OOPS Project Report

Hospital Searching System

IIITM Gwalior

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Candidate's declaration

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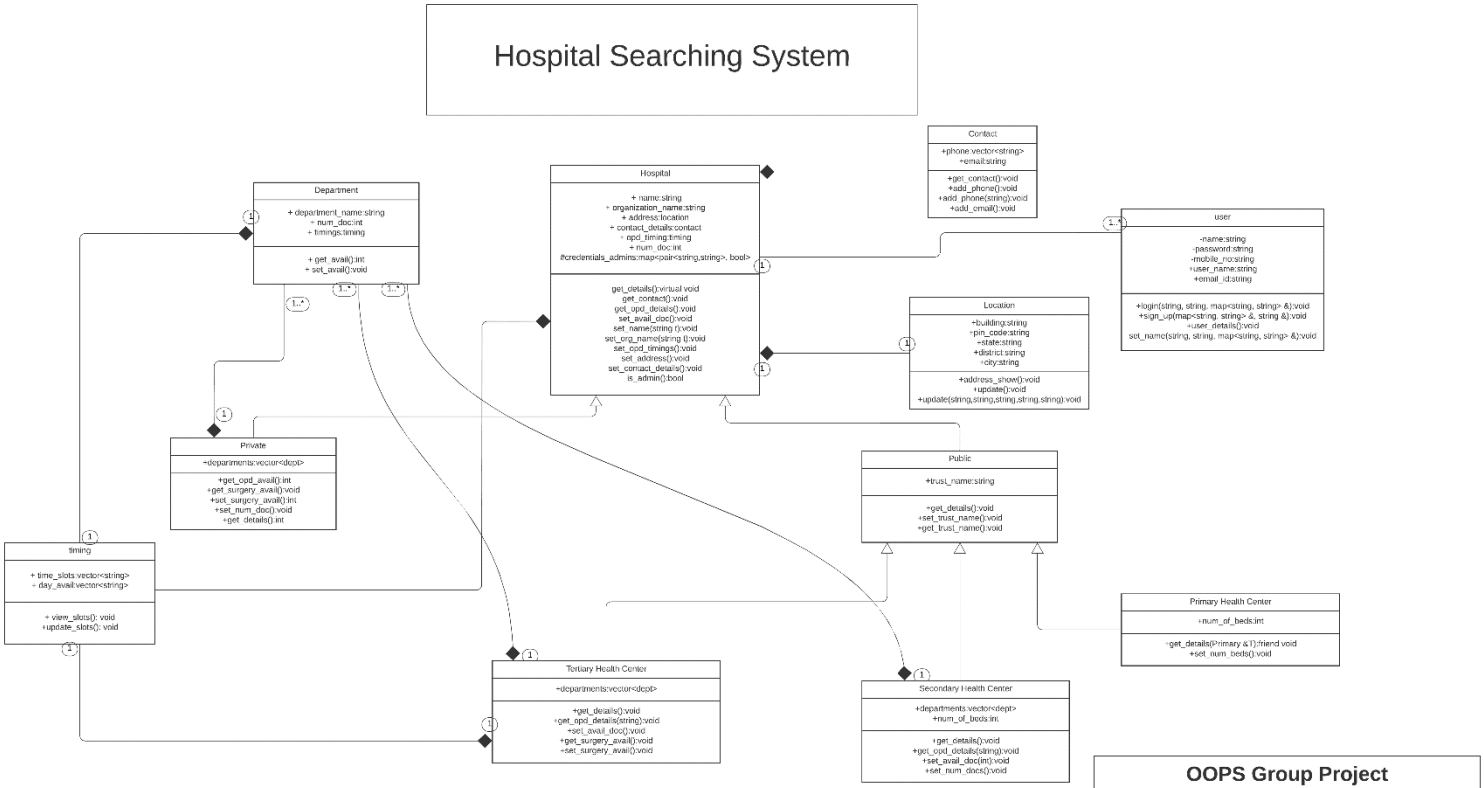
Abstract

This project regarding Hospital searching system enables a user to search hospitals by name or by city. This software has the ability to display the available time slots, the details of the hospital and the working days for a particular hospital. The data used in this software is for demonstration purposes. Adding of the hospitals is not the work of the users and is done by the programmers for demonstration. Similarly, dummy users have been created for an apt demonstration.

