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| GROUP PROJECT | | | |  | |
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|  | | CSPC-205Data Structures and Algorithms | | |
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|  | PROBLEMAirplane seat reservation system (Using Linked List): Airlines Reservation System is a system of airplane seat reservation. The program can reserve seat of a user, show user ticket, show flight schedule, display all passengers. An administrator can add new flight and its details as well as edit and delete the record and there is an option for flight arrival and departure time. The seats are reserved based on input requests in the following format:   * Number of seats desired (should be seated in the same row, next to one another, if possible) * First class or economy * Aisle or window seat (if two or more seats requested, one seat should meet this preference) | | |  |
|  | The Program – #include<iostream>  #include<string.h>  #include<conio.h>  #include<iomanip>  #include<string>  #include<stdio.h>  using namespace std;  class flight;  class user{  string name;  long int passport\_number;  float price\_of\_ticket;  char seat\_no[3];  public:  void get\_price(float x){  price\_of\_ticket=x;  }  void get\_seat(char x,char y,char z){  seat\_no[0]=x;seat\_no[1]=y;seat\_no[2]=z;  }  long long int get\_num(){  return passport\_number;  }  void user\_detail();  void show\_ticket(flight\*ptr);  void display();//done  };  class Node{  public:  int data;  user p1;  Node\* next;  Node(int d){  data = d;  next=NULL;  }  };  struct Node2d{  int data;  user p2;  Node2d\* right, \*down;  Node2d(int d){  data = d;  right = down = NULL;  }  };  Node\* Fcseats(int x){  Node\*p=NULL;  p=new Node(0);  Node\* head=p;  for(int i=1;i<x;i++){  Node\* t;  t=new Node(0);  p->next=t;  p=p->next;  }  return head;  }  Node2d\*Ecoseats(int m, int n){  Node2d\* Mhead = NULL;  Node2d\* head[m];  Node2d \*pright, \*temp;  for (int i = 0; i < m; i++){  head[i] = NULL;  for (int j = 0; j < n; j++){  temp = new Node2d(0);  if (!Mhead)  Mhead = temp;  if (!head[i])  head[i] = temp;  else  pright->right = temp;  pright = temp;  }  }  for (int i = 0; i < m - 1; i++){  Node2d \*t1 = head[i], \*t2 = head[i + 1];  while (t1 && t2){  t1->down = t2;  t1 = t1->right;  t2 = t2->right;  }  }  return Mhead;  }  class flight{  public:  string flightname;  string arrival\_time;  string departure\_time;  float price\_economyclass;  float price\_firstclass;  string dest;  string from;  int counteco;  int countfirst;  Node2d\*Ehead;  Node\*Fhead;  flight(){  Fhead=Fcseats(5);  Ehead=Ecoseats(6,6);  counteco=36;  countfirst=5;  }  void displaySeats();//done  void add\_details();//done  void default\_flight(string f,string at,string dt,float pe,float pf,string destination,string source){  flightname=f;  arrival\_time=at;  departure\_time=dt;  price\_economyclass=pe;  price\_firstclass=pf;  dest=destination;  from=source;  }  void flight\_info();//done  void passenger\_info(int num);  int reservation(int x,int y,int n);//done  ~flight(){  Node2d\*ptr,\*temp1=Ehead,\*temp;  while(temp1!=NULL){  ptr=temp1;  while(ptr!=NULL){  temp=ptr;  ptr=ptr->right;  delete temp;  }  temp1=temp1->down;  }  Node\*p1=Fhead,\*t1;  while(p1!