

SMART LIBRARY MANAGEMENT SYSTEM USING RFID



VIGNAN's
INSTITUTE OF INFORMATION TECHNOLOGY
(AUTONOMOUS)

OUR GUIDE

Mrs. A. Sarvani
Assistant Professor

DONE BY

- B. SAI CHARAN
- D.SRINIVAS VARMA
- N. BHANU KIRAN
- P.YASWANTH





Revolutionizing Library Management: An In-Depth Look Into an RFID-Based System Utilizing Arduino.



Introduction

Revolutionizing Library Management is a crucial task for libraries. An RFID-based system utilizing **Arduino** can help libraries become more efficient and effective. This presentation will cover the benefits of this system and how it works.



TECHNOLOGIES WE USED:



Arduino

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It is used to create interactive projects and prototypes, including those that use RFID technology. Arduino is a cost-effective and flexible solution for implementing RFID-based systems in libraries.



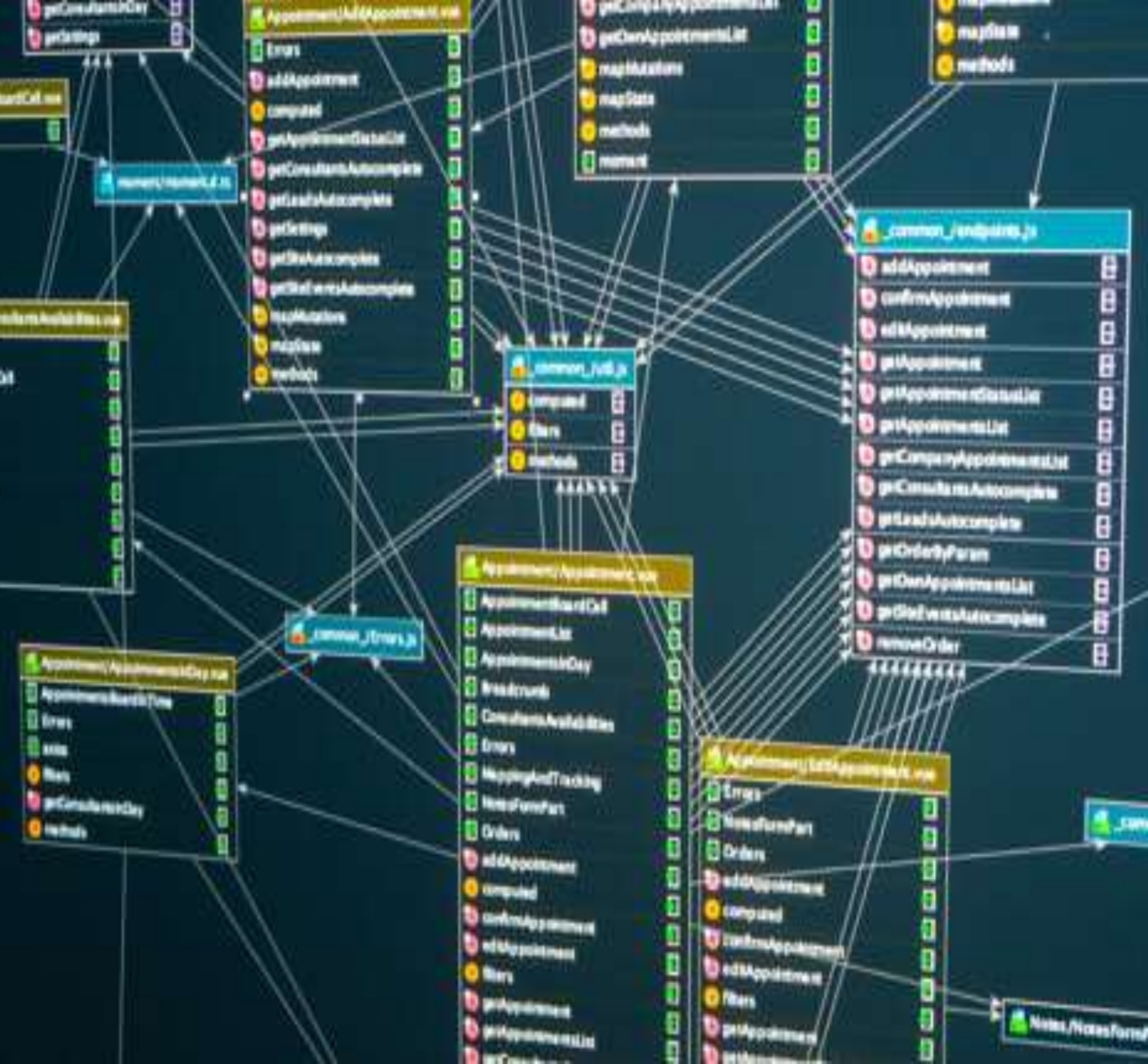
What is RFID?

