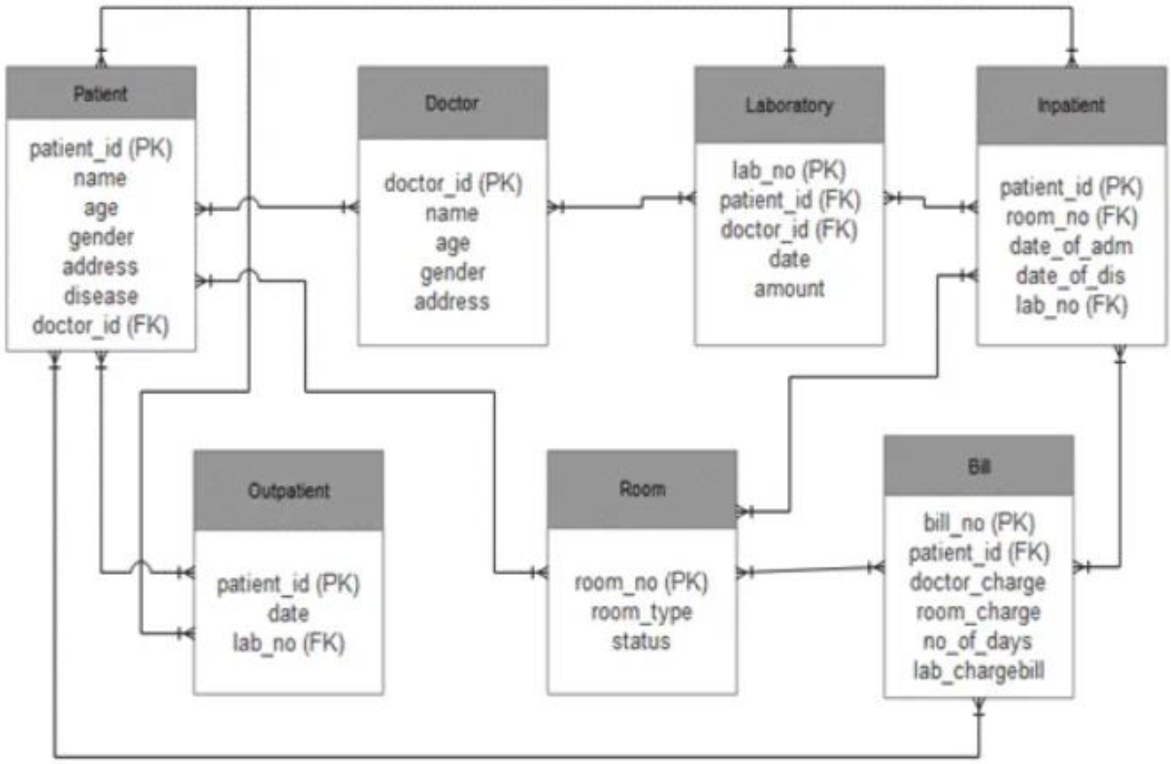
SIMPLE HOSPITAL MANAGEMENT SYSTEM IN C

A health information system (HIS) is a robust, interactive information system designed to manage the operations of health-care facilities (Hospitals). HIS, like any other integrated framework, takes time to develop, necessitates specialized technical expertise for software development, and, most importantly, costs money to develop, install, support, and update.



A general block diagram of SIMPLE HOSPITAL MANAGEMENT SYSTEM is shown in the figure:

ADVANTAGES

1. The Hospital Information System aids in the maintenance of a completely secure database of patient and business data. You can have access to this information at any time.
2. A hospital information system improves healthcare delivery by giving medical staff easier data access, quicker data retrieval, higher-quality data, and greater data display flexibility.
3. .Hospital Information Systems aid in increasing quality, both in terms of cost and clinical treatment. Duplications, repetitions, gaps, incomplete information, and confusions are all avoided..

4. Hospital Information System helps to force orderliness and standardization of the patient records and procedures in the clinic and increasing accuracy & completeness of medical records of Patient.

5. A good managerial tool is a hospital information system that provides total, cost-effective access to full and more reliable patient care data in order to improve efficiency and functions.Hospital Information System helps in gathering information to meet management challenges.