=NULL){  t1=p1;  p1=p1->next;  delete t1;  }  }  };  class node\_flight{  public:  flight f;  struct node\_flight\*next;  };  class administrator{  public:  void add\_flight(node\_flight \*\*head);  void edit\_flight(string s,node\_flight\*head);  void delete\_flight(node\_flight\*\*head,string s);  };  node\_flight\*traverse(node\_flight\*head,string name) //name must be search//  {  node\_flight\*ptr=head;  while(ptr!=NULL){  if(ptr->f.flightname==name)  return ptr;  ptr=ptr->next;  }  return ptr;  }  void user::user\_detail(){  cout<<"\nIn order for us to do anything, first we need some details : "<<endl;  cout<<"\nYour name :: ";  fflush(stdin);  getline(cin,name);  cout<<"\nYour passport number :: ";  cin>>passport\_number;  }  void user::display(){  cout<<"";  if(seat\_no[2]==1&&seat\_no[0]=='A')  seat\_no[0]='W';  cout<<"\nName :: "<<name<<"\tPassport number :: "<<passport\_number<<"\tSeat number is :: "<<seat\_no[0]<<(int)seat\_no[1]<<(int)seat\_no[2];  }  void user::show\_ticket(flight \*ptr)  {  char c[90]={"<><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><>"};  cout<<c<<endl;  display();  ptr->flight\_info();  cout<<"\nPrice of ticket :: "<<price\_of\_ticket;  seat\_no[0]=='A'?cout<<"\nFIRST CLASS":cout<<"\nECONOMY CLASS";  if(seat\_no[2]==1||seat\_no[0]=='B')  cout<<"\tWINDOW SEAT";  if((seat\_no[2]==3||seat\_no[2]==4)&&seat\_no[0]=='A')  cout<<"\tAISLE SEAT";  cout<<"\nSEAT IS CONFIRMED\n";  cout<<c;  }  void flight :: displaySeats(){  int i=1;  Node2d \*R, \*D = Ehead;  cout<<"economy class "<<endl;  cout<<"\nHere 0 indicates for vaccant seat ad 1 for occupied seat \n";  cout<<" 1 2 3 4 5 6"<<endl;  while (D!=NULL){  R = D;  cout<<i<<" ";  while (R!=NULL){  cout << R->data << " ";  R = R->right;  }  cout << endl;  D = D->down;  i++;  }  cout<<"\nfirst class "<<endl;  Node\*head2=Fhead;  cout<<"1 2 3 4 5"<<endl;  while(head2!=NULL){  cout<<head2->data<<" ";  head2=head2->next;  }  cout<<endl;  }  void flight::add\_details(){  cout<<endl<<"Add schedule for a new flight -";  cout<<endl<<"Name of flight :: ";  fflush(stdin);  getline(cin,flightname);  cout<<"Arrival time :: ";  fflush(stdin);  getline(cin,arrival\_time);  cout<<"Departure time :: ";  fflush(stdin);  getline(cin,departure\_time);  cout<<"Price for an Economy Class Seat ::";  cin>>price\_economyclass;  cout<<"Price for a Luxury Class Seat :: ";  cin>>price\_firstclass;  cout<<"Flight will be boarding From :: ";  fflush(stdin);  getline(cin,from);  cout<<"To Destination :: ";  fflush(stdin);  getline(cin,dest);  }  void flight::flight\_info(){  cout<<endl;  cout<<"FLIGHT NAME:: "<<setw(20)<<flightname;  cout<<"\nDeparture time::"<<setw(5)<<departure\_time;  cout<<"\tArrival time::"<<setw(5)<<arrival\_time;  cout<<"\tFrom "<<setw(5)<<from<<"\tto "<<setw(5)<<dest;  }  void flight::passenger\_info(int num){  Node2d\*ptr,\*temp=Ehead;  while(temp!=NULL){  ptr=temp;  while(ptr!=NULL){  if(ptr->p2.get\_num()==num){  ptr->p2.show\_ticket(this);  return ;  }  ptr=ptr->right;  }  temp=temp->down;  }  Node\*p=Fhead;  while(p!=NULL){  if(p->p1.get\_num()==num){  p->p1.show\_ticket(this);  return ;  }  p=p->next;  }  cout<<"\nNo passemger found with this passport number";  }  int flight::reservation(int x,int y,int n)  {  int v=n;  if(x==1)  {  if(counteco<n)  return 0;  Node2d\*ptr,\*temp=Ehead;  int c=1,k=1,m=n;  if(y==0)  {  while(temp!=NULL&&n!=0)  {  ptr=temp;  c=1;  while((ptr!=NULL)&(n!=0))  {  if(ptr->data==0)  {  ptr->data=1;  ptr->p2.user\_detail();  ptr->p2.get\_price(price\_economyclass);  ptr->p2.get\_seat('A',k,c);  cout<<"\nYour seat has been booked."