

# Autonomous Hospital Management System Using Bluetooth Technology Developed on Python

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**Abstract-** In this project a hospital management system is developed by using a Bluetooth connection .Usually in the hospitals and medical clinics Wireless LAN(WLAN) or Wi-Fi is used for data transfer and network connection. The Electro-Magnetic Frequency (EMF) generated from the WLAN ranges from 0 to 300 GHz. Such a high range of frequency is very harmful for the patients since the Wi-Fi has been anecdotally linked to electromagnetic hypersensitivity. However the Bluetooth uses the microwave spectrum in the range of 2.4 GHz and 2.4835 GHz.The radiated output power of the Bluetooth devices vary from 1 to 100 MW and can operate continuously or sporadically.So total exposure to the EMF radiation is quite variable. Thus the Bluetooth device has never been linked to any serious health hazard. Implementation of the project in reality will help to reduce the manpower and in the efficient management of the hospital. The patients can take appointment just by using an embedded Bluetooth device without standing in a queue or waiting at the Appointment Desk. The nurse updates each and every details of the patient regularly to the main server so that by the help of the Bluetooth connection both the doctor and the patient's relatives can fetch whichever documents or information they want regarding that patient. Additionally the hospital canteen,medicine store and the Global Positioning System (GPS) have been incorporated in the project.One can know the direction to reach the particular room number with the help of Bluetooth device.Nurse can order the medicine from medicine store through the Bluetooth device.If it is available it will be send to the patient and bill will get appended. Automated Alarm System for the visitor's entry and exit within a time is facilitated by tracking the visitor's Media Access Control (MAC) –ID.Ambulance and parking facility are also developed by using MAC-ID tracker.The whole algorithm is developed using the Python language.

**Index Terms-** Bluetooth, Hospital management, MAC-ID, Python, Health hazard

## I. INTRODUCTION

In hospitals we often face a lot of problem, .let us focus on the problems which are often faced by the common people.

In the help desk the patients often have to stand in the queue. For getting appointments from a doctor(OPD) or even for getting admitted in the hospital (IPD) and often standing in such a long queue may bring distress amongst the patients.

Within the premise of hospital usage of LAN or Wi-Fi must not be allowed .Since the usage of these can cause severe problem to the patient due to the waves generated. The high signal strength medium such as wi-fi etc can interfere with the delicate medical devices such as pacemakers etc. For maintaining a huge data... large database are to be created. And the doctor may not have such time to go all the data of the patients at a time. All the medical report, the medicine table, the diet charts and also the last updates given by the doctors and it will be updated in regular basis.If the patient's relatives have any enquiries about the patient and if the doctor is not available in that hour, there will be no one to answer their queries. The canteen of the hospital does not remain well organized. But the functionality of the canteen is also simultaneously important.During the Visiting hours the patients were given token cards generally but loosing the token cards are a very common incident.Proper care of the parking area of the hospital must be taken. As the cars of the doctors, staffs,visitors and also the ambulances must be parked in different section with proper identities.

## II. WHY PYTHON??

Python is a remarkably powerful dynamic programming language that is used in a wide variety of application domains. Python is often compared to Tcl, Perl, Ruby, Scheme or Java. Some of its key distinguishing features include:

- very clear, readable syntax
- strong introspection capabilities
- intuitive object orientation
- natural expression of procedural code
- full modularity, supporting hierarchical packages
- exception-based error handling
- very high level dynamic data types
- extensive standard libraries and third party modules for virtually every task
- extensions and modules easily written in C, C++ (or Java for Jython, or .NET languages for IronPython)
- embeddable within applications as a scripting interface.

Thus, Python is a programming language using which we can work more quickly and integrate our systems more effectively. We can use Python to obtain a gain in productivity and also lower maintenance costs.

Python supports multiple programming paradigms, primarily but not limited to object-oriented, imperative and, to a lesser extent, functional programming styles. It features a

fully dynamic type system and automatic memory management, similar to that of Scheme, Ruby, Perl, and Tcl. Like other dynamic languages, Python is often used as a scripting language, but is also used in a wide range of non-scripting contexts. Using third-party tools, Python code can be packaged into standalone executable programs. Python interpreters are available for many operating systems. Python runs on Windows, Linux/Unix, Mac OS X, and has been ported to the Java and .NET virtual machines. Python is free to use, even for commercial products, because of its OSI-approved open source license.

### Comparing Python to Other Languages:

Java: Python programs are typically 3-5 times shorter (in terms of number of lines of code) than equivalent Java programs, thus they also take much less time to develop. This difference

can be attributed to Python's built-in high-level data types and its dynamic typing. A Python programmer does not have to waste any time declaring the types of arguments or variables, and Python's powerful polychromatic list and dictionary types, for which rich syntactic support is built straight into the language, find a use in almost every Python program.

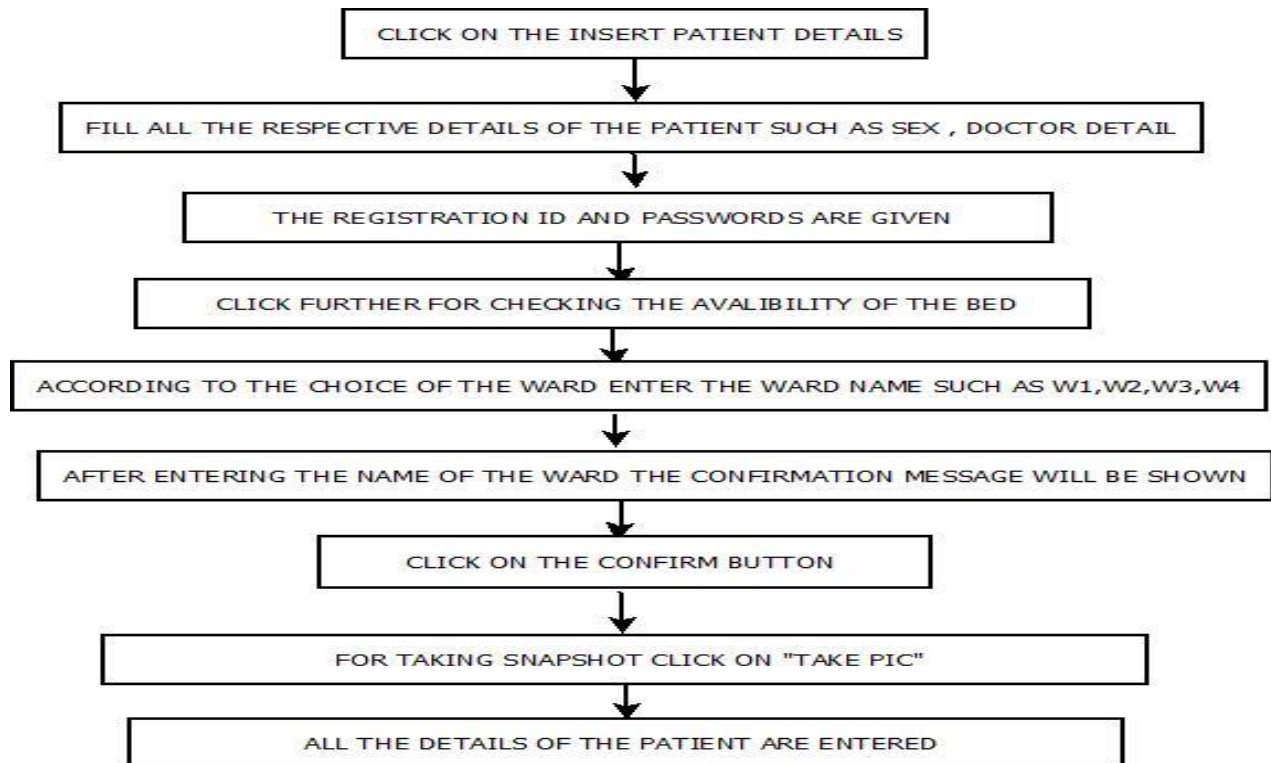
Java Script: Python supports writing much larger programs and better code reuse through a true object-oriented programming style, where classes and inheritance play an important role, whereas JavaScript does not.

Smalltalk: Perhaps the biggest difference between Python and Smalltalk is Python's more mainstream syntax, which gives it a leg up on programming training. Likewise, Perl, C++ follows Python in many a respect.

## III. ALGORITHMS

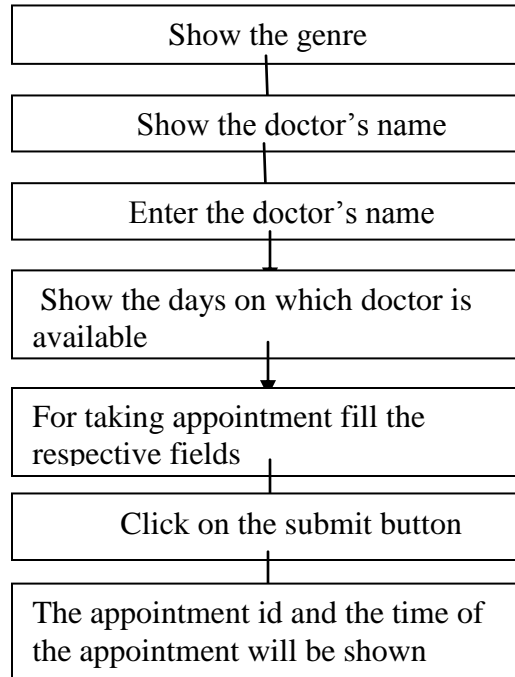
### #INHOUSE PATIENT DEPARTMENT ( entering the information)

- Step 1: Click on the insert patient details.
- Step 2: Enter the details of the patient such as sex age etc.
- Step 3: The registration and the password of the patient is also given.
- Step 5: click on "check availability of the bed".
- Step 6: According to the choice of the ward please enter which ward you want to take.
- Step 7: After entering the name of the ward the confirmation message is shown.
- Step 8: Click on the "confirm" button.
- Step 9: For taking the snapshot of the patient click on



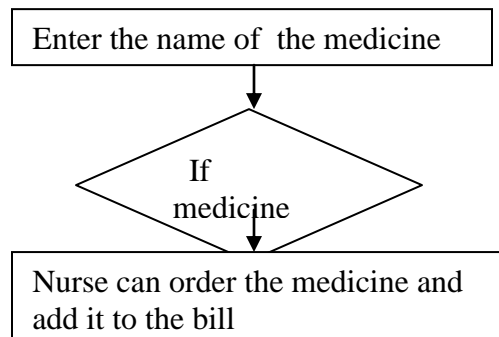
**#OPD:**

- Step 1: Show the genre
- Step 2: Show the doctor 's name
- Step 3: Enter the doctor 's name
- Step 4: Show the days on which the doctor is available
- Step 5: For taking appointment fill the respective fields
- Step 6: Click on the submit button
- Step 7: the appointment id and the time of the appointment will be shown



**#MEDICINE STORE:**

- Step 1:Nurse can check whether the respective medicine is available in the medicine store or not.
- Step 2:If medicines are available then nurse can order the medicines for the respective patient
- Step 3:Add the price of the medicine to the patients bill



## #NURSE ALGORITHM

Step 1. Click on the button "LOGIN".

Step 2. Enter the password and the nurse ID. The password and the nurse id will be matched with that from the database.

Step 3. If the password is matched then a new window will open to you where you will get 5 options.

Step 3.a .PATIENT DETAIL INFORMATION:

- Enter all the information regarding the patient
- Click on the SUBMIT button.
- The data will be updated in the database.

Step 3.b. PATHOLOGICAL LAB TEST:

- Fill the details of the patient diagnosis form.
- Click on the SUBMIT button.
- A message will be shown "The data s are submitted".
- Click on the "Pathological Test".
- Click on what type pathological test you want to enter the data.
- Fill the respective field and click on the SUBMIT button.
- A message will be shown "The values are updated".

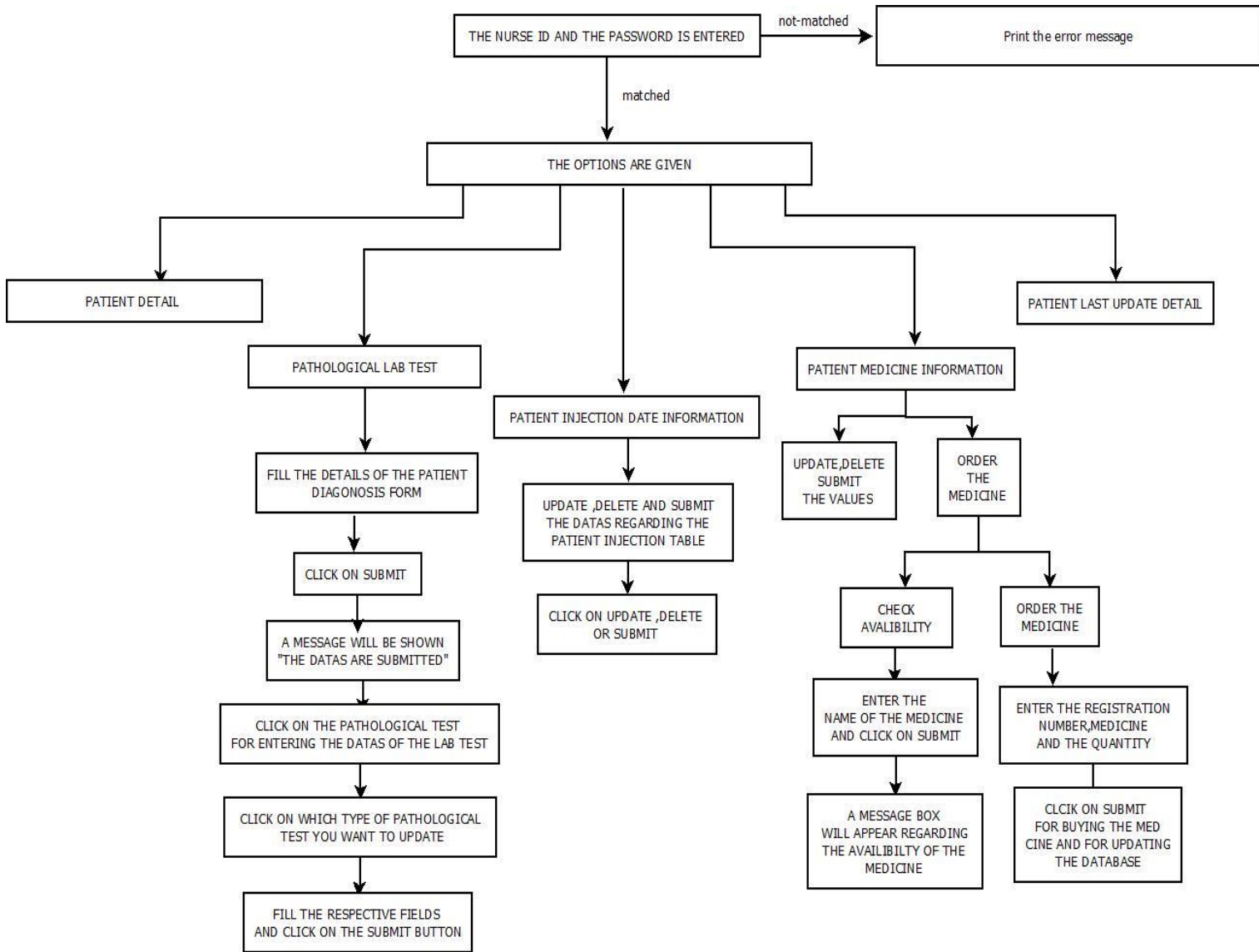
Step 3.c. PATIENT INJECTION DATE INFORMATION:

- Update, delete and submit the data regarding the patient injection information.

Step 3.d. PATIENT MEDICINE INFORMATION:

- Update, delete or submit the data regarding the patient medicine information.
- Click on update, delete or submit.
- Check the availability of a particular type of medicine

Step 4. If the password is not matched then an error message will be displayed "you have entered a wrong password!!!!"



### #VISITOR INFORMATION DESK

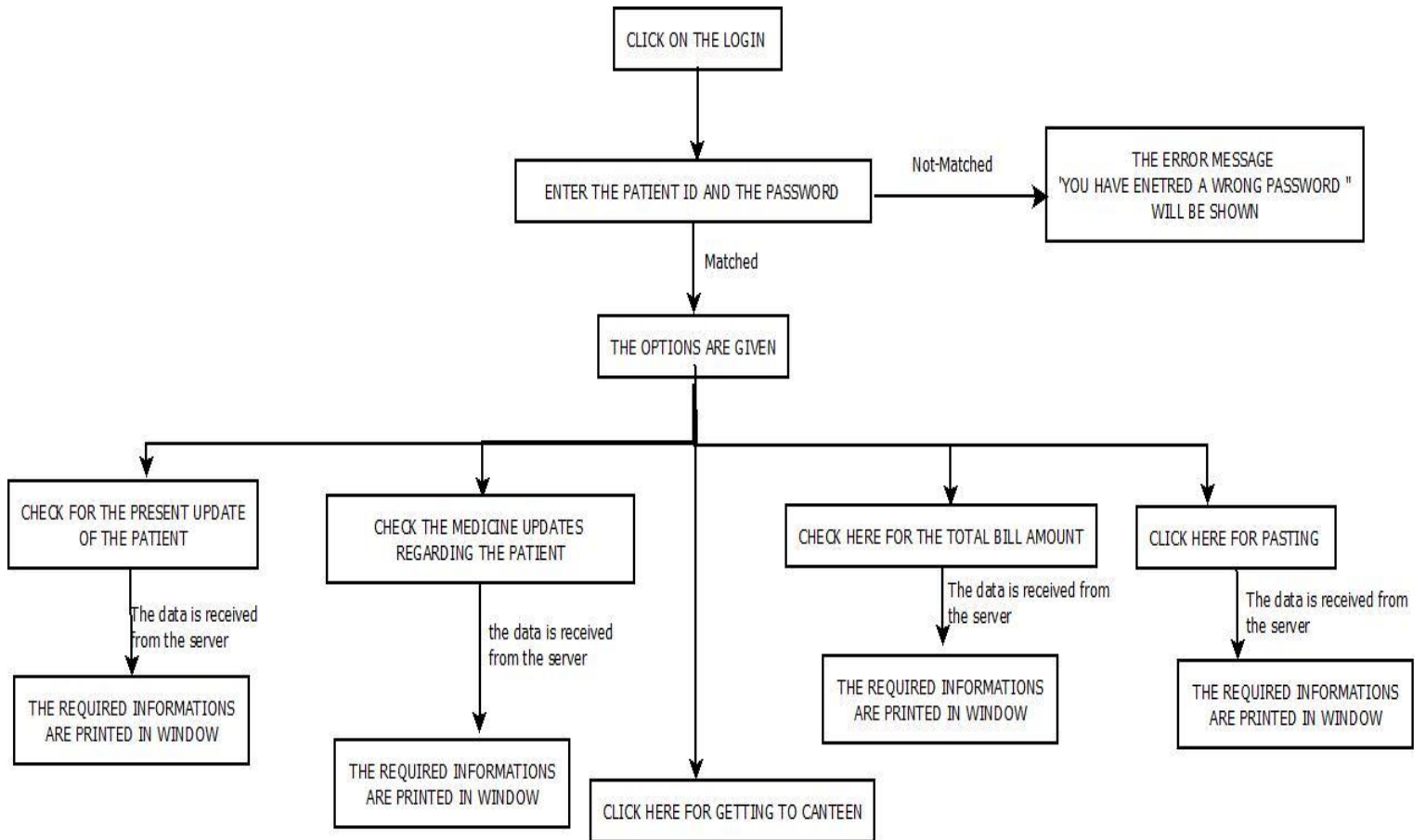
Step 1: Click on the button "Login as the visitor".

Step 2: Enter the password and the nurse ID. The password and the nurse id will be matched with that from the database.

Step 3: If the password is matched then a new window will open where there will be 4 options.

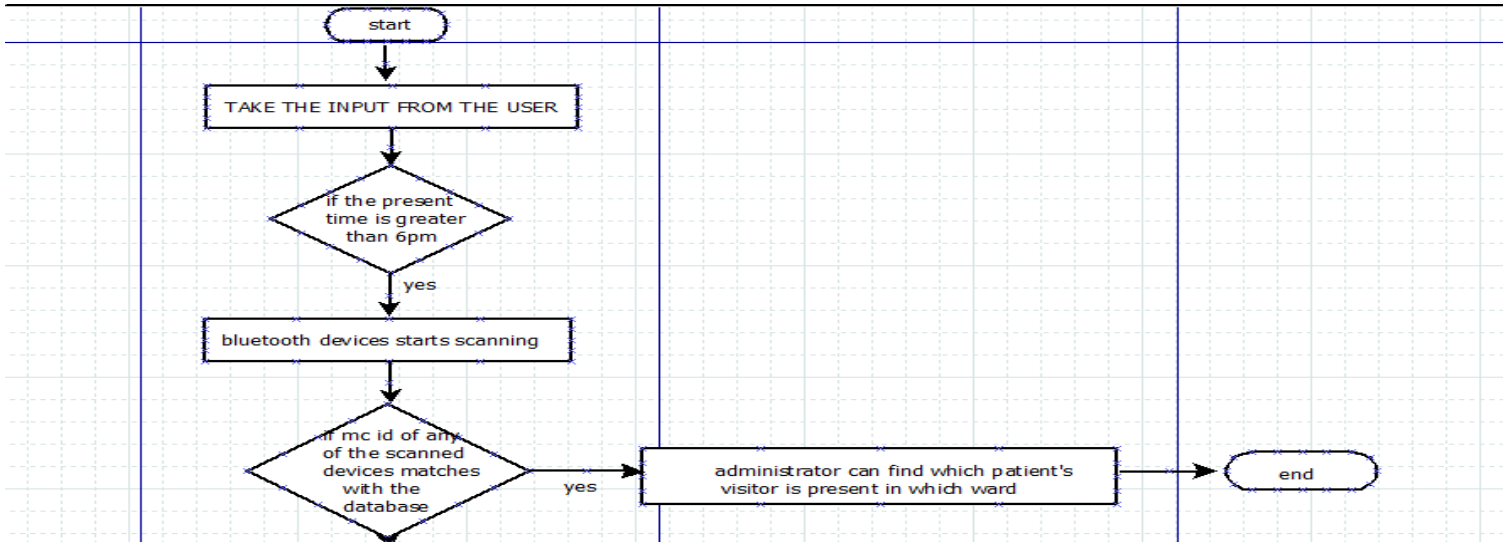
The options are as follows :-

1. Check present update
2. Check the medicine updates of the patient
3. Check the total amount of bill
4. For further enquiry please click here..



