RFID Based Login System – CareerPath AI

Final Hardware Component List & Budget

Project Overview

This project implements an **RFID-based login system** integrated with a **Python Streamlit Career Recommendation (CareerPath AI)** application.
RFID card is used for user authentication, and login status is displayed on the laptop screen as **Login Successful** or **User Rejected**.

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1. Microcontroller Board

Component Name: Arduino UNO R3 (ATmega328P)
Clock Frequency: 16 MHz
Use in Project:

- Reads RFID card UID from RC522 module
- Sends UID to laptop via USB serial communication
  Reason for Selection:
- Fully compatible with RC522
- Stable, beginner-friendly, and exam-safe
  Approx Price: ₹300 – ₹400

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2. RFID Reader Module

Component Name: RFID RC522 Module
Operating Frequency: 13.56 MHz (High Frequency)
Use in Project:

- Scans RFID card
- Generates unique identification number (UID)
  Important Note:
- Only RC522 (13.56 MHz) is used
- 125 kHz RFID modules are not suitable
  Approx Price: ₹120 – ₹180

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3. RFID Cards / Tags

Component Name: MIFARE RFID Card + Keychain
Operating Frequency: 13.56 MHz
Use in Project:

- User authentication and login
  Quantity: Minimum 1 card + 1 keychain
  Approx Price: ₹70 – ₹100

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4. Breadboard

Component Name: Full Size Breadboard (830 tie-points)
Use in Project:

- Temporary wiring between Arduino and RFID module
- No soldering required
  Approx Price: ₹80 – ₹120

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5. Jumper Wires

Component Name: Male-to-Male Jumper Wires
Use in Project:

- Connecting RC522 RFID module to Arduino UNO
  Quantity: 20–40 wires (small pack sufficient)
  Approx Price: ₹60 – ₹80

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6. USB Cable

Component Name: USB A to B Cable (Arduino Cable)
Use in Project:

- Power supply to Arduino
- Serial data communication with laptop
  Approx Price: ₹40 – ₹60

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7. Laptop / PC

Component Name: Laptop / Desktop Computer
Use in Project:

- Arduino IDE for uploading code
- Python execution
- Streamlit application for CareerPath AI
  Requirement: USB port and Python 3.x installed
  Cost: Already available (No additional cost)

Total Estimated Budget

₹800 – ₹900 (Approx)

System Working Summary

1. RFID card is scanned using RC522 module
2. Arduino UNO reads the card UID
3. UID is sent to laptop via USB serial
4. Python reads UID and verifies it from database
5. Streamlit displays:
    - **Login Successful** (Authorized card)
    - **User Rejected** (Unauthorized card)
6. After successful login, Career Recommendation system is activated

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Conclusion

The **Arduino UNO R3 (16 MHz)** and **RFID RC522 (13.56 MHz)** combination provides a stable, low-cost, and reliable solution for implementing an RFID-based login system integrated with a Python Streamlit Career Recommendation application. This setup is suitable for academic and final-year projects.