CODE IN C:

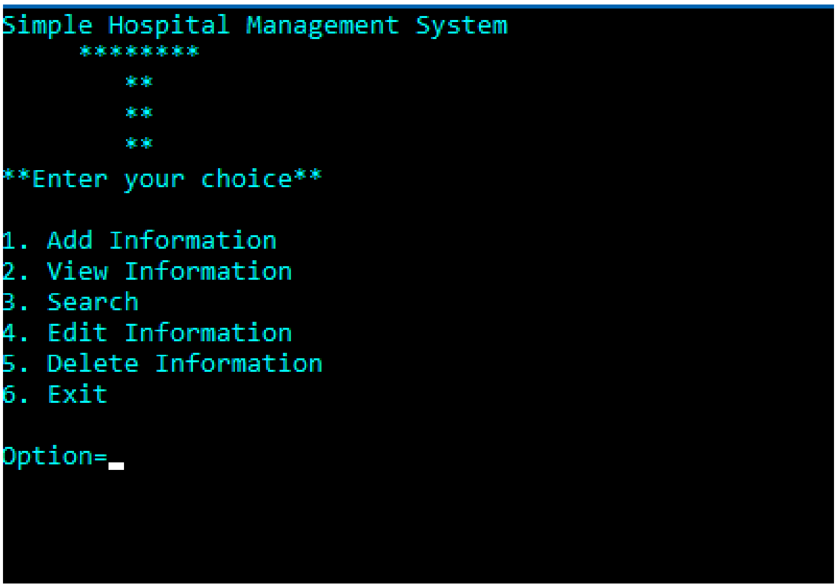
```
#include<stdio.h>
#include<string.h>
struct ad
{
   char name[30];
   char disease[30];
   int cabin,phone,age;
} x[100];
int n,i,j=0,a=0,sum=0,g,flag,num;
void read();
void add();
void view();
void search();
void edit();
void del();
void show();
int main()
{
   read();
   int c,i,q;
   printf("Simple Hospital Management System\n");
   int m,n;
//making out the pattern

   for(m=1; m<=4; m++)
   {
      for(n=1; n<=5; n++)
         printf(" ");
      for(n=1; n<=m-1; n++)
      {
         printf(" ");
      }
      for(n=1; n<=4-m+1; n++)
      {
         if(n==4-m+1 || m==1 || m==4)
            printf("*");
         else
            printf(" ");
      }
      for(n=1; n<=4-m+1; n++)
      {
         if(n==1 ||m==1 || m==4)
            printf("*");
         else
```

```
                printf(" ");
            }
            printf("\n");
        }
        while(c!=6)
        {

            printf("**Enter your choice**\n\n1. Add Information\n2. View Information\n3. Search\n4. Edit Information\n5. Delete Information\n6. Exit\n\nOption=");
            scanf("%d",&c);//choice for option
            fflush(stdin);//making it clear
            if(c==1)//add
            {
                system("cls");
                add();
            }
            else if(c==2)//view
            {
                system("cls");
                view();
            }
            else if(c==3)//search
            {
                system("cls");
                search();
            }
            else if(c==4)//edit
            {
                system("cls");
                edit();
            }
            else if(c==5)//delete
            {
                system("cls");
                del();
            }
            else if(c==6)
            {
                write();
                return 0;
            }
            else
            {
                system("cls");
                printf("\n\nInvalid input , try again by using valid inputs");
            }
            printf("\n\n");
        }
    }
    void add()
    {
        printf("\n\n");
        printf("Already data inputed on the database =%d\n\n",num);//how many inputs
        printf("How many entry do you want to add=\n");
        scanf("%d",&n);
        sum=n+num;

        for(i=num,j=0; i<sum; i++)
        {
            printf("\n");
            fflush(stdin);
            printf("Enter patient's Name = ");
            gets(x[i].name);
            fflush(stdin);
            printf("Enter disease = ");
            gets(x[i].disease);
            fflush(stdin);
            printf("Enter the age = ");
            scanf("%d",&x[i].age);
            fflush(stdin);
            printf("Enter cabin no = ");
            scanf("%d",&x[i].cabin);
            fflush(stdin);
            printf("Enter phone number = ");
            scanf("%d",&x[i].phone);
            fflush(stdin);
            printf("\n");
            j++;
            a++;
            num++;
        }
    }

    void view()
    {
        for(i=0; i<num; i++)
        {
            printf("\n");
            printf("Serial Number=%d\n",i);
            printf("Name = ");
            puts(x[i].name);
            printf("Disease = ");
            puts(x[i].disease);
            printf("Cabin no = %d\nPhone number = 0%d\nAge=%d",x[i].cabin,x[i].phone,x[i].age);
            printf("\n\n");
        }
    }
    void edit()
    {
        int q,p;
        fflush(stdin);
        printf("What do you want to edit ?\n");
        printf("Enter your option\n");
        printf("1.Name\n2.Disease\n3.Age\n4.Cabin\n5.Phone no.\n");
        printf("Option=");
        scanf("%d",&q);//option
        if(q<=5)
        {
            printf("Enter the serial no of that patient= (0 - %d)=",num-1);
            scanf("%d",&p);//serial number
            if(p<num)
            {
                if(q==1)
                {
                    fflush(stdin);
                    printf("Enter the new name=");
                    gets(x[p].name);

                }
                else if(q==2)
                {
                    fflush(stdin);
                    printf("Enter the new Disease=");
                    gets(x[p].disease);
                }
                else if(q==3)
                {
                    fflush(stdin);
                    printf("Enter the new Age=");
                    scanf("%d",&x[p].age);
                }

                else if(q==4)
                {
                    fflush(stdin);
                    printf("Enter the new Cabin no=");
                    scanf("%d",&x[p].cabin);
                }

                else if(q==5)
                {
                    fflush(stdin);
                    printf("Enter the new Phone no =");
                    scanf("%d",&x[p].phone);
                }
            }
            else
            {
                printf("\n\nInvalid Serial \nTry Again !!\n\n");
            }
        }
        else
        {
            printf("\n\nInvalid option\nTry Again!!\n\n");
        }
    }
    void search()
    {
        int s,h,f;
        char u[100];
        printf("By what do you want to search ?\n");
        printf("1.Serial no.\n2.Name\n3.Disease\n4.Cabin no.\n5.Phone no.\n6.Age\n\nOption = ");
```

