- **Functionality**: Captures the unique ID from an RFID tag.
- **Contents**: Hardware circuitry and antenna for reading RFID tags.

2. ATmega32 Microcontroller:
- **Purpose**: Central processing and control unit.
- **Functionality**: Processes RFID tag data, controls LEDs, and manages UART communication.
- **Contents**: ATmega32 chip with GPIO pins, UART module, and firmware for RFID data processing and LED control.

3. LED Control System:
- **Purpose**: To provide visual feedback to users.
- **Functionality**: Controls the status of three LEDs (White, Green, Red) based on system events.
- **Contents**: Three LEDs (White, Green, Red) connected to microcontroller GPIO pins.

4. GUI Application:
- **Purpose**: To interact with the user, manage database verification, and display attendance status.
- **Functionality**: Receives RFID data from the microcontroller, checks against the database, and sends flags back to the microcontroller.
- **Contents**: Graphical interface, database connectivity module, UART communication module for interfacing with the microcontroller.
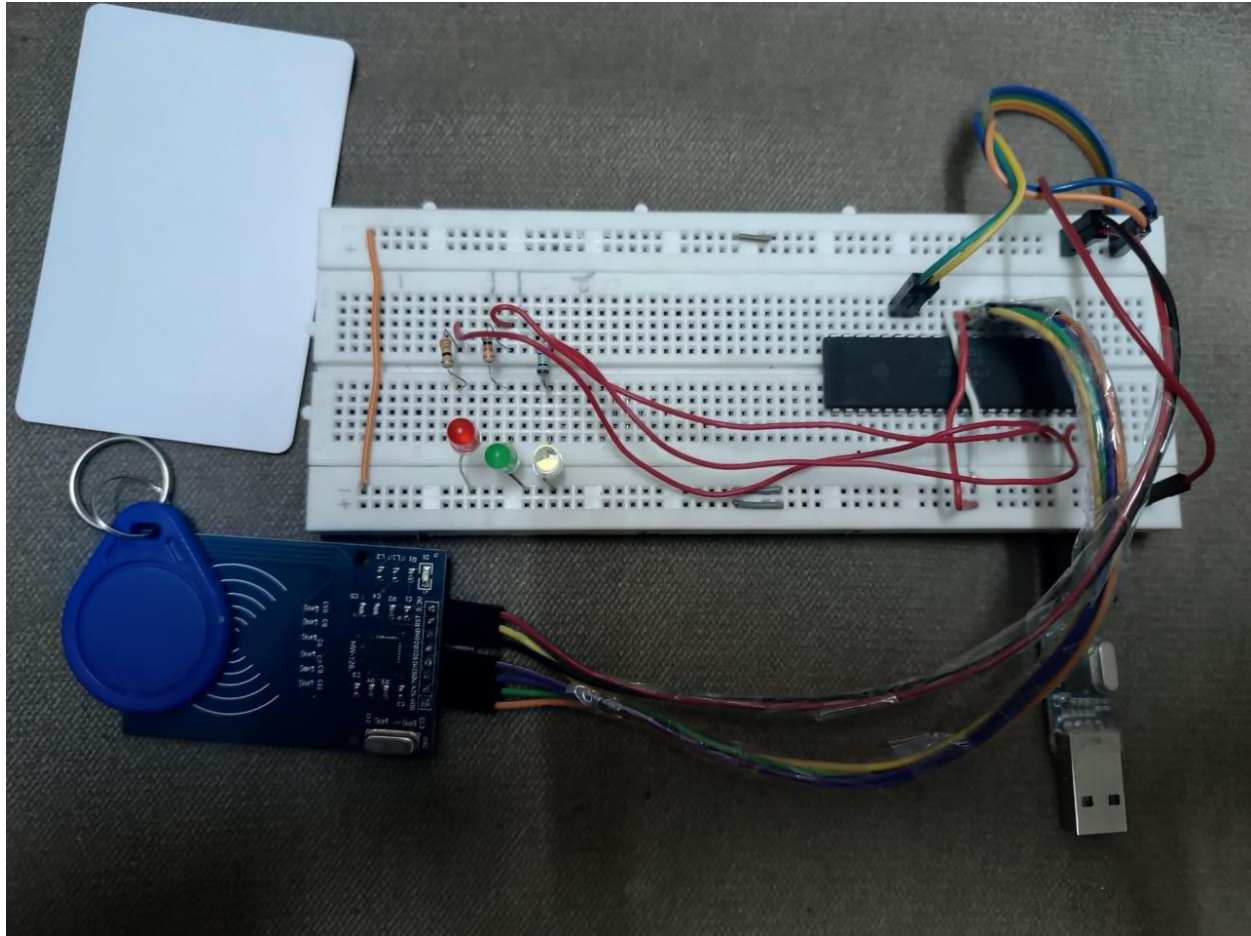
3. Schematic Diagram (Circuit Diagram):
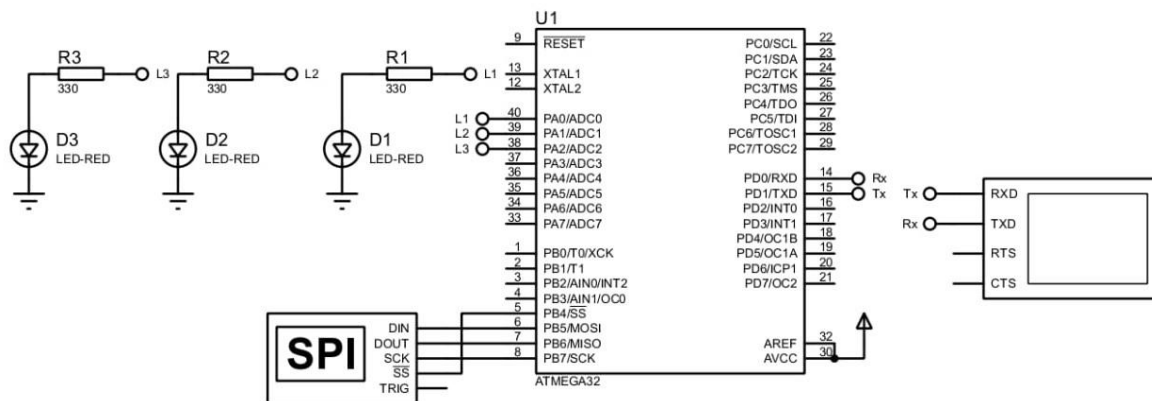
4. List Of Components:

[Provide List of components used in the project. Item Type is the component name. Item Code Name is the item's actual code. Purpose is why this item is required in the project. For example, Item Type: Temperature sensor - Item Code Name: LM35]

SN	Item Type	Item Code Name	Purpose	Quantity
1	**ATmega32 Microcontroller**	ATmega32	Central processing unit for the system.	1
2	**RFID Module**	MFRC525	Device to read RFID tags.	1
3	**LED**	-	• White LED: To indicate readiness. • Green LED: To indicate successful attendance. • Red LED: To indicate unsuccessful attendance.	3
4	Resistor	330 ohm	-	3

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5.   Real-Time Hardware Photo:

5.1. GUI Screenshot: