PROBLEM SOLVING WITH PROGRAMMING [RA20]

(PSP)

COURSE PROJECT

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PROBLEM STATEMENT:

- Railway ticket booking system is implemented by C programming. It is as same as one can see while we are going for online ticket booking. The following series of steps are being followed while booking a railway ticket in this software

- The first step is to provide the total number of passengers and submit all the necessary details of the passengers.

- The next step is to enter the source and destination.

- A list of available trains will appear. Among them, the user has to choose one.

- The ticket value will be evaluated. The system will ask to enter the seat choice by showing the seat matrix. At last, a receipt will be generated on the screen

MODULES:

- The first step is to implement a structure for taking the details of the passengers, like name, gender, and age.

- Five functions are defined void details(int), void add_node(char, char, int), int seat(int), int cal(int, int, int), void bill(int, int) to work smoothly.

- There are three elements in the structure like two strings one for taking passenger name and gender and one integer for taking passenger age. Also, a structure pointer will be used which helps to link the next node of another passenger. It is similar to the linked list.

- Character arrays are defined and some integer arrays are defined globally.

- Take the number of passengers as input and these details are sent to the **details() function**.

- Execute a for loop to take details of each passenger. The details inputted by the user will be sent to the add_node() function.

- In the add_node function, every detail will store in a node for each passenger. These nodes will link each other. This is based on the linked list concept.

- Take the input for source place, destination place and it will give some choice of trains available. Based on that user has to give a choice. Then call the **cal() function**.

- In **cal() function**, the user has to give a choice for sleeper or a.c. class. If the user chooses a.c. class another three options will open where the user has to give another choice based on that the system will add 18% GST on the amount and make total amount.

- Call the **seat() function** where a seat matrix will be given to the user and the user has to choose a seat same with the number of passengers.

At last, call the **bill() function** where the total bill amount with all the necessary details will be displayed.

KNOWLEDGE REQUIRED TO DEVELOP THIS APPLICATION

- ➢ Control Statements(if, if-else, switch)

- ➢ Loop Statements(do while, for)

- ➢ Arrays (1-arrays)

- ➢ Strings (Strings and Table of strings) and its functions(strcpy, strcmp)

- ➢ Functions (Any type of user defined functions)

- ➢ Structure (structures and nested structures)

- ➢ Pointers (pointer to strings and pointers to structures)

- ➢ Dynamic Memory Allocation (malloc/ calloc/ realloc)

- ➢ Structures

```c
C program for the above approach
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>


// Defining Structure

typedef struct mynode {

    char name[20];

    char gen[6];

    int age;

    struct mynode* link;
} Node;


Node* start = NULL;



void details(int);

int seat(int);

int cal(int, int, int);

void bill(int, int);

// Global variables
```

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char source[20], des[20], train[40];

char station[40], cla[40];

int time1, time2, a[55];



// Driver Code

void main()
{

    int i, j, a1, a2, b, c;
     int x = 0, d, e, r;

    char o;

    printf("Enter Number Of Passengers: ");

    fflush(stdin);

    scanf("%d", &j);



    // Calling details() function with

    // argument number of passenger

    details(j);

    printf("Enter The Source Place: ");

    fflush(stdin);

    gets(source);
```

```c
printf("Enter The Destination Place: ");

gets(des);

printf("\t\tThe Following Trains "

    "Are Available.....\n");

printf("\t\t1. Rajdhani Express.."

    ".......10:00 "

    "a.m........Sealdah Station\n");

printf("\t\t2. Satabdi Express..."

    ".......05:00 "

    "p.m........Howrah Station\n");

printf("\t\t3. Humsafar Express..."

    ".......11:00 "

    "p.m........Kolkata Chitpur"

    " Station\n");

printf("\t\t4. Garib-Rath Express"

    ".........05:00 "

    "p.m........Sealdah Station\n");

printf("\t\t5. Duronto Express..."