<<endl;  counteco--;n--;  }  c++;  ptr=ptr->right;  }  k++;  temp=temp->down;  }  return 1;  }  if(y==1)  {  k=1;c=1;  temp=Ehead;  while(temp!=NULL&&n!=0)  {  if(temp->data==0)  {  temp->data=1;  temp->p2.user\_detail();  temp->p2.get\_price(price\_economyclass);  temp->p2.get\_seat('A',k,c);  cout<<"\nYour seat has been booked."<<endl;  counteco--;n--;c++;  ptr=temp;  m=n;  while(ptr!=NULL&&n!=0)  {  if(ptr->data==0)  m--;  ptr=ptr->right;  }  break;  }  k++;  temp=temp->down;  }  if(n==0)  return 1;  if(m>0)  {  temp=Ehead;  k=1;c=1;  while(temp!=NULL&&n!=0)  {  ptr=temp;  c=1;  while(ptr!=NULL&&n!=0)  {  if(ptr->data==0)  {  ptr->data=1;  ptr->p2.user\_detail();  ptr->p2.get\_price(price\_economyclass);  ptr->p2.get\_seat('A',k,c);  cout<<"\nYour seat has been booked."<<endl<<endl<<endl<<endl;  counteco--;n--;  }  c++;  ptr=ptr->right;  }  k++;  temp=temp->down;  }  return 1;  }  else  {  c=2;  ptr=temp->right;  while(ptr!=NULL&&n!=0)  {  if(ptr->data==0)  {  ptr->data=1;  ptr->p2.user\_detail();  ptr->p2.get\_price(price\_economyclass);  ptr->p2.get\_seat('A',k,c);  cout<<"\nSeat is booked";  counteco--;n--;  }  c++;  ptr=ptr->right;  }  }  }  }  else  {  if(countfirst<n)  return 0;  Node\*f=Fhead;  int c=1;  while(f!=NULL&&n!=0)  {  if(f->data==0){  f->data=1;  f->p1.user\_detail();  f->p1.get\_price(price\_firstclass);  f->p1.get\_seat('B',0,c);  cout<<"\nSEAT IS BOOKED";  countfirst--;  n--;  }  c++;  f=f->next;  }  return 1;  }  }  void administrator::add\_flight(node\_flight\*\*head){  node\_flight\*temp;  temp=new node\_flight;  temp->next=NULL;  temp->f.add\_details();  if(\*head==NULL){  \*head=temp;  }  else{  node\_flight\*ptr=\*head;  while(ptr->next!=NULL){  ptr=ptr->next;  }  ptr->next=temp;  }  cout<<"New flight has been successfully added to the schedule."<<endl<<endl;  }  void cancel\_seat(int pass\_no, flight &flt){  Node2d\*ptr,\*temp=flt.Ehead;  while(temp!=NULL){  ptr=temp;  while(ptr!=NULL){  if(ptr->p2.get\_num()==pass\_no){  ptr->data=0;  return;  }  ptr=ptr->right;  }  temp=temp->down;  }  Node\*p=flt.Fhead;  while(p!=NULL){  if(p->p1.get\_num()==pass\_no){  p->data=0;  return;  }  p=p->next;  }  cout<<"\nNo passemger has been found with this Travel Passport Number";  }  void administrator::edit\_flight(string s,node\_flight\*head)  {  node\_flight\*ptr=traverse(head,s);  if(ptr==NULL){  cout<<"NO flight with this name is exist";return;  }  cout<<"\n\nMatching Flight(s) has been Found!";  cout<<"\nAre you sure you want to edit the selected flight? Enter 1 to confirm, else enter 0 : ";  int k=0;  cin>>k;  if(k==1){  int choice;  m1\_ef:  cout<<"\nWhat would you like to change ?Enter the appropriate option number.";  cout<<"Change ";  cout<<"\n1 Name of the Flight";  cout<<"\n2 Arrival of the Flight";  cout<<"\n3 Departure of the Flight";  cout<<"\n4 Seating class costs of the Flight";  cout<<"\n5 Destination of the Flight";  cout<<"\nOr, would you like to";  cout<<"\n9 Cancel a seat on the flight";  cout<<"\nEnter 0 to Go Back"<<endl;  //cout<<"\n8 for edit a seat in flight";  cout<<"\nEnter your choice :: ";  cin>>choice;  switch (choice){  case 1:{  cout<<"\nEnter new name of the flight :: ";  fflush(stdin);  getline(cin,ptr->f.flightname);  break;  }  case 2:{  cout<<"\nEnter new Arrival time of the flight :: ";  fflush(stdin);  getline(cin,ptr->f.arrival\_time);  break;  }  case 3 :{  cout<<"\nEnter new Departure time of the flight :: ";  fflush(stdin);  getline(cin,ptr->f.departure\_time);  break;  }  case 4:{  int j;  m2\_ef:  cout<<"\nFor which seating class would you like to change the price of ?"