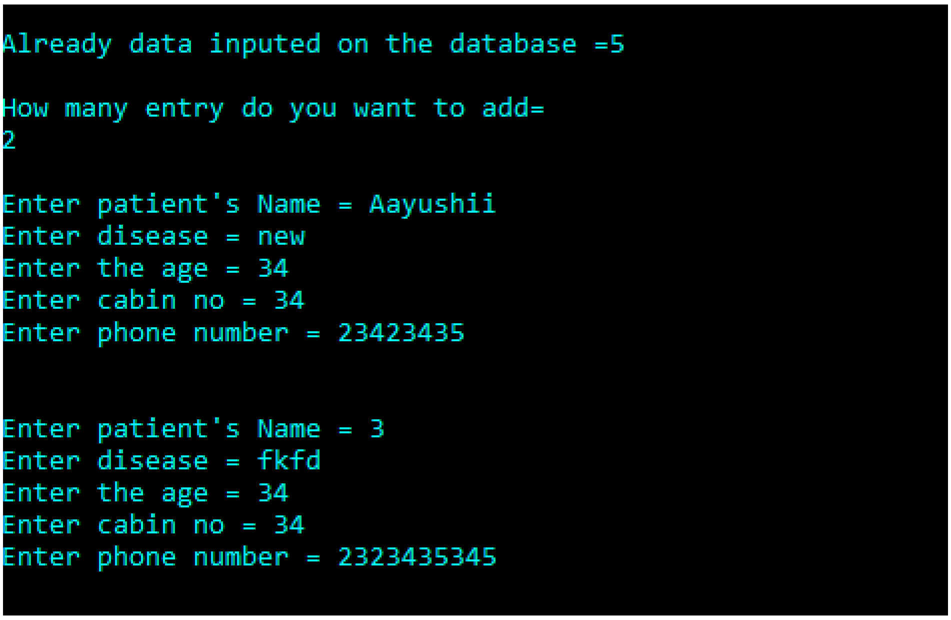
```
scanf("%d",&h);
if(h==1)
{
    printf("Enter Serial number of the patient=");
    scanf("%d",&s);
    if(s<num)
    {
        printf("\n");
        printf("Serial Number=%d\n",s);
        printf("Name = ");
        puts(x[s].name);
        printf("Disease = ");
        puts(x[s].disease);
        printf("Cabin no = %d\nPhone number = 0%d\nAge = %d",x[s].cabin,x[s].phone,x[s].age);
        printf("\n\n");
    }
    else
        printf("\n\nNot Found\n\n");
}
else if(h==2)//problem is here.........
{
    int f=1;
    fflush(stdin);
    printf("Enter your name=");
    gets(u);
    fflush(stdin);
    for(g=0; g<num; g++)
    {
        if(strcmp(u,x[g].name)==0)
        {
            printf("\n");
            printf("Serial Number=%d\n",g);
            printf("Name = ");
            puts(x[g].name);
            printf("Disease = ");
            puts(x[g].disease);
            printf("Cabin no = %d\nPhone number = 0%d\nAge = 
  %d",x[g].cabin,x[g].phone,x[g].age);
            printf("\n\n");
            f=0;

        }
    }
    if(f==1)
        printf("\nNot Found\n");



}
else if(h==3)
{
    int f=1;
    fflush(stdin);
    printf("Enter Disease = ");
    gets(u);
    fflush(stdin);
    for(g=0; g<num; g++)
    {
        if(strcmp(u,x[g].disease)==0)
        {
            printf("\n");
            printf("Serial Number=%d\n",g);
            printf("Name = ");
            puts(x[g].name);
            printf("Disease = ");
            puts(x[g].disease);
            printf("Cabin no = %d\nPhone number = 0%d\nAge =
  %d",x[g].cabin,x[g].phone,x[g].age);
            printf("\n\n");
            f=0;
        }


    }
    if(f==1)
        printf("\nNot Found\n");


}
else if(h==4)
{
    int f=1;
    printf("Enter Cabin number = ");
    scanf("%d",&f);
    for(g=0; g<num; g++)
    {
        if(f==x[g].cabin)
        {
            printf("\n");
            printf("Serial Number=%d\n",g);
            printf("Name = ");
            puts(x[g].name);
            printf("Disease = ");
            puts(x[g].disease);
            printf("Cabin no = %d\nPhone number = 0%d\nAge =
  %d",x[g].cabin,x[g].phone,x[g].age);
            printf("\n\n");
            f=0;
        }

    }
    if(f==1)
        printf("Not Found\n\n");

}
else if(h==5)
{
    int f=1;
    printf("Enter Phone number = ");
    scanf("%d",&f);
    for(g=0; g<num; g++)
    {
        if(f==x[g].phone)
        {
            printf("\n");
            printf("Serial Number=%d\n",g);
            printf("Name = ");