Class Diagram



OOPS Group Project

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Introduction

Hospital Searching System is a software through which a user can access the information of a particular hospital. A user should first sign up and then log in to the command line interface and then they can access the database. The implementation contains 11 classes in total. This project covers these concepts:

i. Encapsulation
ii. Constructors
iii. Function Overloading
iv. Polymorphism
v. Inheritance
vi. Abstract Classes

1. Hospital

The hospital class is an abstract class which contains all the basic information about a hospital which includes its name, the organization controlling that hospital, the number of doctors present in that hospital, address, contact information etc.

1.1 Private

Private hospitals contain the facility for surgeries and also obviously has an outpatient department (O.P.D.). The time slots for surgery and outpatient department are included here.

1.2 Public

Public Hospitals belong to one or more trusts. It is a parent class of three classes namely primary, secondary and tertiary.

1.2.1 Primary

Primary hospitals are those hospitals which we see in villages and cities which have 2-3 doctors, O.P.D. is present and number of beds are present for patients.

1.2.2 Secondary

Secondary hospitals contain a O.P.D. and are bigger than the primary hospitals. These hospitals have a certain number of beds for housing critical patients.

1.2.3 Tertiary

Tertiary hospitals are big full-scale hospitals having various departments for certain areas of medicine like Cardiology, E.N.T, Orthopaedics which have their own timings. Along with these departments they also have an O.P.D and the functionality for surgery.

2. User

User can be of two types: one admin and a normal non-administrative user who will be the end user of this software for using its functionality. The admin can update the details of that hospital while the other users can only view these details. Login and signup functionality is provided here.

3. Department

This contains all the necessary attributes and behaviours of a particular department like the department name, the timing of that department, the number of doctors.

4. Timing

A form of storing the time-slots and the days a particular hospital is operational is implemented in this class.

5. Contact

Any hospital has a combination of ways to contact like a phone number, its address, its email ID etc. All this data is contained in this class.

6. Location

The location of a hospital is an important part of the information regarding that hospital. This class contains attributes like building name, city, state, pin code etc.

Software design

1. hospital.hpp

The hospital class is an abstract class which contains attributes: name (string), organization name (string), number of doctors present in that hospital (int), address of the hospital (location class), contact details of the hospital (contact class), the timings of the O.P.D. (timing class).

a) hospital ()

Default constructor initializing the numbed or doctors in the class hospital.

b) hospital (int num)

Parameterized constructor which has an argument num which is assigned to num_doc.

c) get_contact()

Fetches the contact from the contact_details (contact class object) via the function get_contact().

d) get_details()

Pure virtual function fetches details and prints it out of the hospital will be overridden Pure virtual functions make a class abstract and therefore hospital class is an abstract class.

e) get_opd_details()

Fetches the opd contact from opd_details via the function get_opd_details().

e) setter functions

All the attributes can be set through the set_name(string t), set_org_name(string t), set_opd_timings(),set_address(),set_contact_details() functions.

f) is_admin()

This function is used to check the login credentials and verify if the user is admin or not.

1.1 Private

Private class contains a vector of dept(s) named department_list which holds the different departments present in the hospital. O.P.D. timings and surgery timings are present as a timing class object. We have used composition here.

a) Setter functions

All the functions can be set through set_surgery_avail(), set_num_doc().

b) get_opd_avail()

This function prints the availability of O.P.D. timings, via the view_slots() function of opd_timings object.

c) get_surgery_avail()

This function prints the availability of surgery timings, via the view_slots() function of surgery_timings object.

d) get_details()

This function prints the details of the private hospital and the departments, via the function get_details().

1.2 Public

Public Hospitals belong to one or more trusts. Thus a string storing the names of those trusts is an attribute here. It is a parent class of three classes namely primary, secondary and tertiary.

a) get_details()

This function prints details of a public hospital. And is used to override the pure virtual function get_details() in hospital class.

b) get_trust_name()

This function prints the trust name of the hospital.

b) setter function()

The function used to set trust name is set_trust_name().

