```cpp
//Author: Linganiso Solethu

//File: dateType.h is the header file

//This file contains specifications for the main program


#ifndef DATETYPE_H

#define DATETYPE_H

#include <iostream>


using namespace std;


 class dateType{

private:

        int day;  //variable to store the day

        int month;      //variable to store the month

        int year;       //variable to store the year


 public:

        dateType();

        //Default constructor

        //The date is set to 0/0/0.

        //Postcondition: day = 0; month = 0; year = 0;

        dateType(int d,int m,int y);

        //Constructor with parameters.

        //The date is set according to the parameters.

        //Postcondition: day = d; month = m; year = y;


        void setDate(int ,int,int );

        //Function to set the Date.

        //The date is set according to the parameters.

        //Postcondition: day = d; month = m; year = y;

        //                              The function checks whether the
```

```cpp
//                            values of day, month and year
//                            are valid. If a value is invalid, the
//                            default value 0 is assigned.
    void printDate() const;
    //This function connot modify the member variables of a variable of type dateType
    //Function to output the Date
    //Postcondition: The date is printed in the form day/month/year.
};
#endif
```

//Author: Linganiso Solethu

//File: personType.h is the header file

//This file contains specifications for the main program

```cpp
#ifndef PERSONTYPE_H
#define PERSONTYPE_H
#include <iostream>
using namespace std;
//Base class
class personType{
private:
    string firstNam;        //variable to store the first name
    string lastNam;         //variable to store the last name

public:
    personType();
    //Default constructor
    //The set first name and last name as empty string (" ").
    //Postcondition: firstNam = " "; lastNam = " ";
    personType(string,string);
    //Constructor with parameters.
    //The first Name and last Name is set according to the parameters.
```

//Postcondition: firstNam=firstName; lastNam=lastName;

    void setFirstName(string);   //Function to set first name

    string getFirstName() const;   //Function to retun fisrt name

    void setLastName(string);   //Function to set last name

    string getLastName() const;   //Function to return last name

};
 #endif

//Author: Linganiso Solethu

//File: doctorType.h is the header file

//This file contains specifications for the main program

#ifndef DOCTORTYPE_H

#define DOCTORTYPE_H

#include <iostream>

using namespace std;

//Sub class of personType which is the base class.

class doctorType: public personType

{

private:

    string speciality;   //variable to store the speciality of the doctor.

public:

    doctorType();
    //default constructor
    //The speciality is set to " ".

    doctorType(string,string,string);   //constructor with parameters include the one in
the base class.

    void setSpeciality(string);   //Function to set the speciality.

    string getSpeciality() const;   //Function to return the speciality.

```cpp
};
 #endif
//Author: Linganiso Solethu
//File: billType.h is the header file
//This file contains specifications for the main program

#ifndef BILLTYPE_H
#define BILLTYPE_H
#include <iostream>
using namespace std;

class billType{
private:
        string patient_id;                      //variable to store patient's ID.
        double pharmacyCharges;                 //Variable to store pharmacy's Charges.
        double doctorFee;                       //Variable to store doctor's fee.
        double roomCharges;                     //Variable to store room's Charges.

public:
        billType();
        //default constructor.
        //The patient_id is set to " ".
        //The pharmacyCharges is set to 0.
        //The doctorFee is set to 0.
        //The roomCharges is set to 0.
        billType(string,double,double,double);  //constructor with parameters.
        void setPatient_id(string);                     //Function to set patient's ID.
        string getPatient_id() const;                   //Function to return patient's ID.
        void setPharmacyCharges(double);                //Function to set pharmacy's Charges.
        double getPharmacyCharges() const;              //Function to return pharmacy's Charges.
        void setDoctorFee(double);                      //Function to set doctor's fee.
```

```cpp
        double getDoctorFee() const;              //Function to return doctor's fee.

        void setRoomCharges(double);              //Function to set room's Charges.

        double getRoomCharges() const;            //Function to return room's Charges.
};
 #endif
```