<<endl;  cout<<"1 for Luxury Class"<<endl;  cout<<"2 for Economy Class"<<endl;  cout<<"0 to return to previous menu"<<endl;  cout<<"Enter Appropriate option number :: "<<endl;  cin>>j;  if(j==0)  goto m1\_ef;  if(j==1){  cout<<"\nEnter new price for the Luxury Class :: ";  cin>>ptr->f.price\_firstclass;  cout<<"\nThe Data for selected flight with name has been successfully updated."<<endl<<endl;  goto m2\_ef;  }  else if(j==2){  cout<<"\nEnter new price for the Economy Class :: ";  cin>>ptr->f.price\_economyclass;  cout<<"\nThe Data for selected flight with name has been successfully updated."<<endl<<endl;  goto m2\_ef;  }  else{  cout<<"You have entered an invalid choice. Please try again."<<endl;  goto m2\_ef;  }  break;  }  case 5:{  cout<<"\nEnter new Destination for the selected flight :: ";  fflush(stdin);  getline(cin,ptr->f.dest);  break;  }  case 9:{  int pass\_no;  cout<<"\nEnter Travel Passport Number of the Passenger :: ";  cin>>pass\_no;  cancel\_seat(pass\_no,ptr->f);  break;  }  case 0:{  return;  }  default:{  cout<<"\nYou have entered an invalid choice. Please try again.";}  goto m1\_ef;  }  m3\_ef: cout<<"\nThe Data for selected flight with name has been successfully updated."<<endl<<endl;  goto m1\_ef;  }  }  void administrator::delete\_flight(node\_flight \*\*head,string s)  {  cout<<"\nAre you sure you want to delete the selected flight? Enter 1 to confirm, else enter 0."<<endl;  int k=0;  cout<<"Your input :: ";  cin>>k;  if (k)  {  node\_flight\*ptr=\*head,\*preptr;  while(ptr!=NULL)  {  if(ptr->f.flightname==s)  {  if(ptr==\*head)  {  \*head=ptr->next;  delete ptr;  }  else{  preptr->next=ptr->next;  delete ptr;  }  break;  }  preptr=ptr;  ptr=ptr->next;  }  cout<<"\nFlight schedule has been updated succesfully.\n";  }  else  cout<<"\nPlease enter correct flight name";  }  void flight\_schedule(node\_flight\*\*head)  {  node\_flight\*ptr=\*head;  char c[90]={"-----------------------------------------------------------------"};  cout<<c<<endl;  while(ptr!=NULL){  ptr->f.flight\_info();  ptr=ptr->next;  cout<<endl;  }  cout<<c;  }  void display\_passengers(node\_flight\*ptr){  cout<<"\nPassengers in flight";  cout<<"\nSeats in Economy Class";  int c=0;  Node2d\*temp,\*temp2=ptr->f.Ehead;  while(temp2!=NULL)  {  temp=temp2;  while(temp!=NULL){  if(temp->data==1)  {  temp->p2.display();  cout<<endl;  c++;  }  temp=temp->right;  }  temp2=temp2->down;  }  cout<<"\nSeats in Luxury Class";  Node\*temp3=ptr->f.Fhead;  while(temp3!=NULL){  if(temp3->data==1){  temp3->p1.display();  cout<<endl;  c++;  }  temp3=temp3->next;  }  if(c==0)  cout<<"\nThere are no passenger booked till now"<<endl;  }  int main(){  node\_flight \*start=NULL;  node\_flight\*temp=new node\_flight;  temp->f.default\_flight("AD616","2:00pm","3:00pm",450,890,"Delhi","Los Angeles");  temp->next=NULL;  start=temp;  temp=new node\_flight;  temp->next=NULL;  start->next=temp;  temp->f.default\_flight("A380","2:00pm","3:00pm",450,890,"Delhi","Vancouver");  int choice;  homepage:  cout<<setw(10)<<"\nWelcome to Indira Gandhi International Airport";  while(1){  cout<<"\nTo begin booking your Tickets, enter 1"; //Enter 1152 for super user acoount  cout<<"\nIf you are administrator then login";  cout<<"\nEnter 0 to exit";  cout<<"\n\n\n\nAnd your choice is :: ";  cin>>choice;  if(choice==1152){  administrator admin;  string s;  m1\_su:  cout<<"Superuser has been activated.