1.2.1 Primary.hpp

Primary class contains a map of the pair of the credentials of the administrative users.

a) Primary()

Default constructor initializing the number of doctors to zero.

b) get_details()

This is a friend function which prints out the necessary details of the hospital using the member functions of the timing and contact classes view_slots(), get_contact() and get_trust_name() respectively.

d) setter functions

Setter function used here is to set number of doctors using function set_num_beds().

```
Enter 1 to login or 2 to sign-up
1
Enter User name and password
ankit iamankit
Success
Welcome to our Application
Enter 1 to Search in Primary Hospitals
Enter 2 to Search in Secodary Hospitals
Enter 3 to Search in Tertiary Hospitals
Enter 4 to Search in Private Hospitals
Enter -1 to leave
1
Enter name of city
Chakmoh
Name of Hospital is : PMH Chakmoh
No of Doctors are 2
The Time slots are:
10-12 14-18
The available days are:
Monday Tuesday Wednesday Thursday Friday Saturday
```

1.2.2 Secondary

Secondary hospitals contain a O.P.D. and are bigger than the primary hospitals. Number of beds is an attribute present here. This class

contains a vector of dept named departments which will store the different departments which exist in the hospital. It also contains a map of the pair of the credentials of the administrative users.

a) Secondary()

Default constructor initializing the number of doctors to zero.

b) get_details()

This function prints out the necessary details of the hospital including the details of every department using the member functions of the timing and contact classes view_slots() and get_contact() respectively.

c) get_opd_details(string dept_name)

This function prints only the O.P.D. timings of the department given as an argument in this class using view_slots() function of timing class. If the department given in argument is not present in the hospital a prompt to the user is given saying that the department doesn't exist.

d) Setter functions

Setter functions is used to set number of beds and available doctors using set_num_beds(),set_avail_doc().

1.2.3 Tertiary

Tertiary.hpp contains the class tertiary and its implementation. There are two timing objects present here one for the O.P.D. timings and other for surgery timings. This class contains a vector of dept named departments which will store the different departments which exist in the hospital. It also contains a map of the pair of the credentials of the administrative users.

a) tertiary()

Default constructor initializing the number of doctors to zero and creating a default credential for an admin user.

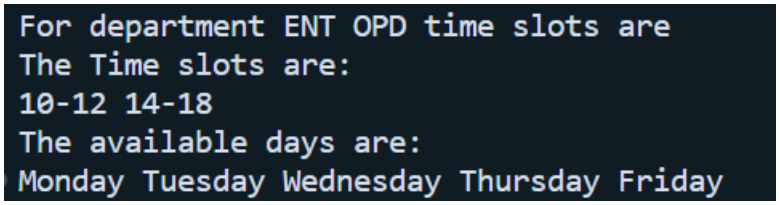
b) get_details()

This function prints out the necessary details of the hospital including the details of every department using the member

functions of the timing and contact classes view_slots() and get_contact() respectively. It also displays the total number of doctors after adding all the doctors in each department.

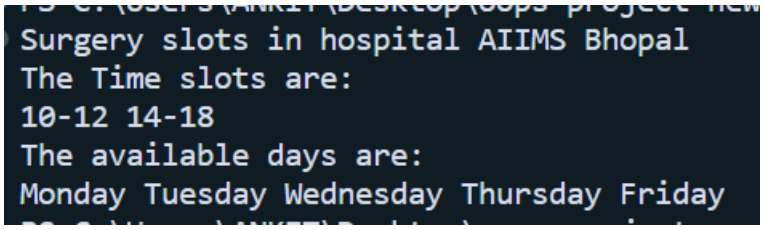
c) get_opd_details(string dept_name)

This function prints only the O.P.D. timings of the department given as an argument in this class using view_slots() function of timing class. If the department given in argument is not present in the hospital a prompt to the user is given saying that the department doesn't exist.



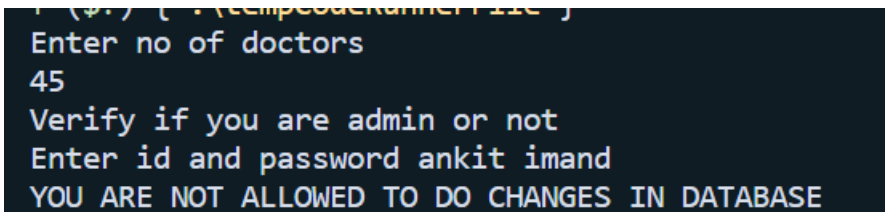
d) get_surgery_avail()

This function displays the timing slots for the surgery of the hospital via the view_slots() function of the timing class.



e) Setter functions

Setter functions is used to set number of surgery slots and available doctors using set_surgery_avail(), set_avail_doc().