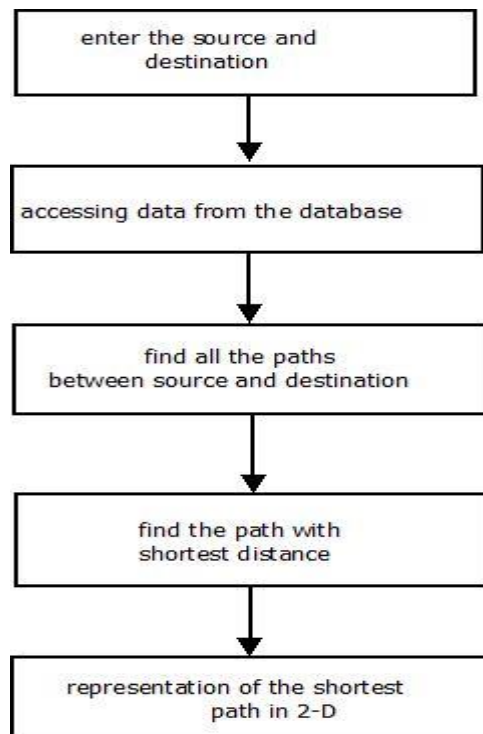
**#PARKING:**

- Step 1: Fetching of data from the database.
- Step 2: Go for an infinite scan.
- Step 3: Scanning of Bluetooth devices.
- Step 4: If the mc id in database matches with mc id of scanned devices then go to the next step.
- Step 5: If it does not belong to the staff zone.
- Step 6: It will show the zone where the vehicle is supposed to go



**#AMBULANCE:**

- Step 1: Scanning of Bluetooth devices
- Step 2: Obtain the mc id and flag value from database
- Step 3: If the mc id from the database matches with the scanned mc id then go to the next step.
- Step 4: If the flag value is 1(i.e the ambulance is not empty) then go to next Step
- Step 5: Message is shown to arrange for the ward boys and the doctor



#### IV. METHODOLOGY

Relatives of each and every patient are given a Bluetooth device. Along with that nurse and the doctor are also given a Bluetooth device.

**OPD:** Doctor 's name and their schedule are shown to the belongers of bluetooth device. People can fix their appointment with the Doctor through the Bluetooth device and a token no. and the appointment time will be given to them. If no more appointments can be fixed with that particular doctor for that day then it will show the message" please try for any other date" .

**IPD:** We take the details of the patient and a respective registration number and password is given. Availability of bed is checked and even patient detail can be updated. The snapshot of the patient can also be taken and thus all the information's and the snapshot of the patient are also displayed.

**AMBULANCE:** If each of the ambulance is given a Bluetooth device and a Bluetooth scanner is installed at the gate. Whenever our ambulance is nearby and if the ambulance is not empty then person at the registration desk can arrange for the ward boys and doctors just before the ambulance arrives. Thus by the use of the Bluetooth application of python we are able to detect ambulances.

**VISITORS:** To each patient 's relatives two Bluetooth devices are given. If any of the visitor is present in the patient's ward except the visitor 's time then the incharge receives a message "The visitor is present in this ward".

**CANTEEN:** Visitors can check out the menu available at the canteen via the Bluetooth device and thus can order the menu via the device (which acts as a client) and thus all the order will be sent to the manager of the canteen.(which acts as a server). The whole procedure is implemented by the socket programming.

**PARKING:** The staff members of hospital (doctor,nurse) who have cars, their IDs are kept as record in the database. When the scanner finds a device whose ID is already there in the database then the security guard will ask to park the Car in sec-'a' rest any other car will be in sec-'b'.

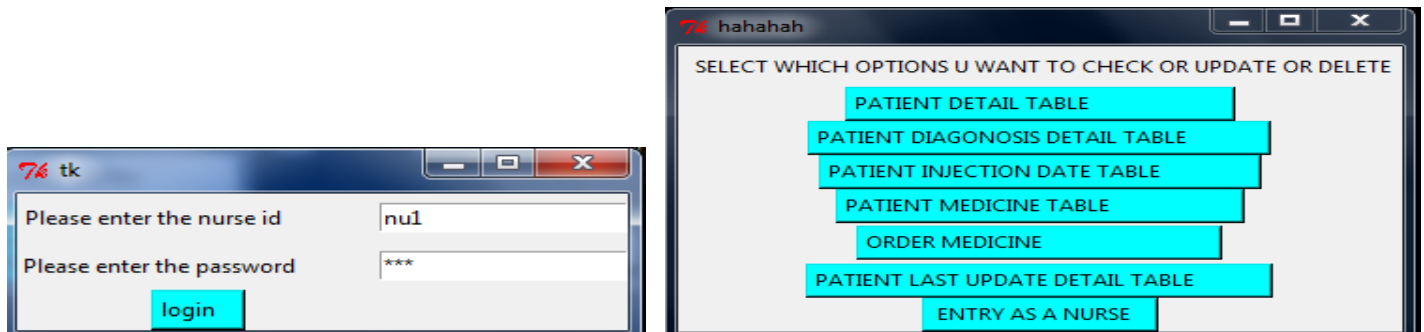
**NURSE:** This whole interface is database based. There is no server client programming in this nurse interface. Each and every nurses are given an embedded device where this whole application is installed. Thus by the help of this device the nurse can go through every details of the patient ..and also update ,delete the datas. Thus all the values gets automatically updated in the database.

