Dhaka University of Engineering & Technology, Gazipur.

Course Title: Software & Hardware Project
Course Code: CSE-3114

Smart Student Card

Submitted To

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Submission Date: - 26-09-2022

Introduction:

A campus card, more commonly known as a student card or a student ID card is an identification document certifying the status of a student. Campus cards are usually valid for one semester (possibly two), and at most universities must be renewed or extended after that, while for some universities it is valid for four years or for however long the person is a student at the university.

Student ID cards are used to ensure campus security, permit access to library and cafeteria services, admit students into campus activities, make purchases at the campus store, get textbooks, keep memories, and obtain student discounts.

Purpose:

The campus card program supports the mission and vision of the university (or community college) by enhancing the overall college experience through access to a variety of services. The campus card is available for individuals on campus who need access to services via a card, allowing it to provide access to such amenities as borrowing books at the campus library, attending events, and more. In some countries, the campus card works as an official identification document. The campus card is also accepted as secondary identification by the State Department for a passport application. In other countries, the campus card turns valid only in conjunction with an official photo ID such as a passport or a driver's license.

Functions:

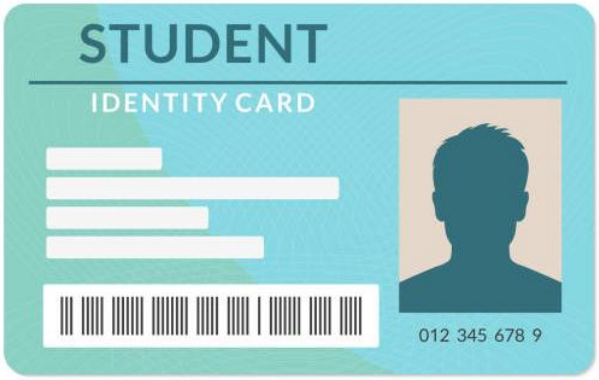
The functions of the campus card, in addition to data storage for the student's identification, vary by university. Some examples of additional campus card functions are:

- Building access (Lecture Halls, IT-rooms, Dorms, Lockers, Sports facilities, Libraries, Cafeterias etc.)
- Equipment access (Computers, Copy machines etc.)
- Transportation access (Ticket for public transport, Parking permit, Car sharing or Bike rental functions etc.)
- Cashless payment for cafeteria, vending machines or shops at the campus
- Library card

- Medical services.
- Time and attendance control
- Exam registration

Campus cards with multiple functions can help simplify internal administrative processes.

About Smart Student Card Technology:

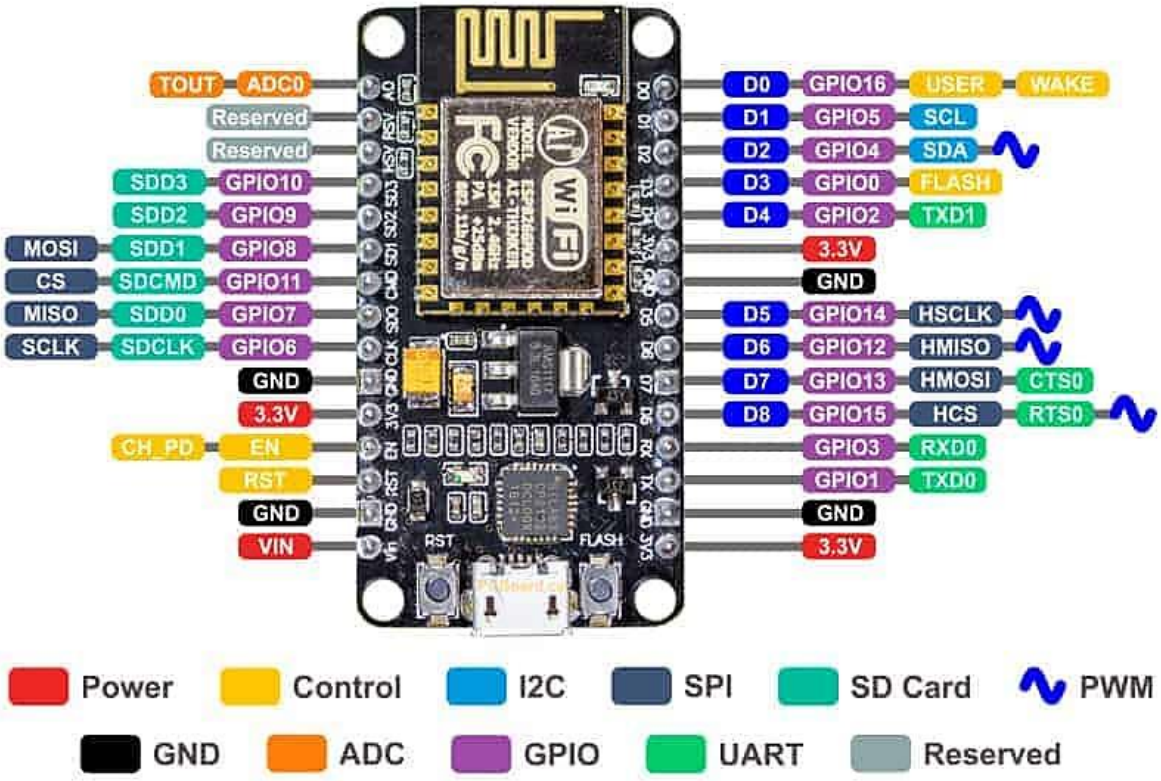


- RFID stands for Radio-Frequency Identification. The acronym refers to small electronic devices that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less.
- The RFID device serves the same purpose as a bar code or a magnetic strip on the back of a credit card or ATM card; it provides a unique identifier for that object. And, just as a bar code or magnetic strip must be scanned to get the information, the RFID device must be scanned to retrieve the identifying information.

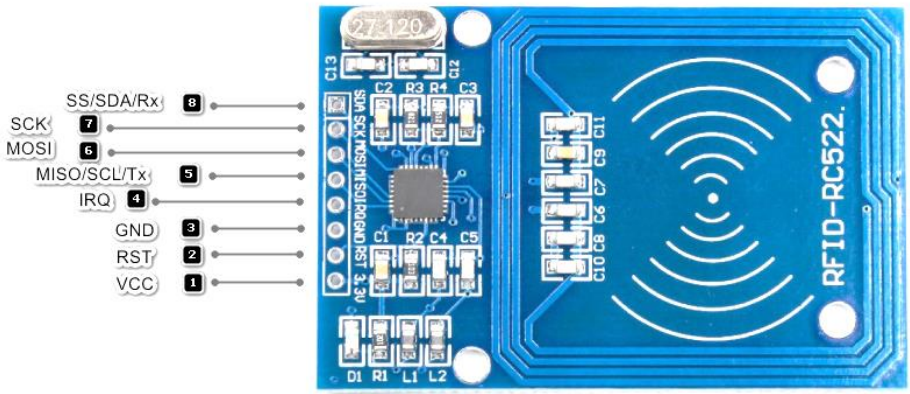
Equipments:

1. **NodeMCU**: The NodeMCU (Node MicroController Unit) is an open-source software and hardware development environment built around an inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains the crucial elements of a computer: CPU, RAM, networking (WIFI), and even a modern operating system and SDK. That makes it an excellent choice for Internet of Things (IoT) projects of all kinds.

NodeMCU Pinout and Functions:



2. RC522 RFID Module: The MFRC522 is a 13.56 MHz RFID (Radio-frequency identification) IC. The RC522 reader supports ISO/IEC 14443 A/MIFARE and NTAG. The RC522's inbuilt transmitter may operate a reader/writer antenna designed to interface with ISO/IEC 14443 A/MIFARE cards and transponders without the need for additional active circuitry. The reader can communicate with a microcontroller via a 4-pin Serial Peripheral Interface (SPI) at up to 10Mbps. It also supports I2C and UART protocols for communication. The RC522 supports contactless communication and MIFARE higher transfer speeds in both directions of up to 848 kB.