//Author: Linganiso Solethu

//File: patientType.h is the header file

//This file contains specifications for the main program

```cpp
#ifndef PATIENTTYPE_H
#define PATIENTTYPE_H
#include <iostream>

using namespace std;
//Sub class derived from personType which is a base class
class patientType : public personType{
private:
        string patient_id;          //Variable to store patient's ID.

        int age;                    //Variable to store age.

        string date_of_birth;       //Variable to store date of birth.

        string physicianNam;         //Variable to store physician's name.

        string admissionDate;       //Variable to store admission date.

        string dischargedDate;       //Variable to store discharged date.


public:
        patientType();            //default constructor

        patientType(string,string,string,int,string,string,string,string);
        //constructor with parameters include the two members from base class.


        void setPatient_id(string);                  //Function to set patient's ID.
```

```cpp
        string getPatient_id() const;              //Function return patient's ID.

        void setAge(int);                          //Function to set age.

        int getAge() const;                        //Function to return age.

        void setDate_of_birth(string);             //Function to set date of birth.

        string gettDate_of_birth() const;          //Function to return date of birth.

        void setPhysicianNam(string);              //Function to set physician's name.

        string getPhysicianNam() const;            //Function to return physician's name.

        void setAdmissionDate(string);             //Function to set admission date.

        string getAdmissionDate() const;           //Function to return admission date.

        void setDischargedDate(string);            //Function to set discharged date.

        string getDischargedDate() const;          //Function to set discharged date.
};
 #endif


//Author: Linganiso Solethu

//File: Implimentation.h

//Implimentation.h is implementation file

//This file provides the function implimentation or functionality


#include <iostream>

#include "dateType.h"

#include "personType.h"

#include "doctorType.h"

#include "billType.h"

#include "patientType.h"

using namespace std;


dateType ::dateType()

//default constructor that initialize day, month and year to all 0.

{
        day=0;
```

```cpp
        month=0;

        year=0;

}

dateType::dateType(int d,int m,int y){

        //constructor with parameters

        //day = d; month = m; year = y;

        //If these values are out of range the member variable d, m and y

        //are initialized to 0

        if(0<=d&&d<=31)

                day=d;

        else

                day=0;


        if(0<=m&&m<=12)

                month=m;

        else

                month=0;


        if(y>0)

                year=y;

        else

                year=0;


}

void dateType::setDate(int d,int m,int y){

//The definition of setDate check for the valid value of m,d and y.

//If these values are out of range the member variable d, m and y

//are initialized to 0


        if(0<=d&&d<=31)

                day=d;
```

```cpp
        else
                day=0;


        if(0<=m&&m<=12)
                month=m;
        else
                month=0;


        if(y>0)
                year=y;
        else
                year=0;


}
void dateType::printDate() const
{
//The function contain the values that weill call to print them
        cout<<day<<"/"<<month<<"/"<<year<<endl;           //print the Date


}


personType ::personType(){
//default constructor that initialize both first and last name to empty string.
        firstNam=" ";
        lastNam=" ";
}
personType ::personType(string firstName,string lastName){
//constructor with parameters which set firstNam=firstName; lastNam=lastName;
        firstNam=firstName;
        lastNam=lastName;
}
```

```cpp
void personType::setFirstName(string firstName){      //Function set firstNam=firstNam;

        firstNam=firstNam;

}

string personType::getFirstName() const{              //Function return firstNam;

        return firstNam;

}

void personType::setLastName(string lastName){        //Function set lastNam=lastName;

        lastNam=lastName;

}

string personType::getLastName() const{               //Function return lastNam;

        return lastNam;

}


doctorType::doctorType(){

        //default constructor that initialize speciality to empty string.

        speciality=" ";

}

doctorType::doctorType(string firstName,string lastName, string spty)
:personType(firstName,lastName){

        //constructor with parameters. speciality=spty;

        //Include first name and the last name from base class personType

        speciality=spty;

}

        void doctorType::setSpeciality(string spty){

                //Function set speciality=spty

                speciality=spty;

        }

        string doctorType::getSpeciality() const{

                //Function return speciality

                return speciality;

        }
```

```cpp
billType::billType(){              //default constructor that initialize:
        patient_id=" ";             //patient_id=" ";
