

Developing an Efficient Desktop Application of Hospital Care Management System using Java and Database Management

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Abstract

These days with the accelerated increase in human population, the amount of information and records is also becoming humongous in almost every aspect that may be considered.

Handling such huge amounts of data has now become a backbreaking task. Handling involves – Inserting all the records accurately, displaying particular records according to the need, updating them as and when required and lastly deleting them when no longer of any use. These problems occur especially in large organizations where extensive amount of data is added and updated on a daily basis. We have considered one such organization that is Hospitals and have tackled this problem. We have worked on creating an efficient and user-friendly desktop application, which covers all aspects of data management with the help of Java on Net Beans IDE 7.3 as our front end and Microsoft SQL Server Management Studio as our backend. This application makes data retrieval and handling incredibly easy to manage.

Keywords: *User-friendly, Efficient, Easy to use, Desktop Application, Database management, Java programming*

1. Introduction

A desktop application is an application that cannot be accessed on web, meaning, which does not need Internet to function. The sole purpose of introducing the health care management system is to reduce the cumbersome work of maintaining huge records at Hospitals [1] Hospitals in general are large organizations handling discrete and critical information about their patients and employees. Hence, it is important to have a smooth and reliable application that could help in efficient data storage and reduce the tedious work of maintaining records and handling all the paperwork. We have built the system with the intention of facilitating hassle free work in data management of any organization.

2. Related Work

2.1 Full integration of mobile computing to an enterprise hospital information system. Enhancing data quality, patient empowerment and medical research.[2]

2.2 It is a long-term, sustainable commitment to changing the culture of health care to become more collaborative, more transparent, and more proactive. A knowledge management infrastructure has become the measure of value of belonging to a hospital system or membership organization. [3]

3. Methodology

In this application, we created various forms like employment registration, patient registration, IPD patient details, OPD patient details, Drug store details, Pharmacy details and Daily patient details using Java language with the platform being Net Beans IDE 7.3

for our front end working of the application. To store all this data in an organized manner we have used Microsoft SQL Server Management Studio for our back end. This section attempts to describe each module of the project in brief, and the detailed description of each of these modules. The Health Center Management System project has been divided into three modules:

3.1 Patient

This module is divided into 3 sub parts **p_reg (Patient Registration)**-This is for registering any patient into the medical institution. This form generates a registration number through which the patient is referred throughout his medical treatment.

IPD (Indoor Patient) IPD patients are those who suffer from some critical or chronic disease. They are admitted into the hospital under a specialized doctor because they need constant monitoring. This form confirms details like the blood group and previous medical record and admits the patient into the hospital. Results from cross-sectional studies of IPD patients [4].

OPD (Outdoor Patient) OPD patients are those who do not have chronic diseases and therefore they do not need to be admitted in the hospital. They come only for check-ups and consultation. OPD form after being filled generates the department to which the patient is referred. The patients are served for common problems.

Then there is an update patient form to update any new information regarding the patient under the same card number issued in the beginning of the treatment.

There is another form view patient details. It gives various details like card number, registration number, name, and date of birth, age and address in tabular manner. There is a daily patient detail form, which helps in viewing the number of patients, and their respective details date wise.

3.2 Employee

The details of doctors are maintained separately. Master table like qualification_master and designation_master maintain the record of the degree held by a particular employee such as nurse, doctor, chief doctor etc. Forms like updating employee and viewing employee help in updating new information and viewing the details respectively.