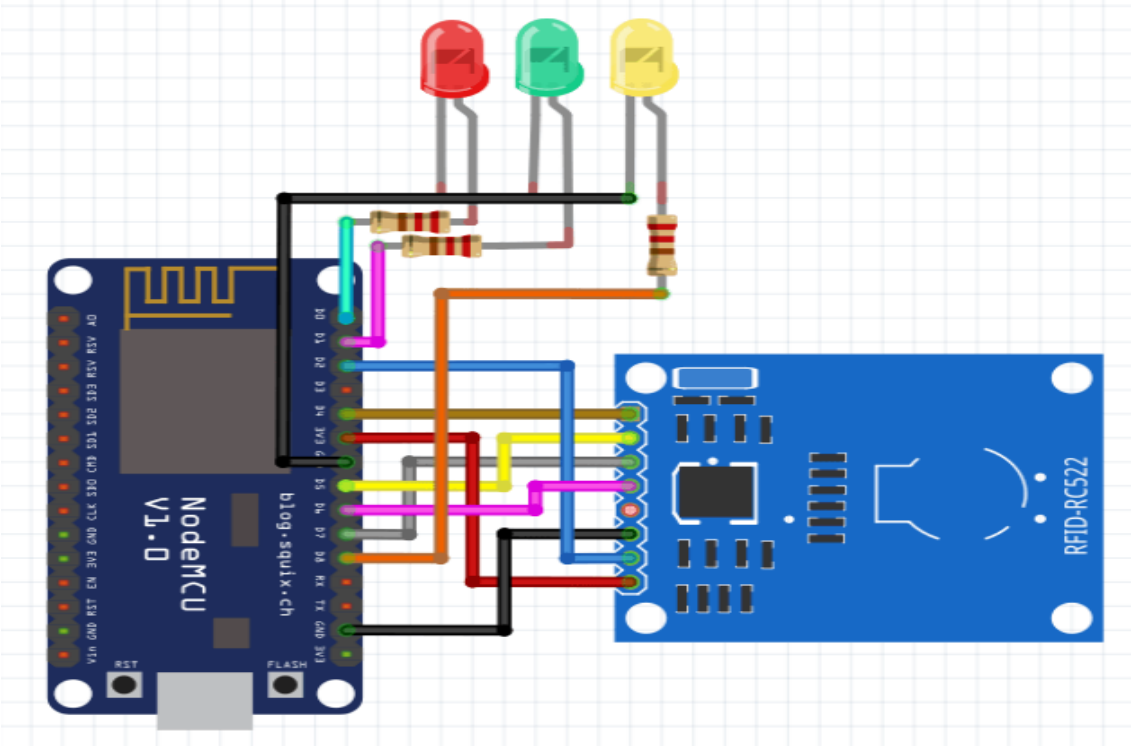
Equipment with Estimated Price:

Sl. No	Item Name	Quantity	Unit Price (TK)	Net Total (TK)
1	EM4100 125kHz Printable RFID Card	03	25	75
2	RC522 RFID Card Reader Module Kit Android NFC supported	01	200	200
3	ESP8266 CH340 NodeMCU WIFI Module LUA V3	01	500	500
4	Breadboard Jumper Wire Set	01	200	200
5	LED	03	5	15
6	Buzzer	1	10	10
7	Register 100 ohm	3	5	15
			Total:	**835/=**

Requirements:

1. RFID Cards and Scanner System (The above-mentioned hardware)
2. Arduino IDE (to initialize the scanner system)
3. Central Management Software.
    i. HTML, CSS, JavaScript, jQuery
    ii. PHP and MySQL Database System
4. Web Browser (to browse the system software)

Block Diagram and Real Organization:



Working procedure:

The smart student card system along with a management system serves almost all possible or required identification of students. The card of a student holds a unique identification number, that is associated with all information of the student in the management system software. if a student wants to use any service, he/she must scan the ID card in the RFID scanner device, which will be supervised by an administrative person. When a card is scanned, the Smart Student Card Management System software will identify it and give the required data according to the service. The System software allows to add of new student cards and updates information of old cards if needed. Let us give some examples of the use of the system.