        pharmacyCharges=0;          //pharmacyCharges to 0.
        doctorFee=0;                //doctorFee to 0.
        roomCharges=0;              //roomCharges to 0.
}
billType::billType(string id,double Pcharges,double Dfee,double Rcharges)        {
        //constructor with parameters
        patient_id=id;
        pharmacyCharges=Pcharges;
        doctorFee=Dfee;
        roomCharges=Rcharges;
}
        void billType::setPatient_id(string id){
                //Function set patient_id=id;
                patient_id=id;
        }
        string billType::getPatient_id() const{
                //Function return patient_id;
                return patient_id;
        }
        void billType::setPharmacyCharges(double Pcharges){
                //Function set pharmacyCharges=Pcharges;
                pharmacyCharges=Pcharges;
        }
        double billType::getPharmacyCharges() const{
                //Function retrieve pharmacyCharges that was set to Pcharges
                return pharmacyCharges;
        }
        void billType::setDoctorFee(double Dfee){
```

```cpp
        //Function set doctorFee=Dfee;

        doctorFee=Dfee;

    }

    double billType::getDoctorFee() const{

    //Function retrieve doctorFee that was set to Dfee;

    return doctorFee;

    }

    void billType::setRoomCharges(double Rcharges){

        //Function set Rcharges=Rcharges;

        roomCharges=Rcharges;

    }

    double billType::getRoomCharges() const{

        //Function retrieve roomCharges that was set to Rcharges

        return roomCharges;

    }

patientType::patientType()      //default constructor that initialize:

{

        patient_id=" ";              //patient_id to " ".

        age=0;                       //age to 0.

        date_of_birth=" ";           //date of birth to " ".

        physicianNam=" ";            //Physician's name to " ".

        admissionDate=" ";           //Admission date to " ".

        dischargedDate=" ";          //Discharged date to " ".

}

patientType::patientType(string firstName,string lastName,string id,int Age,string dfb,string
PNam,string ADate,string Ddate):personType(firstName,lastName)

        //constructor with parameters.

        //Include first name and the last name from base class personType

{

        patient_id=id;

        age=Age;
```

```cpp
        date_of_birth=dfb;

        physicianNam=PNam;

        admissionDate=ADate;

        dischargedDate=Ddate;

}

void patientType::setPatient_id(string id)

//Function set patient_id to id;

{

        patient_id=id;

}

string patientType::getPatient_id() const       //This function cannot modify the member
                                                 // variables of a variable of the type
                                                 // patientType.

//Function retrieve the patient_id that was set id.

{

        return patient_id;

}

void patientType::setAge(int Age)

//Function that set age to Age.

{

        age=Age;

}

int patientType::getAge() const                  //This function cannot modify the member
                                                 // variables of a variable of the type
                                                 // patientType.


//Function retrieve age that was set to Age.

{

        return age;

}

void patientType::setDate_of_birth(string dfb)

//Function that set date_of_birth to dfb.
```

```
{
        date_of_birth=dfb;
}
string patientType::gettDate_of_birth() const      //This function cannot modify the member
                                                    // variables of a variable of the type
                                                    // patientType.


//Function retrieve date_of_birth that was set to dfb.
{
        return   date_of_birth;
}
void patientType::setPhysicianNam(string PNam)
//Functrion that set physicianNam to PNam.
{
        physicianNam=PNam;
}
string patientType::getPhysicianNam() const         //This function cannot modify the member
                                                    // variables of a variable of the type
                                                    // patientType.


//Function retrieve physicianNam that wat set to PNam.
{
        return physicianNam;
}
void patientType::setAdmissionDate(string ADate)
//Function set admissionDate to ADate.
{
        admissionDate=ADate;
}
string patientType::getAdmissionDate() const        //This function cannot modify the member
                                                    // variables of a variable of the type
                                                    // patientType.
```

```cpp
        //Function retrieve that was set to ADate.

        {

                return admissionDate;

        }

        void patientType::setDischargedDate(string Ddate){

                dischargedDate=Ddate;

        }

        string patientType::getDischargedDate() const    //This function cannot modify the member
                                                          // variables of a variable of the type
                                                          // patientType.


        //Function retrieve dischargedDate that was set to Ddate.

        {

                return dischargedDate;

        }
```

```cpp
//Author: Linganiso Solethu