3.3 Drug Store

The drug store department maintains the detailed record of high quality medicines. It keeps a check on the quantity of medicines and update in case of any medicine is declining. It is very difficult to maintain a record of different medicines. Thus the drug store department makes this job less cumbersome by notifying the expiry dates of various medicines in the store. [5]

4.ER Diagram

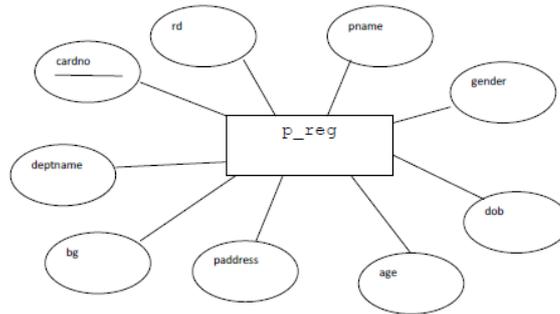


Diagram 1. It Represents the Entity p_reg and it's Various Attributes. Cardno is the Primary Key

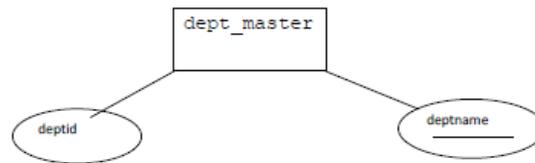


Diagram 2. It Represents the Entity dept_master and it's Attributes. Deptname is Primary Key

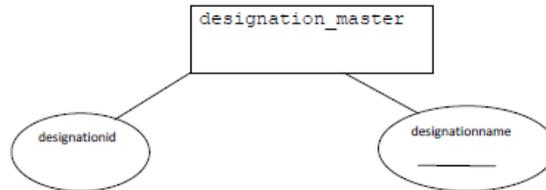


Diagram 3. It Represents the Entity designation_master and it's Attributes. Designation is Primary Key

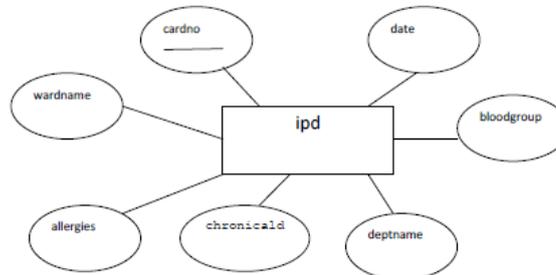


Diagram 4. It Represents the Entity ipd and it's Attributes. Cardno is Primary Key

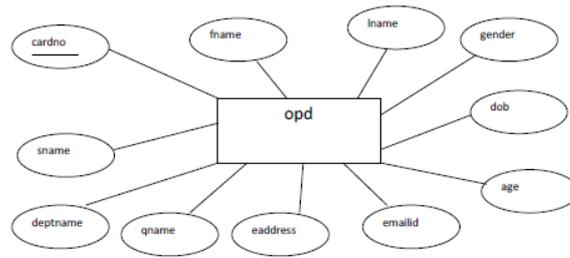


Diagram 5. It Represents the Entity opd and it's Attributes. Cardno is Primary Key

4. Working



Figure 1. Login Page of the Application

The application can be logged in by different users i.e. the employee (who could register, view and update patient) and the admin (administrator - who could register employees, update their details, add and update drug store details entries, register patients as well).



Figure 2. Main Page of Contents

The main page of the application provides an easy access to all the forms.

The screenshot shows a web browser window with two tabs: 'Personal Details' and 'Credentials'. The 'Personal Details' tab is active. The form is titled 'vitalhub Patient Care. Evolved'. It contains the following fields:

- First Name: Deepak
- Last Name: Bhatta
- Gender: Male Female
- D.O.B: 12-12-1989
- Age: 26
- Phone number: 9872225409
- Email ID: deepak12@yahoo.com
- Address: #12,sec-38, Chandigarh

Figure 3. Employee Registration Form- Personal details

The personal details of every employee of the organization are kept by filling this form.

The screenshot shows the 'Credentials' tab of the registration form. It includes:

- Qualification: MBBS (dropdown menu)
- Designation: Intern (dropdown menu)
- Submit button

A message box is overlaid on the form, displaying: 'Message: Registration ID: 2053' with an 'OK' button.

Figure 4. Employee Registration Form- Credentials

The credentials of all employees are stored and are then assigned a unique registration id, which can be used to later to access, view or update the details of that particular employee.