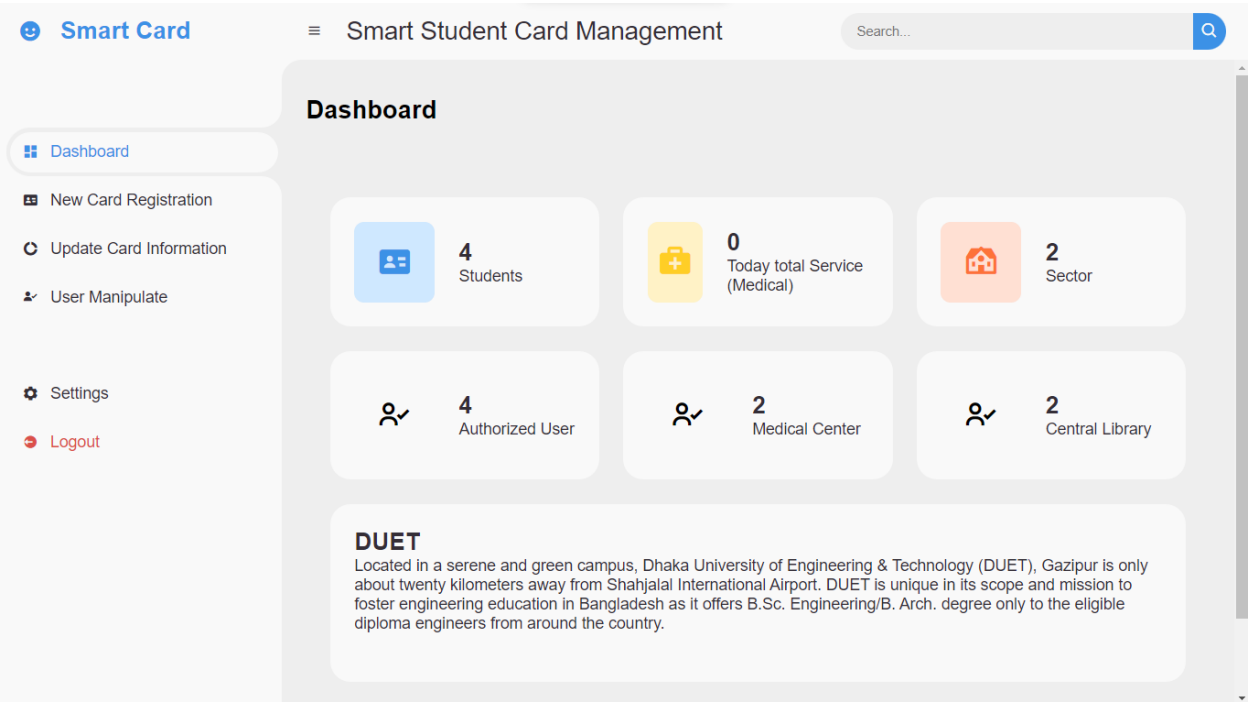


Figure: Admin View

1. Medical Center:

a) A doctor will be logged-in to the management system software.

b) If a student wants to take any service from the doctor, they will be asked to scan a student ID card.

c) If the card is valid, basic information of the student (e.g. name, student ID number, department, etc.) will be retrieved in the view of the system.

d) The System will load all of the previous service details (if available)

e) After Consulting, the doctor/assistant will write down the service details containing problems/issues, given tests (if needed), prescribed medicine, etc.

f) All new information will be stored in the system database for future usages.

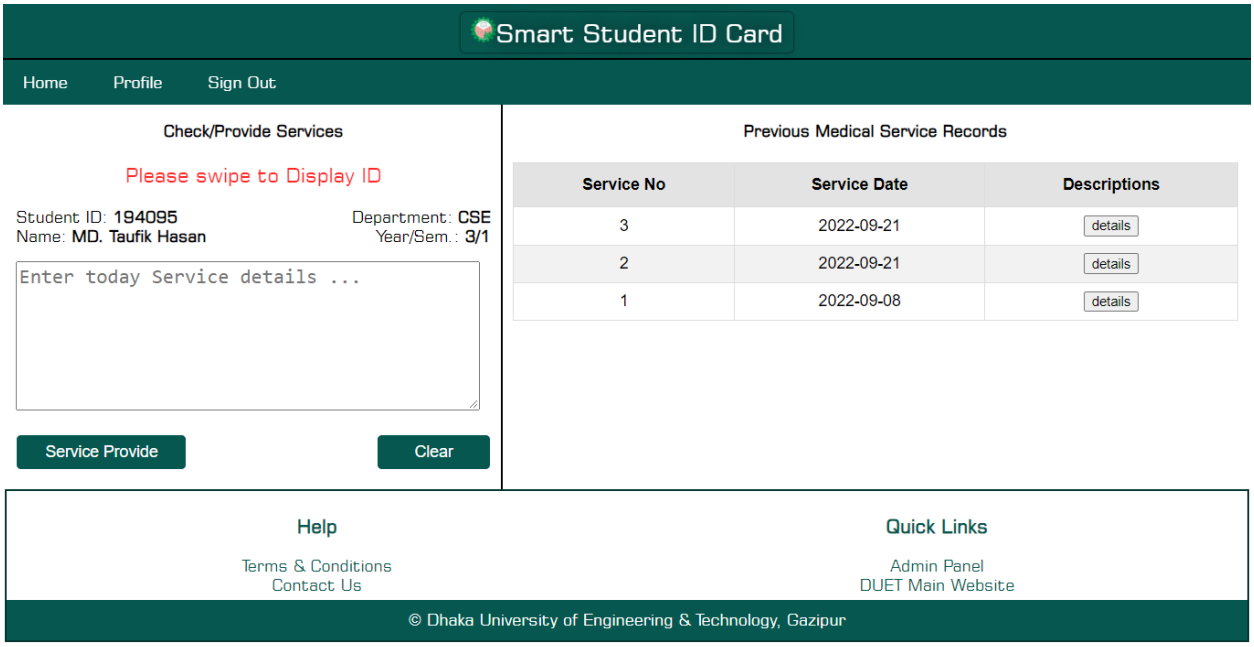


Figure Medical View

2. Central Library

a) A Liberian/assistant will be logged-in to the management system software.