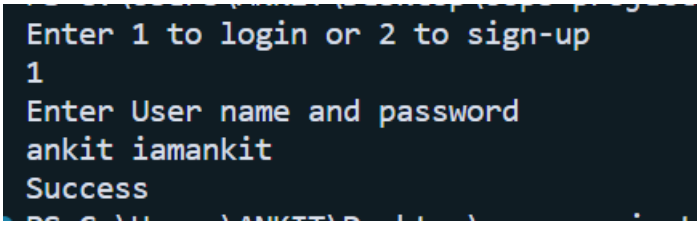


2. User

User class contains a map of string to string which pairs the username with the passwords.

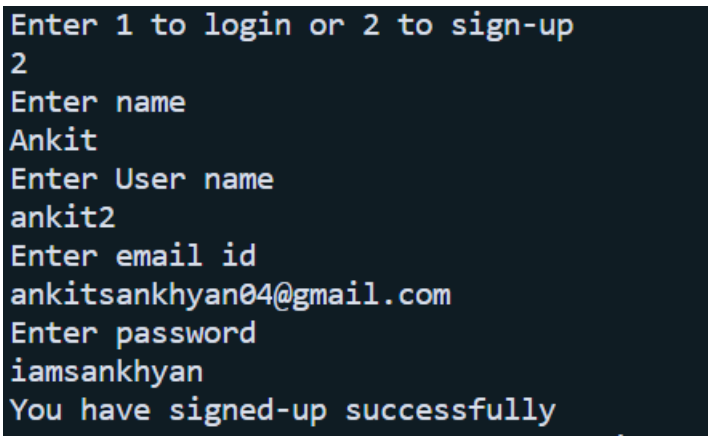
a) login(string user, string password, map<string, string> &credentials_users)

Login function will return true if the user exists in the dummy database else it will return false.



b) sign_up()

This function asks the user their details and then signs them up so they can login again and then they can access the dummy database after they login.



c) user_detail()

This function displays the details of user using function user_detail()

d) Setter functions

the setter function set_name() is used to set_name.

3. Department

Dept class contains the department name (string), the timing of that department (timing), the number of doctors(int).

a) get_avail()

This function is used for getting or printing the department details.

b) Setter functions

These functions are used to update the attributes of the department object made in the hospital classes using set_avail()

```
Verify if you are admin or not
Enter id and password ankit iamankit
Enter department
ENT
Update no of doctors in ENT
45
Successfully updated
```

c) dept()

Default constructor is used to set and get availability function

4. Timing

This timing class contains two vectors of strings one containing the time slots and one containing the available days the hospital is operational in a week.

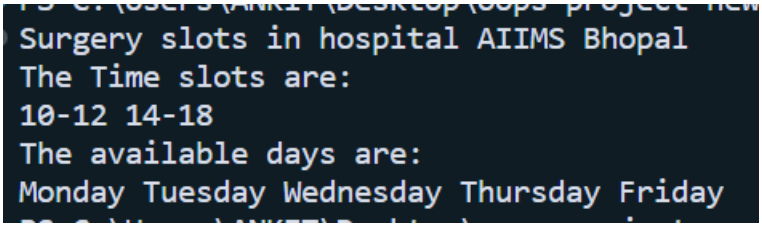
a) view_slots()

This function is used to display the availability of the hospital or department in which this object has been made. It displays all the time_slots as well as the available days in a week.

b) update_slots()

Setter function to update the time slots and the available days of the timing object.

```
Verify if you are admin or not
Enter id and password
 ankit iamankit
If you want to add available day  press u or q to update time slot or s to stop
u
The day to be added
Sunday
Successfully updated!
If you want to add available day  press u else q or s to stop
s
Saving changes
```



5. Contact

Any mode of contacting the hospital is an attribute here. A vector of string stores the phone numbers of a hospital and an email (string) is used to store the email for contacting the hospital.

a) contact()

Default constructor initializing email value to empty string.

b) add_phone()

This function is used to add a phone number using cin.

c) add_phone(string temp)

This function is a overloaded function to explicitly only add a phone number.

d) add_email()

Function used for setting the email for contacting the hospital.

e) get_contact()

This is used for getting all the contact details of the hospital i.e. printing them.

6. Location

This location class contains attributes namely, building name (string), city (string), district (string), state (string), pin code (string).

a) address_show ()

This function is used for displaying all the contact details at once.

b) update ()

This function is used for updating any or all of the attributes of this class using cin.