RFID (Radio Frequency Identification) is a technology that uses radio waves to identify and track objects. It consists of a reader and a tag that contains a microchip and an antenna. RFID is used in many industries, including libraries, to automate processes and improve efficiency.

Python

Python is a popular and easy-to-learn programming language that allows people to give instructions to a computer in a way it can understand. It is often used for tasks like creating websites, writing automation scripts, data analysis, artificial intelligence, and much more. Python's clear and readable syntax makes it a favorite among beginners and professionals alike.

SQL, which stands for Structured Query Language, is a programming language used to interact with databases. It allows you to manage, manipulate, and retrieve data from a relational database management system (RDBMS).



Current Library

Current library management systems are outdated and often require manual labor. This can lead to errors and inefficiencies. The **RFID-based** system utilizing Arduino can automate many of these processes and reduce errors. This system can also provide real-time data on inventory and usage.





RFID Technology

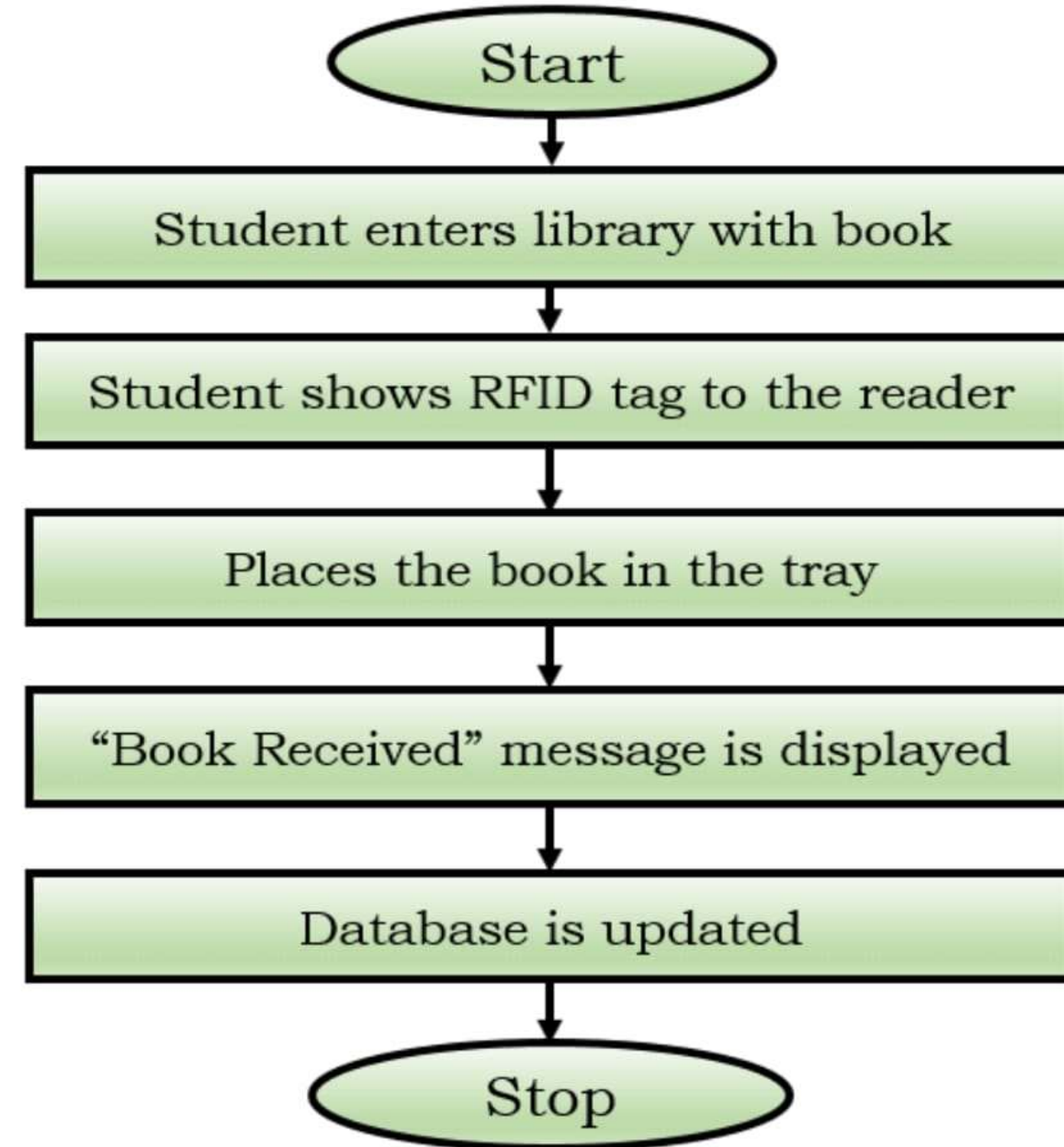
RFID stands for Radio Frequency Identification. It uses electromagnetic fields to automatically identify and track tags attached to objects. RFID technology is used in many industries, including libraries. It can provide faster and more accurate tracking of library materials.