b) If a student wants to take any service from the library, they will be asked to scan a student ID card.

c) If the card is valid, basic information of the student (e.g. name, student ID number, department, etc.) will be retrieved in the view of the system.

d) The System will load all of the previous service details (if available)

e) After taking the needed service from the library, the Liberian/assistant will write down the service details containing problems/issues.

f) If a student wants to rent a book,

1) if the maximum number of allowed books are taken by the student, then the system will restrict the user from issuing a new book. otherwise, the book will be posted for rental against the student.

g) If the student wants to return the book the system will automatically check if the period of renting the book crosses the time limit of free rent.

1) If crosses then the system will calculate fine according to the rule and regulations of the library.

f) All new information will be stored in the system database for future usages.

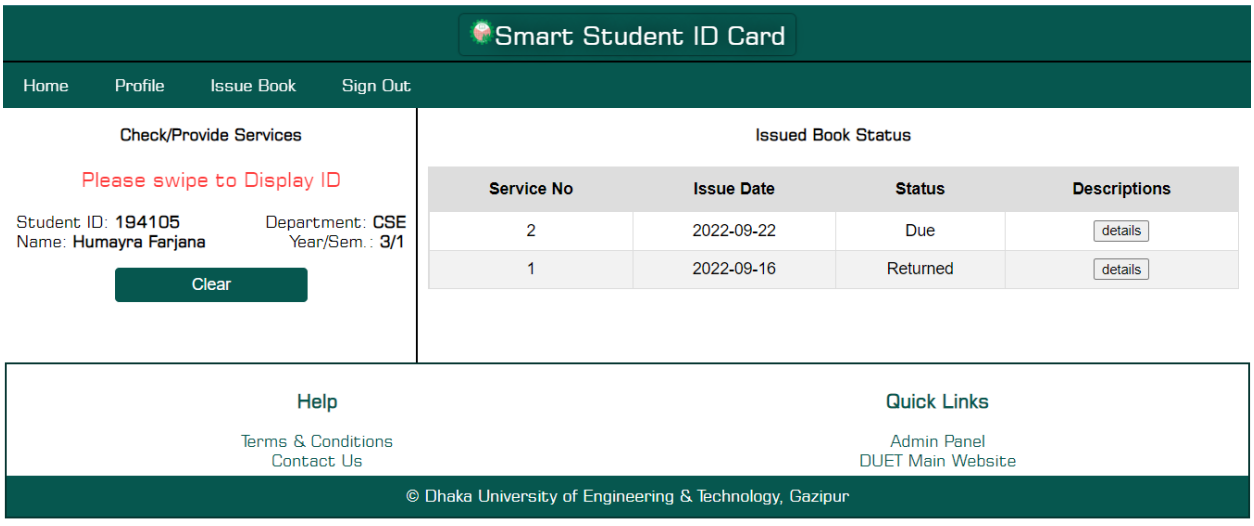


Figure: Library View

3. Cafeteria:

a) A manager/employee will be logged-in to the management system software.

b) If a student wants to take any service from the cafeteria, they will be asked to scan a student ID card.

c) If the card is valid, basic information of the student (e.g. name, student ID number, department, etc.) will be retrieved in the view of the system.

d) The System will load all of the previous service details (if available)

e) After taking the needed service from the cafeteria, the manager/employee will write down the service details containing food or drinks and so on including price.

f) If a student wants to deposit a balance to their account, the manager will perform the action.

g) If the student purchase something from the cafeteria the system will allow them to add a bill against the student account.

h) If the balance of the student's account is insufficient, the system will pop up the message asking the confirmation that the user wants to submit the bill and mark the account as an overdraft or not. otherwise, the system will decrement the balance with the bill amount.

i) All new information will be stored in the system database for future usage.

Conclusion:

This Project is designed and developed to serve one of the major jobs inside a campus. During the development, we considered the drawbacks of conventional identification systems. The conventional system uses different kinds of identifications system like medical cards, library cards, etc, also there is no digital system to manage these sections of the campus, as well as the cafeteria. We analyzed these problems and tried to figure out how we can reduce the problem with a digital system and an all-in-one Student Card. Therefore, we decided to develop this project.

We are highly hopeful that this project can reduce the problem of conventional systems. It offers a centralized system that provides functionalities to identify Students Using only one identification Card and serve their needs more efficiently.

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