The screenshot shows the 'Patient Registration Form'. It includes:

- Registration Date: 30-05-2015
- Name: Riya
- D.O.B: 03-05-1994
- Address: #12,sec-35, Chd
- Submit button

A message box is overlaid on the form, displaying: 'Message: Card Number: 222' with an 'OK' button.

Figure 5. Patient Registration Form

The patients are also registered and provided a unique card number. The card number can be used by the patient whenever he visits.

The screenshot shows a web form titled 'vitalhub Patient Care. Evolved'. It contains the following fields and values:

Card Number	100
Date of admission	10-07-14
Blood Group	O+
Department referred	General
Any chronicl disease	Asthma
Allergies	None
Ward Admitted to:	General

A 'Submit' button is located at the bottom center of the form.

Figure 6. Indoor Patient Department Form

The IPD form requires basic details to be filled like the date of admission, department referred, ward admitted to and as shown above.

The screenshot shows a web form titled 'vitalhub Patient Care. Evolved'. It contains the following fields and values:

Card Number	105
Date	10-07-14
Blood Group	A+
Department Referred to	General

A 'Submit' button is located at the bottom center of the form.

Figure 7. Outdoor Patient Form

The OPD form requires only a few details i.e. the date, blood group and department referred to.

The screenshot shows a web form titled 'vitalhub' with a 'Select Details | Update' header. It contains the following fields and values:

Registration ID	2000	Email ID	kumar@gmail.com
First Name	Akash	Address	sec-1, Chandigarh
Last Name	Kumar	Qualification	BDS
Gender		Department	Anesthesio...
D.O.B		Specialization	Anesthesio...
Age	41	Designation	Doctor
Phone Number	9213374848		

A 'Message' dialog box is overlaid on the form, displaying 'Record Updated' and an 'OK' button. An 'Update' button is located at the bottom center of the form.

Figure 8. Update Employee Details Form

The application also provides an easy way to update the employee details by clicking the update employee details button on the main page.

Card Number	Registration D.	Name	Gender	D.O.B	Age	Address
100	04-06-14	Sara	female	03-08-94	20	#125,sector-17
101	04-07-14	Jessica	female	04-03-72	42	#456,sector-48
102	04-07-14	Lena	female	09-08-95	19	#87,sector-10
103	04-07-14	Mira	female	29-01-01	13	#651,sector-45
104	04-07-14	Adam	male	02-06-90	24	#12,sector-9
105	04-07-14	James	male	09-07-94	20	#12,sector-12

Figure 9. Daily Patient Detail Form

The application also provides an easy way to update patient details by clicking the update employee details on button the main page.

Figure 10. Drug Store Details Form

The application can also be used to enter the details of the stock of medicines coming into the hospital using the drug store entries form.

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Microsoft SQL Server Management Studio Express
File Edit View Query Tools Window Community Help
New Query Execute
master
Summary
create table p_reg(
cardno int identity(100,1) primary key,
rd varchar(20),
pname varchar(20),
gender varchar(20),
dob varchar(20),
age int,
paddress varchar(30),
bg varchar(20),
deptname varchar(30) references dept_master(deptname))

create table opd(
cardno int primary key references p_reg(cardno),
date varchar(20),
bloodgroup varchar(20),
deptname varchar(30) references dept_master(deptname))

create table ipd(
cardno int primary key references p_reg(cardno),
date varchar(20), bloodgroup varchar(20),
deptname varchar(30), chronicaid varchar(30),
allergies varchar(30), wardname varchar(30))

create table emp_reg(cardno int identity(2000,1) primary key, fname varchar(20), lname varchar(20), gender varchar(20), dob varchar(20),
age int, phoneno varchar(20), emailid varchar(20), eaddress varchar(30), qname varchar(30) references homequalification_master(qname),
deptname varchar(30) references dept_master(deptname), sname varchar(30) references specialization_master(sname), designationname
varchar(30) references designation_master(designationname) )
    