            puts(x[g].name);
            printf("Disease = ");
            puts(x[g].disease);
            printf("Cabin no = %d\nPhone number = 0%d\nAge =
  %d",x[g].cabin,x[g].phone,x[g].age);
            printf("\n\n");
            f=0;
        }

    }
    if(f==1)
        printf("Not Found");
}
else if(h==6)
{
    int f=1;
    printf("Enter Age = ");
    scanf("%d",&f);
    for(g=0; g<num; g++)
    {
        if(f==x[g].age)
        {
            printf("\n");
            printf("Serial Number=%d\n",g);
            printf("Name = ");
            puts(x[g].name);
            printf("Disease = ");
            puts(x[g].disease);
            printf("Cabin no = %d\nPhone number = 0%d\nAge =
  %d",x[g].cabin,x[g].phone,x[g].age);
            printf("\n\n");
            f=0;
        }

    }
    if(f==1)
        printf("Not Found\n\n");

}
else
    printf("\n\nInvalid input\n\n");
```

```
}
void del()
{
   int f,h;
   printf("Enter the serial number of the patient that you want to delete=");
   scanf("%d",&f);
   if(f<num)
   {
      printf("What do you want ?\n");
      printf("1.Remove the whole record\n2.Remove Name\n3.Remove Disease\n4.Remove
    age\n5.Remove Cabin\n6.Remove phone number\nOption = ");
      scanf("%d",&h);
      if(h==1)
      {
         while(f<num)
         {
            strcpy(x[f].name,x[f+1].name);
            strcpy(x[f].disease,x[f+1].disease);
            x[f].age=x[f+1].age;
            x[f].cabin=x[f+1].cabin;
            x[f].phone=x[f+1].phone;
            f++;
         }
         num--;
      }
      else if(h==2)
      {
         strcpy(x[f].name,"Cleared");

      }
      else if(h==3)
      {
         strcpy(x[f].disease,"Cleared");
      }
      else if(h==4)
      {
         x[f].age=0;
      }
      else if(h==5)
      {
         x[f].cabin=0;
      }
      else if(h==6)
      {
         x[f].phone=0;
      }

   }
   else
      printf("\n\nInvalid Serial number\n");

}
void read()
{
   FILE *fp = fopen("patient.txt","r");
   if(fp == NULL)
   {
      //create empty file, so that we can open it
      //in the next execution of this program
      fp = fopen("patient.txt","w");
      fclose(fp);
      printf("File does not exist, I JUST CREATED IT, exiting...\n\n\n");
      return 0;
   }

   num = fread(x, sizeof(struct ad),100, fp);
   fclose(fp);
}
void write()
{
   FILE *fp = fopen("patient.txt","w");
   if(fp == NULL)
   {
      printf("Error");
      exit(1);
   }
   fwrite(x, sizeof(struct ad),num, fp);

   fclose(fp);
    }
```