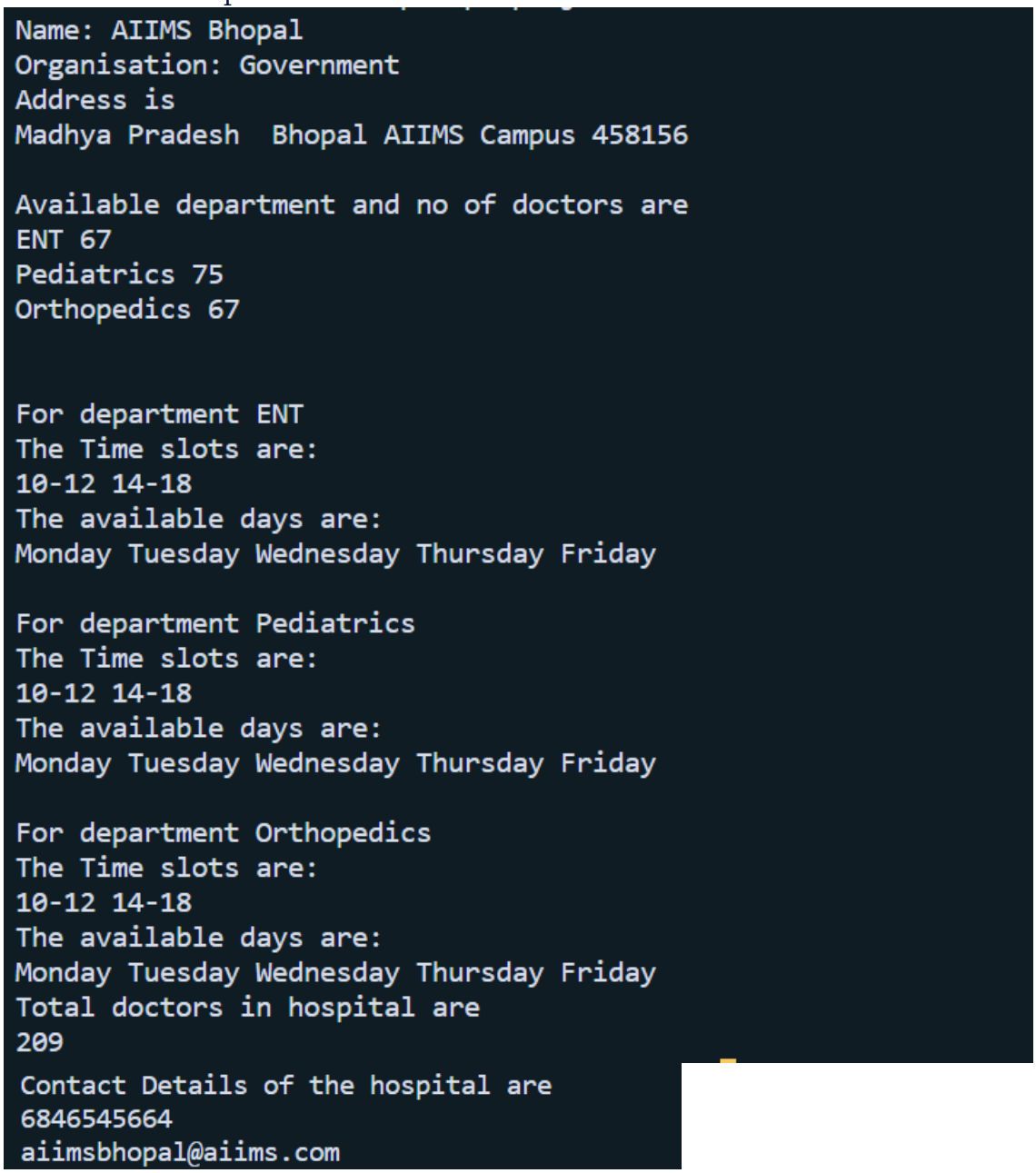
c) update (string build, string City, string District, string State, string pin)

This is an overloaded function used to update the contact details of the hospital.

7. main.cpp

This file contains all the implementation for a menu driven program. It has implementation for searching and the creation of a dummy database. 2 objects each of private, primary health centre, secondary health centre and tertiary health centre is created for dummy database.

Output when a user has searched the dummy database by city and tertiary hospital and entered 'Bhopal':



Conclusion

User will be able to search the available hospital by the name of hospital or using the city name. This is the main functionality provided by this software.

This way it'll be easier for users to see which hospitals are present in their city and which hospitals have what kind of departments and they can then decide to visit that hospital according to their needs.