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# SMART BASKET FOR LIBRARY

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*Abstract: In library management system there always been a thing that library need to implement a new management system in order to remove the disadvantage of the previous management system. This project deals with the issuing of books using smart basket in order to self-issuing of the books. This basket is embedded with the RFID reader to read RFID tags. In existing system barcode system were used and the barcode always need to align to barcode reader. In the case of RFID, it doesn't need the line of sight, it can read dynamically and it remove manual maintenance of the library database and improved utilization of resources like manpower, infrastructure etc. [1]*

*KEYWORDS: RFID tags, RFID sensor, Basket, Arduino UNO, MY SQL, Android.*

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## I. INTRODUCTION

This project titled Smart Basket for Library, Smart Basket is designed to self-issuing of books from library. It is embedded with the RFID sensor. Here RFID sensor is used for maintaining the database of the books that is to be issued. Smart basket is implementing for issuing books and make the system fully automated and more secure.

Now there is a certain existing system which are using RFID technology for Library management it uses RFID tags in the books and sensor placed inside the basket where book will be store. RFID technology is used for fast issuing and returning of books. It can also find books location inside the library without manually searching the books. Using RFID is better than the Barcode, as it can be read dynamically whereas Barcode can read only when it is aligned with an optical sensor. This system is design for library that provide easy access, security and transparency of books which is not in the existing system. User (students and teacher) can get their required books easily.

## II. RELATED WORK

Chetan J. Jadhav, Vijay M. Sancheti [2] The propose system is about RFID based Smart Library Management System (SLMS) that allows fast transaction flow and will make easy to handle the activities like issue and return of books from the library without manual work. This system is based on RFID readers and passive RFID tags that are able to store the information electronically which can be read by the RFID readers.

Mohammed I. Younis [3] Proposes a smart library management system based on an RFID technology. Using low-cost passive tags in libraries reduces the cost of modernization significantly. Integrating RFID into library system make the library users and staff's task easy, smart, convenient and practical.

Jitendra Pandey, Imran Ahmed [4] Propose a smart solution for libraries in Oman by designed an application which will be called as Smart library Management System by using the concepts of Radio Frequency Identification (RFID) and Mobile (IoT). This system will manage and control all the information of the library and It also solve the above mention problems as well as provide several benefits for the staff & students. This application includes several forms which will be used by the library staff and students.

A.Thendral Mary, S.Ramya , Mr.S.Krishna Murthy, Dr.A.Valarmathi [5] Proposed system that is mainly used by librarian and the library admin .We can enter the record of new books and retrieve the record detail of those books available in the library. The librarian can issue the

books to the student and maintain their records. He can also check how many books are issued and stocks available in library. This project has three module as Student, Librarian and Admin.

### III. PROPOSED SYSTEM

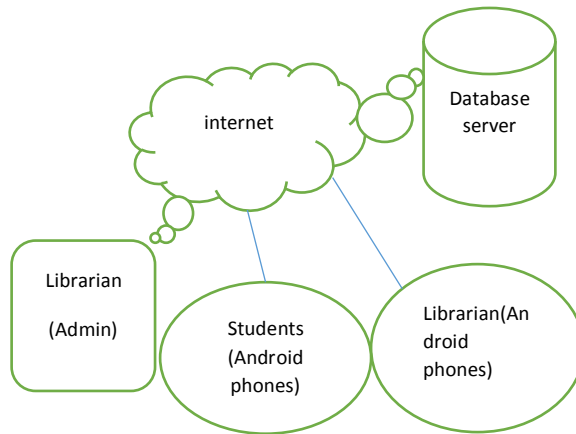


Fig : BASIC STRUCTURE

#### ANDROID APPLICATION:

This systems application is designed for devices powered by Google’s android platform. The main programming language used here is java. The development tools such as debugger, emulator, documentation and sample codes are present in Android Software Development Kit (SDK). It consumes less memory and provides fast performance. This whole application is connected with the DATABASE via INTERNET

#### DATABASE:

All the required information about books, faculty and student stored in library database.