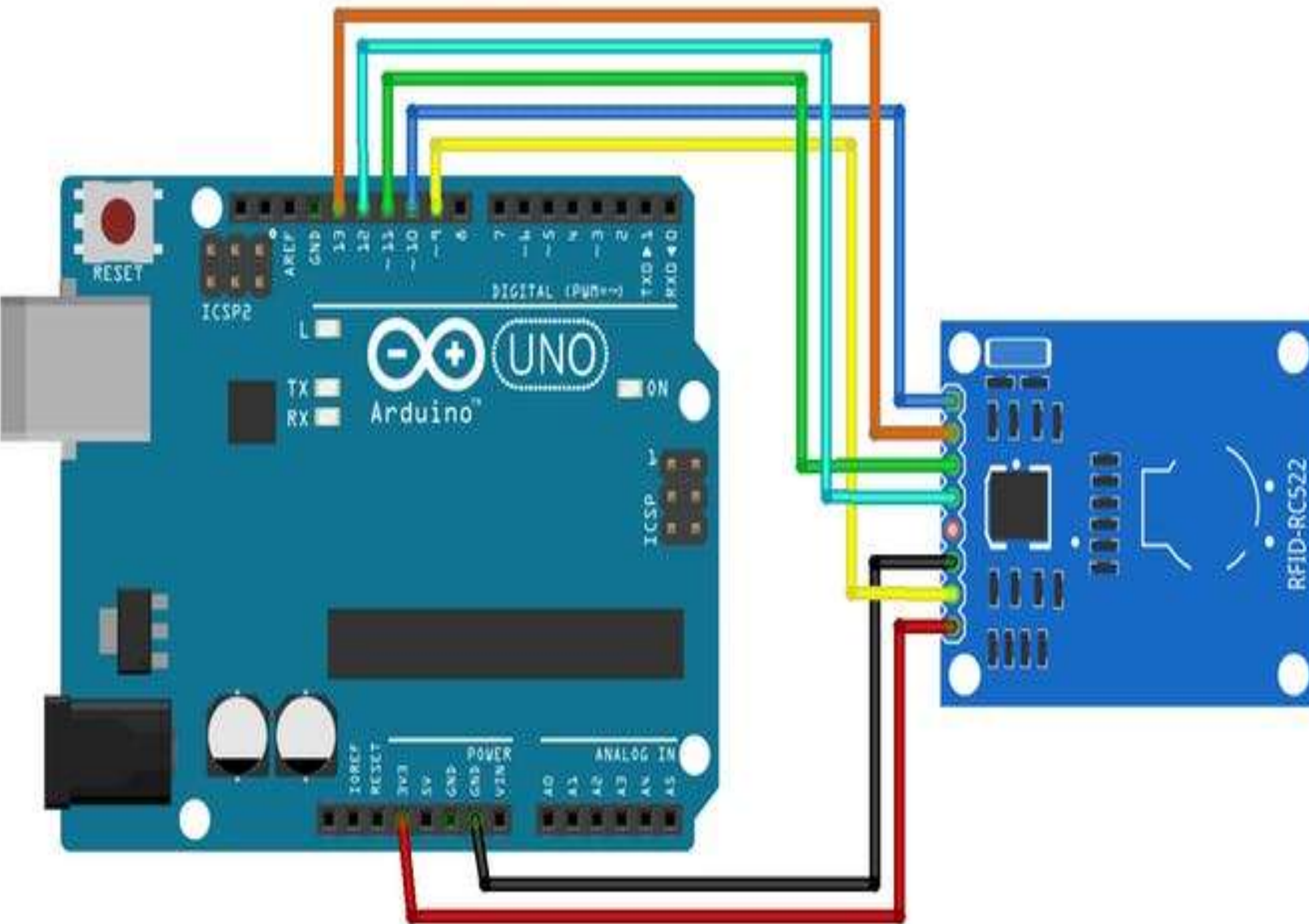
Why use RFID in Libraries?