**VISITOR INFORMATION DESK:** The patient's relatives are given a device,which is an embedded device where the whole application is being installed. Thus even if there is no doctor or nurse present one can get every information regarding that patient.

In the Bluetooth device ,if the option of mapping is entered and the source and destination is entered then the direction Is shown to the visitor.

#### V. RESULT

To enter the record ,nurse has to do it by entering her user name and password. After entering into its own account,she is able to update the details of the patient as:

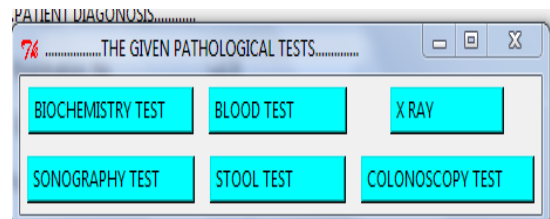


Data of a particular inhouse patient is taken in the following pattern and the data gets updated in the database.



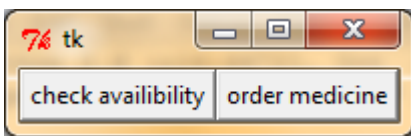
The screenshot shows a web-based form for patient admission. It is divided into two main sections: 'INSERT PATIENT DETAILS' on the left and 'RETRIEVE PATIENT DETAILS' on the right. The 'INSERT' section contains a list of fields: NAME, AGE, SEX, ADDRESS, CONTACT NUMBER, DEPARTMENT, NAME OF THE DOCTOR, TREATMENT REQUIRED, OPERATION, BLOOD GROUP, VEG OR NONVEG, reg num, and password. The 'RETRIEVE' section contains a 'REFRESH' button and an 'exit' button. Below the form, there are instructions: 'please click here for cheking the availibility of beds' (with a link), 'For admission in the general ward type w1', 'For admission in the cabin type w2', 'For admission in the cabin(a.c) type w3', and 'For admission in the ICU type w4'. At the bottom right, there is a button that says 'TO SUBMIT THE DETAILS CLICK HERE.....'.

We get the report of test from the following interface.  
 By clicking on the buttons we get the report of that particular test.



### MEDICINE ORDER BY BLUETOOTH TRANSACTION

Nurse can check the the availibility of medicine.



Nurse can order for the particular patient as:

REGISTRATION NO.	MEDICINE NAME	QUANTITY
w12	azithral	12
	painkiller	20

submit

### VI. CONCLUSION

Despite some of the problems, Bluetooth remains a very promising technology, with plenty of medium and long term applications. But the real test will be whether it survives the hype. Promoters are laying on it, with their unrealistic claims. This technology is probably the only one which has a good

chance to become widely available among PDAs and mobile devices. Bluetooth-equipped gadgets can connect to the LAN through the Access Protocols at once.50 kilobytes per second is about all you can expect from Bluetooth.

### RELATED WORKS

- Use e-mail while your portable PC is still in the briefcase!  
 When your portable PC receives an e-mail, you'll get

an alert on your mobile phone.

•A travelling businessman could ask his laptop computer to locate a suitable printer as soon as he enters a hotel lobby, and send a printout to that printer when it has been found, and replied in a positive manner.

•Cable-less connection to printers and faxes, to digital cameras and video projectors. Cordless connection from cell phone to handfree headset.

•Bluetooth interface to office PBX and Dial-up networking and automatic e-mail and use cell phone as office cordless phone. Use of PC or PDA as handfree phone.

•Automatic exchange of files, electronic business cards, calendars etc.

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