OUTPUT OF C CODE:



```
Simple Hospital Management System
     ********
        **
        **
        **
**Enter your choice**

1. Add Information
2. View Information
3. Search
4. Edit Information
5. Delete Information
6. Exit

Option=
```

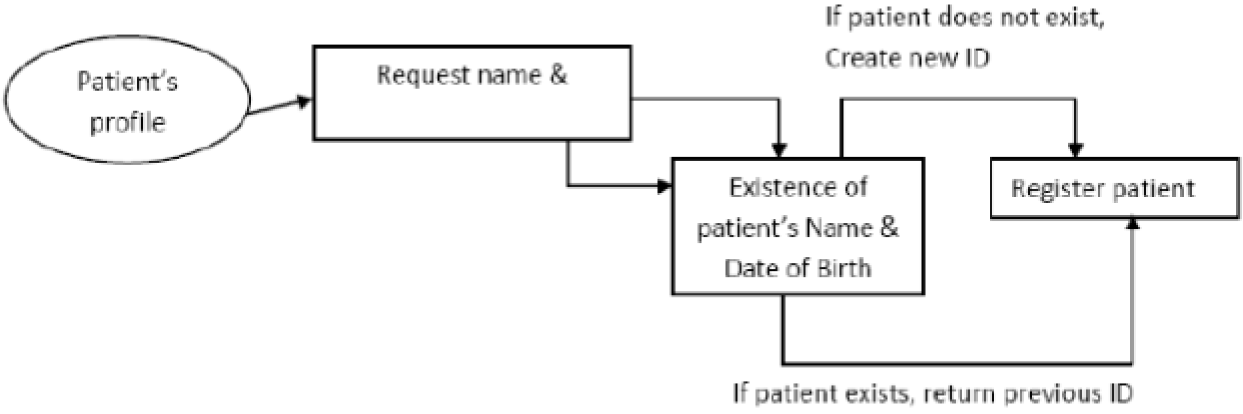


```
Already data inputed on the database =5

How many entry do you want to add=
2

Enter patient's Name = Aayushii
Enter disease = new
Enter the age = 34
Enter cabin no = 34
Enter phone number = 23423435


Enter patient's Name = 3
Enter disease = fkfd
Enter the age = 34
Enter cabin no = 34
Enter phone number = 2323435345
```