Using RFID technology in libraries can bring many benefits, including faster and more accurate inventory management, streamlined check-in and check-out processes, and improved security. RFID can also enhance the user experience by enabling self-service options and reducing wait times.



Working





CIRCUIT DIAGRAM

```
#include <SPI.h>
#include <MFRC522.h>

#define SS_PIN 10
#define RST_PIN 5
MFRC522 mfrc522(SS_PIN, RST_PIN);
MFRC522::MIFARE_Key key;

void setup() {
    Serial.begin(9600);
    SPI.begin();
    mfrc522.PCD_Init();
    for (byte i = 0; i < 6; i++) {
        key.keyByte[i] = 0xFF;
    }
}

int block=2;
byte readbackblock[18];

void loop()
{

    if ( ! mfrc522.PICC_IsNewCardPresent() ) {
        return;
    }
    if ( ! mfrc522.PICC_ReadCardSerial() ) {
        return;
    }

    readBlock(block, readbackblock);
```

```
    readBlock(block, readbackblock);
    for (int j=0 ; j<16 ; j++)
    {
        Serial.write (readbackblock[j]);
    }

    Serial.println("");
}

int readBlock(int blockNumber, byte arrayAddress[])
{
    int largestModulo4Number=blockNumber/4*4;
    int trailerBlock=largestModulo4Number+3;

    if (status != MFRC522::STATUS_OK) {
        Serial.print("PCD_Authenticate() failed (read): ");
        Serial.println(mfrc522.GetStatusCodeName(status));
        return 3;
    }
    byte buffersize = 18;
    status = mfrc522.MIFARE_Read(blockNumber, arrayAddress, &buffersize);
    if (status != MFRC522::STATUS_OK) {
        Serial.print("MIFARE_read() failed: ");
        Serial.println(mfrc522.GetStatusCodeName(status));
        return 4;
    }
    Serial.println("block was read");
}
```

ARDUINO CODE


```
import serial
from serial import Serial
import mysql.connector

db=mysql.connector.connect(host='localhost',user='root',password='123456',database='library')
mycus=db.cursor()
se = serial.Serial('COM5', 9600)
line_count = 0
while True:

    if se.in_waiting:
        print(".....")
        data = se.readline().decode('utf-8').rstrip('\n')
        line_count += 1

        if line_count == 2:
            parts = data.split(" ")
            x=parts[0]
            y=parts[1]
            z=parts[2]
            sql="INSERT INTO b_details(b_id,b_name,b_author) values(%s,%s,%s)"
            val=(x,y,z)
            mycus.execute(sql,val)
            db.commit()
            print("record inserted")
```

PYTHON CODE

```
mysql> select *from b_details;
+-----+-----+-----+
| b_id | b_name | b_author |
+-----+-----+-----+
|    1 | DBMS   | RAGHU    |
+-----+-----+-----+
1 row in set (0.00 sec)
```

```
mysql> |
```

DATABASE VIEW

Conclusion

The RFID-based library management system utilizing Arduino is a game-changer for libraries. It can help libraries become more efficient, effective, and provide a better experience for patrons. This system is affordable, flexible, and easy to use. Libraries should consider implementing this system to revolutionize their library management.

References

- [1] Younis, Mohammed I. "SLMS: a smart library management system based on an RFID technology." *International Journal of Reasoning-based Intelligent Systems* 4.4 (2012): 186-191.
- [2] H. Cheng, L. Huang, H. Xu, Y. Hu and X. A. Wang, "Design and Implementation of Library Books Search and Management System Using RFID Technology," 2016 International Conference on Intelligent Networking and Collaborative Systems (INCoS), Ostrava, Czech Republic, 2016, pp. 392-397, doi: 10.1109/INCoS.2016.35.
- [3] J. F. Zhang and C. J. Wen, "The university library management system based on radio frequency identification," 2017 10th International Congress on Image and Signal Processing, BioMedical Engineering and Informatics (CISP-BMEI), Shanghai, China, 2017, pp. 1-6, doi: 10.1109/CISP-BMEI.2017.8302176. Wikipedia: Literature Survey and History.

Thank You!