```

Figure 11. List of Tables Created

At the back end, MS SQL Server is used where a total of 12 tables were created.

cardno	rg	pname	gender	dob	a...	paddress
92	198	08-03-2014	Rohan	Male	14-08-2005	15 #2221 Sec-2 Chd
93	199	08-03-2014	Mano...	Male	12-02-1990	25 #86 Sec-16 Chd
94	200	08-03-2014	Hem...	Male	18-05-1998	17 #82 Sec-13 Chd
95	201	08-03-2014	Hima...	Male	16-02-2001	14 #8611 Sec-17 Chd
96	202	08-03-2014	Hardik	Male	21-09-2009	6 #800 Sec-18 Chd
97	203	08-03-2014	Hoka...	Male	22-04-2001	14 #99 Sec-16 Chd
98	204	08-03-2014	Sahaj	Male	31-09-2002	13 #868 Sec-16 Chd
99	205	08-03-2014	Sahib	Male	16-07-2003	12 #9976 Sec-40 Chd
100	206	08-03-2014	Abhis...	Male	16-04-2013	2 #956 Sec-44 Chd
101	207	08-03-2014	Ishita	Fem...	21-01-2013	2 #956 Sec-44 Chd
102	208	08-03-2014	Ishhan	Male	18-09-2004	11 #56 Sec-14 Chd
103	209	09-03-2014	Alok	Male	14-05-2010	15 #944 Sec-12 Chd
104	210	09-03-2014	Amrit	Male	23-08-2000	15 #13 Sec-44 Chd
105	211	09-03-2014	Anmol	Male	17-02-2000	15 #24 Sec-2 Chd
106	212	09-03-2014	Anman	Male	12-02-1980	35 #96 Sec-34 Chd
107	213	09-03-2014	Akash	Male	30-04-1999	16 #1300 Sec-44 Chd
108	214	09-03-2014	Akshita	Fem...	22-05-1995	19 #2454 Sec-17 Chd
109	215	09-03-2014	Anu	Fem...	16-06-2006	9 #55 Sec-43 Chd
110	216	09-03-2014	Kanu...	Fem...	23-04-1984	31 #950 Sec-40 Chd
111	217	09-03-2014	Kanika	Fem...	29-04-2003	12 #1003 Sec-43 Chd
112	218	10-03-2014	Navr...	Fem...	23-04-2001	14 #2956 Sec-44 Chd
113	219	10-03-2014	Mani...	Fem...	04-04-1994	20 #100 Sec-4 Chd
114	220	10-03-2014	Milli	Fem...	06-09-1967	48 #24411 Sec-32 Chd
115	221	10-03-2014	Mannat	Fem...	28-09-1993	21 #1956 Sec-41 Chd

Figure 12. Entries of the p_reg table

This shows the details of p_reg table, which stores the registration details of all the patients. Similarly, the entries of the other forms are stored in their corresponding tables and can be retrieved later using the application. Strategic Working of health care organization [6].

5. Conclusion

The problem with the old system was manual paperwork. Paperwork is a hassle because, with time paper perishes, ink fades, or in any calamity it's more vulnerable to being destroyed than records on computer. The need for large organizations like hospitals to quit manual labour in processing and servicing the patient's request and adopting computerized data management system is most necessary and now inevitable. Large amounts of data cannot be handled manually in an efficient way; it is prone to errors and produces results at a much slower pace. In today's world, where time is money, an application that can do the same work at a much faster rate and that too accurately, proves to be a great asset. Java is a platform independent, flexible and a modularized language; hence it makes the application portable and efficient. A good delivery system [7].

6. Future Scope

With technological advancements booming, and fast paced lives of people, internet has crawled up in our lifestyle in such a way that we have become accustomed to getting everything done for us just in a few clicks. Therefore if this hospital care management system's desktop application is developed on web, it would bring about a huge change in the health care sector, as patients could book appointments with their doctors online, they could consult and leave messages for their doctors in times of emergency. A portal could be established where patients could get medicines and reports delivered to their homes. Doctors could post educational blogs for patients. The possibilities that Internet can establish are innumerable, hence if this application is converted to web using PHP, HTML and CSS it would be a significant step in making everyone's life a lot easier.

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