\nEnter appropriate option number :";  cout<<"\n1 Add flight";  cout<<"\n2 Edit a flight";  cout<<"\n3 Delete a flight";  cout<<"\n4 Display schedule of all flight";  cout<<"\nEnter 0 to return to Welcome Page"<<endl;  cout<<"\n\nYour choice is :: ";  cin>>choice;  switch(choice){  case 0:{  goto homepage;  }  case 1:{  admin.add\_flight(&start);  goto m1\_su;  break;  }  case 2:{  if(start==NULL)  cout<<"\nThere are no flight scheduled to take off.";  else{  flight\_schedule(&start);  string c;  cout<<"\nName of the flight you want to edit : ";  cin>>c;  admin.edit\_flight(c,start);  }  goto m1\_su;  break;  }  case 3:{  if(start==NULL){  cout<<"\nThere are no flight scheduled to take off.";  }  else{  cout<<"\nName of the flight you want to delete : ";  cin>>s;  admin.delete\_flight(&start,s);  }  goto m1\_su;  break;  }  case 4:{  flight\_schedule(&start);  goto m1\_su;  break;  }  case 5:{  cout<<"\nYou have entered an invalid choice. Please try again.";  goto m1\_su;  }  }  }  else if(choice==1){  string s;  if(start==NULL){  cout<<"\nThere are no flight scheduled to take off.";  //cout<<"\n\*THANKS";  }  else{  m1\_user:  choice = 0;  cout<<"\nWelcome Traveller, what would you like to do? Enter appropriate choice number";  cout<<"\n1 Book a trip around the World.";//done  cout<<"\n2 Lookup your trip details.";  cout<<"\n3 Lookup available seats to display all passengers.";//to display all passengers  cout<<"\n4 Show available/booked seat in a particular flight.";  cout<<"\n Enter 5 to exit";  cout<<"\nAnd your choice is :: ";  cin>>choice;  if(choice==5)  {  cout<<"\nEXIT";  exit(1);  }  flight\_schedule(&start);  cout<<"\nEnter flight name from above scheduled flights:: ";  //scanf(" %[^\n]s",s);  fflush(stdin);  getline(cin,s);  node\_flight\*ptr=traverse(start,s);  if(ptr==NULL){  cout<<"No search results for the flight(s) are there."<<endl<<endl<<endl<<endl<<endl;  goto m1\_user;  break;  }  else{  switch(choice){  case 1:{  int eco,first,check,n=1;  cout<<"\nEnter the number of seats in Economy Class :: ";  cin>>eco;  cout<<"\nEnter 1 if you would like a window seat, else press 0 for any seat";  cin>>n;  check=ptr->f.reservation(1,n,eco);  if(!check){  cout<<"Seats are unavailable. Please look for an alternative.";  goto m1\_user;  }  /\* }  else if(eco>0)  {  check=ptr->f.reservation(1,n,eco);  if(!check)  {  cout<<"SEAT IS NOT AVAILIBLE";  }  }\*/  cout<<"All the seats in Luxury Class are by the window"<<endl;  cout<<"\nNumber of seats in Luxury Class :: ";  cin>>first;  if(first>0){  check=ptr->f.reservation(2,1,first);  if(!check==1)  cout<<"\nSeats are unavailable. Please try an alternative."<<endl;  }  }  case 3:{  display\_passengers(ptr);  break;  }  case 2:{  long long int p;  cout<<"\nEnter User's Travel Passport Number";  cin>>p;  ptr->f.passenger\_info(p);  break;  }  case 4:{  ptr->f.displaySeats();  break;  }  default:{  cout<<"You have entered an invalid choice. Please try again.";  }  }  }  }  }  else if(choice==0){  cout<<"\n####################THANK YOU FOR USING OUR SERVICES############################";  exit(1);  }  else{  cout<<"\nYou have entered an invalid choice. Please try again.";  }  }  } | |  |  |

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