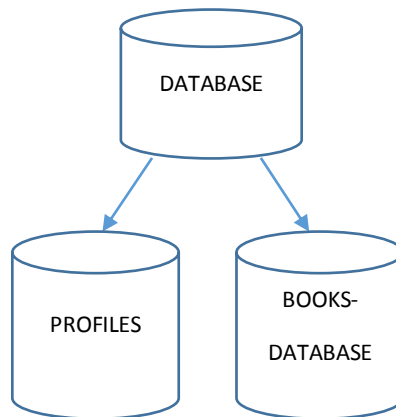


Fig : DATABASE MODULE

Initially student and the Faculty member have to register with their details on the database of library through the Smart-LIBO application. Student/faculty database contains information regarding their name, RFID NO. Branch, year, mobile number and password. Database is divided into two parts that is “PROFILES” (both student and faculty) and the “BOOKS-DATABASE”. For database, SQL and JAVA programming languages can be used.

#### LIBRARIAN:

In this system librarian does not take part in the book issuing process. It will be self-issuing by the users. But librarian can check the current number of books in the library and how many books gets issued today[6].

This system is divided into three modules. That is Maintaining and Registration unit, Smart Basket, Final checkpoint and Book issuing and Returning.

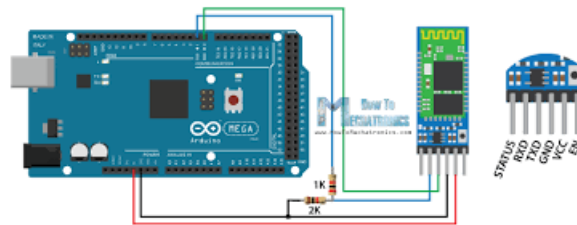
1. *Maintaining and Registration unit*: This unit deals with the maintaining of the books affixed with the RFID tags and also maintain a record of it inside the database. There will also maintain records of the user for validation, that the user is legal or not. As each valid user get its RFID card from the library for any transaction is to be done inside the library. And each user details are linked with its RFID card.



RFID Tags affixed in books.

2. *Smart Basket*: Smart basket is an ordinary looking basket which is embedded with the sensor like RFID reader, memory, LCD screen and battery. RFID reader for scanning of the books inside a basket. After scanning the books memory is required for maintaining the database of the transaction. Here memory store the transaction data temporary later it will only get updated at the final checkpoint on the user card and the LCD screen will show quantity and name of the books inside the basket. Battery is to power the whole smart basket.

3. *Final Checkpoint*: Final Checkpoint is an updating area of the books on the card of the valid user. It consists of the Bluetooth HC-05 module interfacing with Arduino Mega 2560 board module interfacing with Arduino board.



Bluetooth interfaced with Arduino mega.

The connection is as follows:

Voltage divider for 5V to 3.3V is used to drop. After the connection is established, the red led on HC05 Bluetooth Module will blink continuously that is indicating the device is ready to pair.

To pair the HC-05 Bluetooth module with computer

1. The first step is, Go to the Bluetooth icon on computer than, right click on Add a Device.
2. Search for new device to pair, Bluetooth module HC-05 will appear as HC-05.
3. Then Go to HC-05, click Ready to pair.
4. Enter the password as 1234.
5. We can program the Arduino microcontroller to send and receive data after pairing is done [7].

The pairing of HC-05 Bluetooth module with the computer in the final checkpoint is done automatic as with the whole system boots up.

4. *BOOK ISSUING AND RETURNING*: Every user have their RFID card for their transaction in library.

It follow below steps:

1. User need to authenticate the basket with their RFID card.
2. Now user can add books to the basket.
3. For updation of books user will have to visit the Final Checkpoint after that user can take book from there.

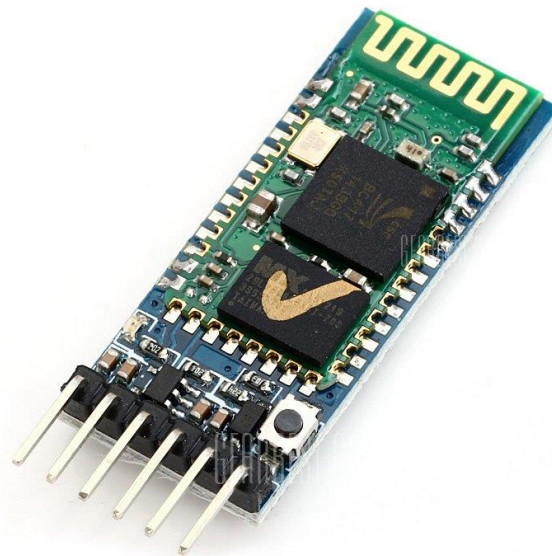
## Sensors:

### 1. *RFID READER:*



RFID readers are the device used to gather information from an RFID tags, which are used to track individual objects. Radio waves are used to transfer data. That is from RFID tag to a RFID reader. The RFID tag does not have to be scanned directly or does not require line-of-sight to a reader as done in Barcode. The RFID tag must be within the range of an RFID reader, which ranges up to 300 feet, in order to read. RFID technology also used for scanning and enables fast identification of a particular product, although, it is surrounded by several other items.

