Name :- Abhishek Kumar
Roll No:- 19CS30002

- ## Station Class :

  private -

      name_ : It will store the name of the station

             : String value

  public methods -

      GetName() : it will return the name of the station

          : Made constant because of constant station object

      Friend function operator << is used for out streaming

      GetDistance() : It will return distance between two given stations

      Operator ==() : It is overloaded and it will check the equality of two stations

- ## Railways Class :

  It will have a singleton object only.

  private :

      pointer to railway class to have the singleton object

      constructor: It is private to create a singleton class

  public:

      copy constructor and copy assignment operator

      GetDistance() : It will return the distance between two stations

  static :

      sStations : vector will store the list of stations

      sDistStations : map of pair of two stations and int that will store distance between
          two stations

- ## Date Class :

  private :

      date_ : It will store current date : unsigned integer

      month_ : It will store current month : Month type

      year_ : It will store current year : unsigned integer

      Month, Day : enumerate the month and day names to numbers : enum type

  public :

      constructor (date , month , year)

      copy constructor and copy assignment operator

      print() : It will print date in dd/mm/yyyy format : it is const since const date
          object may call it

      CheckLeapYear() : checks if the current year is leap year or not : bool

      CalculateAge() :Calculate the age of the given date from the current date : int

      CheckSpanOfYear() : checks if the difference between the current date and the
          give date is more / less than 1 year : bool

static constants and methods :

        monName : string array to store month names as string

        dayName : string array to store day names as string

        UnitTestDate() to test the date functionalities

- ## BookingClasses class:

It is an abstract base class

protected :

        loadFactor_ : It will store the loading factor of the class : float

        name_ : it will store name of the booking class : string

        ac_notac_ : booking classes is ac or non ac : bool

        lux_nolux_ : booking classes is luxury or not : bool

        tier_no_ : stores tear number : int

        sitting_ : Berth is sitting or not : bool

        tatkalLoadFactor_ : stores tatkal load factor of the class : float

        miniTatkalCharge_ : stores minimum tatkal charge : int

        maxiTatkalCharge_ : stores maximum tatkal charge : int

        miniTatkalDistance_ :stores minimum tatkal distance : int

        reservationCharges_ :stores reservation charges of the class : float

public :

        GetLoadFactor() : returns load factor of the class : float

        GetName() : returns name of the booking class : string

        IsAC() : returns if the class is AC or not : bool

        IsLuxury() : returns if the class is luxury or not : bool

        IsSitting() : return if the class is sitting or not : bool

        GetNumberOfTiers() : returns number of tiers in the class : int

        GetTatkalLoadFactor() :returns tatkal load factor of the class : float

        GetMiniTatkalCharge() : returns minimum tatkal charge : int

        GetMaxTatkalCharge() : returns the maximum tatkal charge : int

        GetMinTatkalDistance() : return the minimum tatkal distance : int

All functions are pure virtual functions and const since a const object would be calling these functions

- ## AC2Tier Class :

private:

        constructor : It is private to make this class singleton

        static pointer to the singleton object of the class

public :

        copy constructor and copy assignment operator are blocked

        Friend function operator << is used for output streaming

        static function for unit testing

        Type() function to return the singleton object of the class

pure virtual functions from the abstract base class are implemented as given In BookingClasses Class

- ## FirstClass Class :
  private:
  - constructor : It is private to make this class singleton
  - static pointer to the singleton object of the class

  public :
  - copy constructor and copy assignment operator are blocked
  - Friend function operator << is used for output streaming
  - static function for unit testing
  - Type() function to return the singleton object of the class

  pure virtual functions from the abstract base class are implemented as given In BookingClasses Class

- ## ACFirstClass Class
  private:
  - constructor : It is private to make this class singleton
  - static pointer to the singleton object of the class

  public :
  - copy constructor and copy assignment operator are blocked
  - Friend function operator << is used for output streaming
  - static function for unit testing
  - Type() function to return the singleton object of the class

  pure virtual functions from the abstract base class are implemented as given In BookingClasses Class

- ## AC3Tier Class
  private:
  - constructor : It is private to make this class singleton
  - static pointer to the singleton object of the class

  public :
  - copy constructor and copy assignment operator are blocked
  - Friend function operator << is used for output streaming
  - static function for unit testing
  - Type() function to return the singleton object of the class

  pure virtual functions from the abstract base class are implemented as given In BookingClasses Class