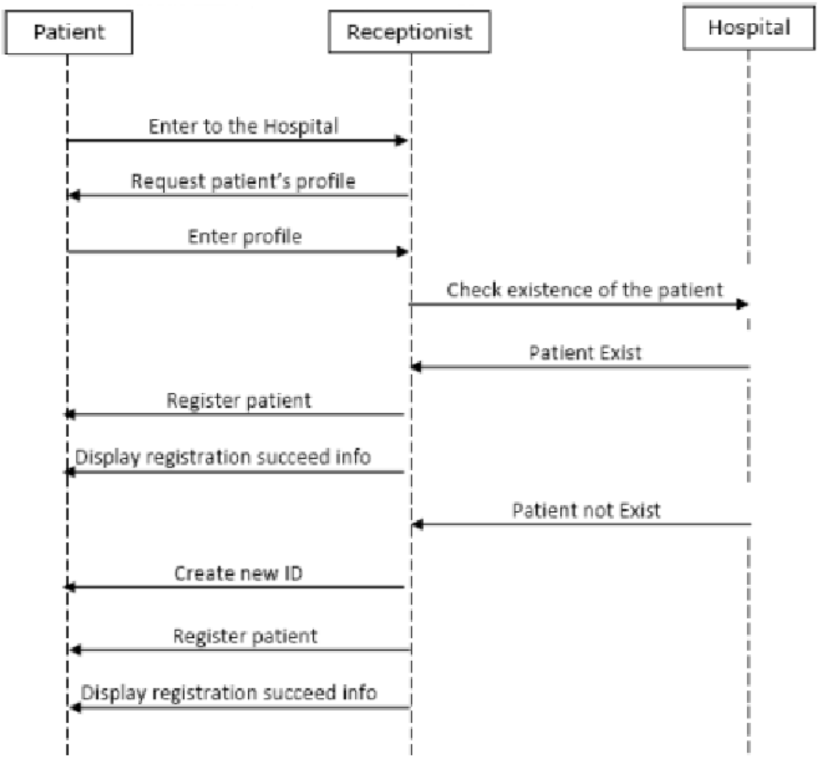
INFORMATION ON HOSPITAL MANAGEMENT SYSTEM:

Structuring Medical Records to carry out functions like admissions, discharge, treatment history etc:

Patient Registration: This function of Hospital Management Information System deals with registering the new Patient either for OPD or IPD and giving unique Identification Number to the Patient. This number is unique through out the System for identifying the patient. All the medical record of the patient are identified by combination of numbers i.e. Patient ID and OPD/IPD ID. The numbers gives flexible search in terms of finding patient's History Record.


Patient's profile
Request name &
If patient does not exist, Create new ID
Existence of patient's Name & Date of Birth
Register patient
If patient exists, return previous ID

OPD / IPD Investigation Cases: This Module of Hospital Management System deals with all kinds of Investigations suggested by Doctors. The function enables the entry of Investigations /Procedures for a particular patient. The entered investigations are rooted through the Billing/Cash office and once the patient pays for the Investigations the entries of the same goes to respective Diagnostics Center.



IPD ADMISSION AND WARD ALLOCATION: This function Patient IPD Admission gives facility to process patient admission and allocate Bed to patient. System identifies the patient as new IPD patient or internal referred from hospital OPD/CMO. This function gives information on vacant beds in a Hospital. Occupancy status on that particular position can be find out while allocating the Bed. The main function Patient Admission facilitates admitting the patient according to requirement, considering the type of admission and the patient condition.

PATIENT SHIFTING: This function of Hospital Management System facilitates to Shift patient from one Room to other inside the Hospital. With this facility patient's actual position can be updated on line so that the internal functions such as Billing, Investigations, Surgery are planned. The position of the patient is very important since all the charges like Surgery. Procedures, Investigations are related to Room Category.

DEPOSITS, ADVANCES, REFUNDS, DISCOUNTS AND CONCESSIONS:

This function of Hospital Management System facilitates all kind of financial transactions from the patient. Function plays vital role in payment recovery from patients time to time during the stay. The Advances from the patient depends on the Type of Admission and the Patient category is prompted by the System. The Interim Bill vs. Advances ratio is also maintained to carry out recovery planning. Advances and the deposits accepted by the Billing/Cash counter are directly posted into Accounts.

Refund cases are considered for excess Advances from the Patient. The Accounts Official authorizes this transaction and then refund is processed. In case of Company category patient the ration analysis between Interim Bill and the Authority letter amount by the company is compared for further action. If patient is to be given Discounts then the authorized person authorizes the Amount and the discount is processed. The discount categories are flexible and can be changed by the administrator. This facilitates easy way to keep track on the discounts and concession.