### 2. *BLUETOOTH HC-05*



A Bluetooth HC-05 is a short range device (10 meters) which provides sound and data transmission. It transmits and receives at a frequency band of 2.4 GHz. The Bluetooth device uses an IEEE 802 standards where in the connections can be point-to-point or point-to-multipoint. The data transfer rate is 3mbps and the maximum range of a Bluetooth device is up to 100 meters.

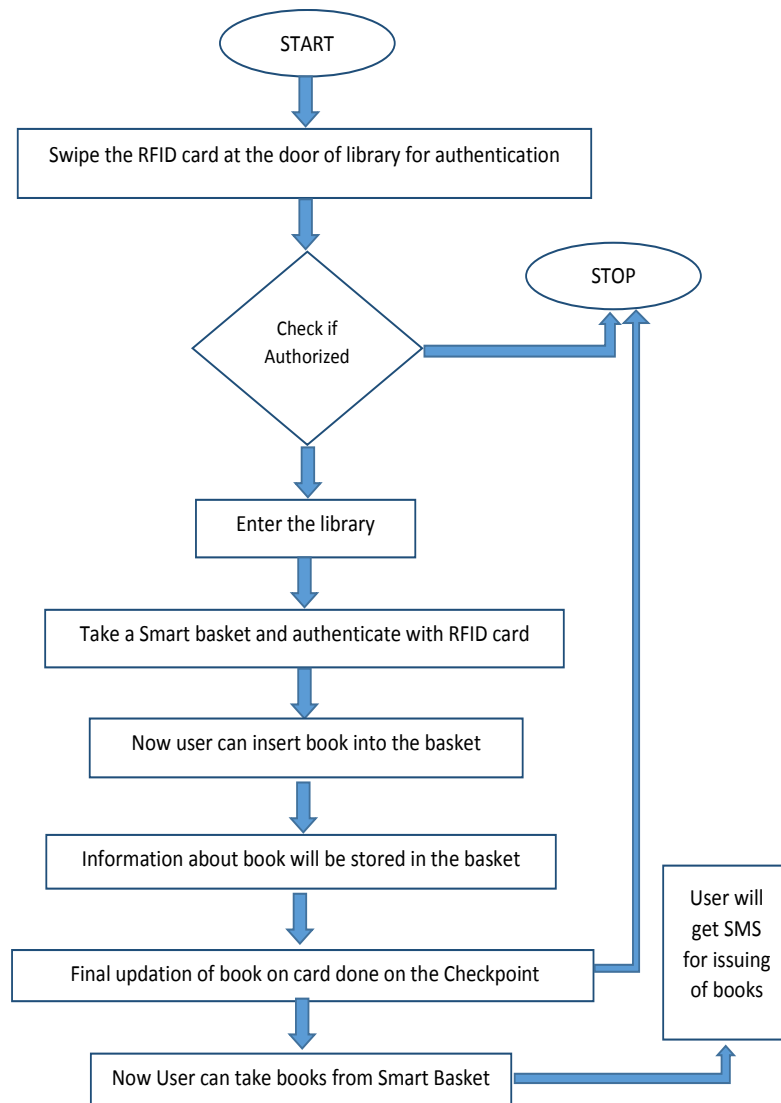
Bluetooth can connect up to 8 devices simultaneously. It uses the spread spectrum technology in which each device uses different frequency band and hence the devices do not transmit at same time. [7].

3. *RFID TAGS:*



RFID tags that have a magnetic coil within them and are used to generate radiofrequency waves. They can be read up to a small distance of 20-25 cm. A passive RFID tag that does not contain a battery, the power is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms. The RFID tag draws power from magnetic field that energizing the circuits in the tag. The tags sends the information encoded in the tag's memory. The tag is less expensive. All tags have unique identification number which is quite useful and these tags can be re-used [8].

FLOW CHART:



#### IV. CONCLUSION

RFID in the library speeds up book borrowing, monitoring, books searching processes as we know but by the use of the smart basket we can remove the need of the librarian and minimize the time for issuing the books and some of the manual error while issuing books. These applications can lead to significant savings in labour costs, enhance customer service, lower book theft and provide a constant record update of new collections of books.

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