- ## Sleeper Class
  private:
  - constructor : It is private to make this class singleton
  - static pointer to the singleton object of the class

  public :
  - copy constructor and copy assignment operator are blocked
  - Friend function operator << is used for output streaming
  - static function for unit testing
  - Type() function to return the singleton object of the class

  pure virtual functions from the abstract base class are implemented as given In BookingClasses Class

- ## Second Sitting Class
  private:
  - constructor : It is private to make this class singleton
  - static pointer to the singleton object of the class

  public :
  - copy constructor and copy assignment operator are blocked
  - Friend function operator << is used for output streaming
  - static function for unit testing
  - Type() function to return the singleton object of the class

  pure virtual functions from the abstract base class are implemented as given In BookingClasses Class

- ## ExecutiveChairCar Class
  private:
  - constructor : It is private to make this class singleton
  - static pointer to the singleton object of the class

  public :
  - copy constructor and copy assignment operator are blocked
  - Friend function operator << is used for output streaming
  - static function for unit testing
  - Type() function to return the singleton object of the class

  pure virtual functions from the abstract base class are implemented as given In BookingClasses Class

- **ACChairCar Class**

  private:

          constructor : It is private to make this class singleton

          static pointer to the singleton object of the class

  public :

          copy constructor and copy assignment operator are blocked

          Friend function operator << is used for output streaming

          static function for unit testing

          Type() function to return the singleton object of the class

     pure virtual functions from the abstract base class are implemented as given In BookingClasses Class

- **BookingCatagory class:**

  It is an abstract base class

  protected :

          name_ : name of the booking class : string

  public :

          GetName() : returns name of the booking class : string value

          CreateBooking(bookingclass_type,stations,dates) : return a pointer to the booking object created : Booking *

- **General class:**

  It is derived from BookingCategory class

  private:

          constructor: It is private to make singleton class

  public:

          copy constructor and copy assignment operator are blocked

          Friend function operator << is used for output streaming

          static function for unit testing

          Type() function to return the singleton object of the class

  pure virtual functions from the abstract class are implemented as given in BookingCategory class

- **Tatkal class:**

  It is derived from BookingCategory class

  private:

          constructor: It is private to make singleton class

  public:

          copy constructor and copy assignment operator are blocked

Friend function operator << is used for output streaming
static function for unit testing
Type() function to return the singleton object of the class

pure virtual functions from the abstract class are implemented as given in
BookingCategory class

- ## PremiumTatkal class:
  It is derived from BookingCategory class
  private:
        constructor: It is private to make singleton class
  public:
        copy constructor and copy assignment operator are blocked
        Friend function operator << is used for output streaming
        static function for unit testing
        Type() function to return the singleton object of the class

  pure virtual functions from the abstract class are implemented as given in
  BookingCategory class

- ## Concessions Class :
  It is derived from BookingCategory class
  It is an abstract base class for those classes which are applicable for concessions

- ## SeniorCitizen class:
  It is derived from Concessions class
  private:
        constructor: It is private to make singleton class
   public:
        copy constructor and copy assignment operator are blocked
        Friend function operator << is used for output streaming
        static function for unit testing
        Type() function to return the singleton object of the class

  pure virtual functions from its abstract class are implemented.

- ## Ladies class:
  It is derived from Concessions class

private:

    constructor: It is private to make singleton class

 public:

    copy constructor and copy assignment operator are blocked

    Friend function operator << is used for output streaming

    static function for unit testing

    Type() function to return the singleton object of the class

pure virtual functions from its abstract class are implemented.

● Divyaang Class :

 It is derived from the Concessions class

 It is an abstract base class for classes which are under Divyaang

● Blind class:

It is derived from Divyaang class

private:

    constructor: It is private to make singleton class

public:

    copy constructor and copy assignment operator are blocked

    Friend function operator << is used for output streaming

    static function for unit testing

    Type() function to return the singleton object of the class

static public constants:

    sConcessions: vector of pair of string and float to store the master data for class

pure virtual functions from its abstract class are implemented

● CancerPatient class:

It is derived from Divyaang class

private:

    constructor: It is private to make singleton class

public:

    copy constructor and copy assignment operator are blocked

    Friend function operator << is used for output streaming

    static function for unit testing

    Type() function to return the singleton object of the class

static public constants:

    sConcessions: vector of pair of string and float to store the master data for class

pure virtual functions from its abstract class are implemented

- **OrthopadicallyHandicapped class:**
    It is derived from Divyaang class
    private:
        constructor: It is private to make singleton class
    public:
        copy constructor and copy assignment operator are blocked
        Friend function operator << is used for output streaming
        static function for unit testing
        Type() function to return the singleton object of the class
    static public constants:
        sConcessions: vector of pair of string and float to store the master data for class

pure virtual functions from its abstract class are implemented

- **TBPatient class:**
    It is derived from Divyaang class
    private:
        constructor: It is private to make singleton class
    public:
        copy constructor and copy assignment operator are blocked
        Friend function operator << is used for output streaming
        static function for unit testing
        Type() function to return the singleton object of the class
    static public constants:
        sConcessions: vector of pair of string and float to store the master data for class

pure virtual functions from its abstract class are implemented

- **Passenger class:**
    private :
        firstName_ : stores first name of the Passenger : string
        middleName_ : stores middle name of the Passenger(optional : string
        lastName_ : stores last name of the passenger : string
        dateOfBirth_ : stores date of birth of the Passenger : Date
        gender_ : stores gender of the Passenger : Gender
        aadhar_ : stores aadhar of the Passenger : string
        mobile_ : stores mobile of the Passenger : string
        disabilityType_ : stores the disability type of Passenger (optional) : string
        disabilityID : stores the disability ID of the Passenger (optional) : string
    public :
        CheckAadhar() : Check validity of aadhar of Passenger : bool

CheckName() : Check validity Name of Passenger : bool
CheckDateOfBirth() : Check validity of Date of Birth of Passenger : bool
CheckMobile() : Check validity Mobile number of Passenger : bool
GetAadhar() : returns aadhar of the passenger : string
GetName() : returns Name of the passenger : string
GetGender() : returns Gender of the passenger : Gender
GetMobile() : returns mobile number of the passenger : string
GetdisabilityID : returns disability ID of the passenger : string
GetDisabilityType() : returns disability type of the passenger : string

- **Booking class:**
    It is an abstract base class
    protected :
        pnr_ : stores pnr number of the current booking : int
        fromStation_ : stores boarding station of the Booking : Station
        toStation_ : stores destination station of the Booking : Station
        dateOfReservation_ : stores date of reservation : Date
        dateOfBooking_ : stores date of Booking : Date
        bookingStatus_ : stores status of the Booking : bool
        bookingMessage_ : stores booking message : string
        passenger_ : stores passenger details : Passenger
    public :
        ComputeFare() : it is for Fare computation (Virtual method)
    static public constants:
        sBaseFarePerKM : stores base fase per km : float
        sBookings : vector of Booking pointers to store the bookings
        sBookingPNRSerial : stores PNR number of the booking : int

- **GeneralBooking class:**
    It is derived from Booking class
    public:
        ComputeFare() : method for Fare computation according to general class

- **Tatkal class:**
    It is derived from Booking class
    public:
        ComputeFare() : method for Fare computation according to Tatkall class

- **PremiumTatkal class:**
    It is derived from Booking class
    public:

ComputeFare() : method for Fare computation according to Premium tatkal class

- ## Concessions class:

    It is derived from Booking class
    public:
    ComputeFare() : method for Fare computation according to Concessions class

- ## Ladies class:

    It is derived from Booking class
    public:
    ComputeFare() : method for Fare computation according to Ladiesl class

- ## Divyaang class:

    It is derived from Booking class
    public:
    ComputeFare() : method for Fare computation according to divyang class

- ## SeniorCitizen class:

    It is derived from Booking class
    public:
    ComputeFare() : method for Fare computation according to Senior citizen class

- ## Blind class:

    It is derived from Booking class
    public:
    ComputeFare() : method for Fare computation according to Blind class

- ## OrthopadicallyHandicapped class:

    It is derived from Booking class
    public:
    ComputeFare() : method for Fare computation according to Orthopadically
    Handicapped class

- ## CancerPatients class:

    It is derived from Booking class
    public:
    ComputeFare() : method for Fare computation according to cancer patients class

- ## TBpatients class:

    It is derived from Booking class

public:

    ComputeFare() : method for Fare computation according to TBpatients class