Following are the main reports / outputs generated by Hospital Information system:

- **Patient List – Admitted / Discharged.**
  This report gives information on admitted/discharged patients during certain time period. This facilitates management to know the Admission vs. Discharges ratio.
- **Bed occupancy Reports.**
  This report gives information on Bed Occupancy at any given time room category wise.
- **Ward Allocation Reports.**
  This report gives allocated rooms report for tracking of patient.
- **Interim Bill v/s Advance Report.**
  This report gives the ration of Interim Bill vs. Advances paid by the patient with the percentage of payment.
- **Admission / Discharge Register.**
  Admission and Discharge register is maintained by the system. This report gives details of patient Admission and discharges during specific period.
- **Consultant wise patients**
  This report gives Doctor wise patients at any point of time to know referring or In-charge doctor.
- **Appointment List**
  The appointments for consultants are maintained on the system.
- Performed operation list.
- Patient follow-up report.
- DIAGNOSTIC CENTRES
- This module enables to get patient’s investigation, procedure record from different locations i.e. IPD, OPD, Casualty.

FUTURE SCOPE:

Automated Clinical Laboratory Systems & Radiology Information System:

This function of HIS covers Laboratory System for Pathology, Radiology, Cardiology, Neurology, and Chest Medicine. The prescriptions given by the Doctors are routed through billing system to respective Diagnostic Centers.

Pathology

Laboratory module starts with receiving the online request from doctors. Laboratory personnel can also generate requests. This facilitates investigations for referral patients. Tests are grouped under various sections and sample type (specimen). Based on the request the user can input the sample and generate the sample number. Results can be inputted based on the sample type. Results can be inputted either to one test or multiple tests. If the test result requires approval, the supervisor has to approve the result. Test results are available to concerned doctors. Test report can be made confidential. Tests can be performed only after the billing is done. This rule is exempted when the case is declared as Urgent.

- Integration of tests Ordered from Clinical Modules
- Comprehensive On-line Laboratory Reports

- Fast Entry of Results
- Enables Doctors to see the Results On-Line from any Location at any time
- Up-to-date status about request
- Provision for templates of Input of test Results

Radiology

Radiology module caters to services such as X-ray, Scanning, Ultra sound etc. Scheduling of Radiology resources is possible. The system stores all the result details of various tests and makes a Report based on the Test Results. These Tests are carried out both for Inpatient and Outpatient. The system stores all the details (like patient number, Test Report like X-Ray, Scanning details) and for each scan the system generates a unique number for the image.

Investigations can be done only after the billing is done. This rule is exempted when the case is declared as Urgent.

- CT Scanning: Direct Capturing of CT Scanned images, Easy Reporting facility
- MRI: Easy reporting
- X-Rays: Direct Capturing of X-Ray images

Sonology

- Sonography Reporting
- Capturing of Images

Cardiology

- ECG Notes

Neurology

- EMG Reporting
- Prescriptions Discharge Card

Blood Bank

This module is developed keeping in view the legal and other requirements of operating the Blood Banks. It deals in detail with blood transfusion centers and the component laboratories and works as is online interactive system. It also generates legal as well as internal operation records.

Functions

- Donors data entry, Details of Donors such as Name, Address, Contact Numbers, Blood group are maintained in the system through Donors data entry.
- The details can be printed as and when required. The mailing list from the available data of donors can be printed for Correspondence.
- Investigation Data Entry
- Various tests details are stored in the system for as per rules of Blood Bank.
- Maintains data of tests
- Tests data details required for Blood Bank records are stored into the system with specific results on HIV, HB details.
- Facilitates component level administration of the blood units
- Keeps track of distribution / disposal of the whole blood and the components
- Signals expiry dates and components characteristics

Reports

- Blood Stock Register
- Donor register as per FDA requirements
- Investigation Report
- Blood Issue Register
- Demographic data of Donors

Role of Database in Hospital management system

Database is the heart of Hospital Information system. It consists of an orderly written document encompassing the patient's identification, health history, physical examination findings, laboratory reports, treatment, surgical procedure reports and hospital course. When complete, the record should contain the data to justify investigations, diagnosis, treatment, and length of stay, results of care and future course of action". Thus, it becomes a tool :

- To provide a means of communication among physicians, nurses and other allied health care professionals
- To provide Continuity of patient care, help in medical education and research
- To provide information for the quality review of patient care
- To protect legally the physician, patient, hospital and helps in third party payment.
- Failure to maintain an accurate, timely and complete database spoils the usefulness of HIS.

Medical Records are valuable to patients, physicians, nurses, teachers, students, and health care institutions, and research teams, national and international organizations.

other services. As more and more wired and wireless services are used and the network must support patient care, an efficient network is no longer a luxury, it is a necessity.