//publisher : Solethu Linganiso

//Description : Program that computerze the billing

//system of a hospital

//File: mainFunction.h is a main function file

//Date created 06/10/2021

//Due Date:10/10/2021


#include <iostream>

#include "dateType.h"

#include "personType.h"

#include "doctorType.h"

#include "billType.h"

#include "patientType.h"


using namespace std;    // use std namespace
```

```cpp
// function main begins program execution

int main(){

    cout<<endl; //display endl

    //display message and endl

    cout<<" *********BILLING SYSTEM OF A HOSPITAL***********"<<endl;

    cout<<endl;

    //display message and endl

    cout<<" ==============================================="<<endl;

    cout<<"              Date"<<endl;

    cout<<" ==============================================="<<endl;


    dateType date_of_birth(18,8,1998);      //initializes its member variables of date of birth
                                            // day,month and year to 18, 8 and 1998.

    dateType admissionDate(20,5,2020);      //initializes its member variables of admission date
                                            // day,month and year to 20, 5 and 2020.

    dateType dischargedDate(9,10,2021);     //initializes its member variables of discharged date
                                            // day,month and year to 9, 10 and 2021.


    cout<<" Date of birth           : ";    //Display date of birth of the user
    date_of_birth.printDate();              //The function output the centents of three
// member variables of date_of_birth.


    cout<<" Admission date          : ";    //Diplay admission date of the user in
                                            // hospital
    admissionDate.printDate();              //The function output the centents of three
                                            // member variables of admissionDate.


    cout<<" Discharged date         : ";    //Display the discharge date of the user in h
                                            // hospital
    dischargedDate.printDate();             //The function output the centents of three
                                            // member variables of dischargedDate.


    cout<<endl;     //display endl
```

```cpp
//display message and endl
cout<<" ================================================"<<endl;
cout<<"           Doctor's Info"<<endl;
cout<<" ================================================"<<endl;


doctorType doctor("WILLIAM","SOBHUZA","PLASTIC SURGERY");
cout<<" First Name              : "<<doctor.getFirstName()<<endl;          //Output the
                                                                           // doctor's first

                                                                           // name.

cout<<" Last Name               : "<<doctor.getLastName()<<endl;           //Output the

                                                                           // doctor's last
                                                                           //name.

cout<<" Specialty               : "<<doctor.getSpeciality()<<endl;         //Output the
                                                                           // doctor's
                                                                           // speciality


cout<<endl;                //display endl
//display message and endl
cout<<" ================================================"<<endl;
cout<<"           Patient's Info"<<endl;

cout<<" ================================================"<<endl;


patientType patient("BUZO","MHLALAWEDWA","9806134864087",23," "," "," "," ");
//initializes member variables of First Name, First Name, Patient's ID, Patient's age to BUZ
// MHLALAWEDWA, 9806134864087. 23
//Output patient's first name.
cout<<" First Name              : "<<patient.getFirstName()<<endl;
//Output patient's last name.
cout<<" Last Name               : "<<patient.getLastName()<<endl;


//Output patient's ID.
cout<<" Patient's ID            : "<<patient.getPatient_id()<<endl;
```

```cpp
    //Output patient's age.

    cout<<" Patient's age            : "<<patient.getAge()<<" years old"<<endl;


    cout<<endl;             //display endl

    //display message and endl

    cout<<" ============================================="<<endl;

    cout<<"          Billing Details "<<endl;

    cout<<" ============================================="<<endl;


    billType bill(" ",300,859.45,598.65);

    //initializes member variables of billType patient's ID, Pharmacy's Charges,

    //Doctor's fee and Room's Charges to " ", 300, 859.45 and 598.65.

    //diplay the Pharmacy's Charges.

    cout<<" Pharmacy's Charges      : R"<<bill.getPharmacyCharges()<<endl;

    //display the Doctor's fee.

    cout<<" Doctor's fee            : R"<<bill.getDoctorFee()<<endl;

    //display the Room's Charges.

    cout<<" Room's Charges          : R"<<bill.getRoomCharges()<<endl;


    //Add the charges; display the sum

    cout<<" _____"<<endl;

    cout<<" Total charges           : R"<<bill.getPharmacyCharges()+

                          bill.getDoctorFee()+

                          bill.getRoomCharges()<<endl;

    cout<<" _____"<<endl;


    return 0;         // indicate that program ended successfully
};      // end function main
```