    ".........07:00 "
```

```c
        "a.m.........Santraganchi"

       "Station\n");

scanf("%d", &i);

do {

   switch (i) {

    case 1: {

       strcpy(train,

           "Rajdhani Express");

       strcpy(station,

           "Sealdah Station");

      time1 = 10;

      time2 = 00;

      a1 = 2099;

      a2 = 1560;



      // Calling cal() function

      // with the three argument

      // and return value
```

```c
        d = cal(a1, a2, j);

        printf("Total Bill Amount:"

            " %d\n",

            d);

    }; break;

    case 2: {

        strcpy(train,

            "Satabdi Express");

        strcpy(station,

            "Howrah Station");

        time1 = 05;

        time2 = 00;

        a1 = 1801;

        a2 = 981;


        // Calling cal() function with

        // three argument & return value

        d = cal(a1, a2, j);

        printf("Total Bill Amount:"
```

```c
            "%d\n",

            d);

}; break;

case 3: {

  strcpy(train,

      "Humsafar Express");

  strcpy(station,

      "Kolkata Chitpur Express");

  time1 = 11;

  time2 = 00;

  a1 = 2199;

  a2 = 1780;


  // Calling cal() function with

  // three argument & return value

  d = cal(a1, a2, j);

  printf("Total Bill Amount: %d\n", d);

}; break;
```

```c
case 4: {

    strcpy(train, "Garib-Rath Express");

    strcpy(station, "Sealdah Station");

    time1 = 05;

    time2 = 00;

    a1 = 1759;

    a2 = 1200;


    // Calling cal() function with

    // three argument & return value

    d = cal(a1, a2, j);

    printf("Total Bill Amount: %d\n", d);

}; break;

case 5: {

    strcpy(train, "Duronto Express");

    strcpy(station, "Santraganchi Station");

    time1 = 07;

    time2 = 00;

    a1 = 2205;
```

```c
        a2 = 1905;


        // Calling cal() function with

        // three argument & return value

        d = cal(a1, a2, j);

        printf("Total Bill Amount: %d\n", d);

    }; break;

    default:

        printf("Enter Correct choice.....\n");

        x = 1;

        break;

    }

} while (x);

printf("Now Book Your Seats......\n");


// Calling seat() function with number

// of passenger

seat(j);
```

```c
    // Calling bill() function with

    // the number of passenger

    // and amount argument

    bill(d, j);
}


// Function for calculation of amount

int cal(int y1, int y2, int h)
{

    int b, c, i, t, r, n;

    printf("\t\tEnter Your Choice......\n");

    printf("\t\t1. Slepper Class....\n");

    printf("\t\t2. A.C Class.......\n");

    scanf("%d", &i);

    switch (i) {

    case 1: {

        strcpy(cla, "Slepper Class");

        b = y2 * h;

        c = b + (b * 0.18);
```

```c
    } break;

case 2: {

    printf("\t\tEnter Your Choice....\n");

    printf("\t\t1. 3A Class....\n");

    printf("\t\t2. 2A Class....\n");

    printf("\t\t3. 1st Class A.C.....\n");

    scanf("%d", &n);

    switch (n) {

    case 1: {

        strcpy(cla, "3A Class");

        b = y1 * h;

        c = b + (b * 0.18);

    } break;

    case 2: {

        strcpy(cla, "2A Class");

        b = (y1 + 1000) * h;

        c = b + (b * 0.18);

    } break;

    case 3: {
```

```c
            strcpy(cla, "1st Class A.C.");

        b = (y1 + 5000) * h;

        c = b + (b * 0.18);

      } break;

      default: {

        printf("\t\tEnter Right Choice......\n");

      }

      }

   } break;

   default: {

     printf("\t\tEnter Right Choice......\n");

   }

   }

   return c;
}


// Function for taking details
// of passengers

void details(int k)
{
```

```c
    int i, a;

    char val[20], gen[6];

    for (i = 1; i <= k; i++) {

        printf("Enter The %dth Passenger Name: ", i);

        fflush(stdin);

        gets(val);

        printf("Enter The %dth Passenger Gender: ", i);

        fflush(stdin);

        gets(gen);

        printf("Enter The %dth Passenger Age: ", i);

        fflush(stdin);

        scanf("%d", &a);



        // Calling add_node() function

        add_node(val, gen, a);

    }
}


// Function to add details in node
// for each passengers
```

```c
void add_node(char lol[20], char der[6], int b)
{

    Node *newptr = NULL, *ptr;

    newptr = (Node*)malloc(sizeof(Node));

    strcpy(newptr->name, lol);

    strcpy(newptr->gen, der);

    newptr->age = b;

    newptr->link = NULL;

    if (start == NULL)

        start = newptr;

    else {

        ptr = start;

        while (ptr->link != NULL)

            ptr = ptr->link;

        ptr->link = newptr;

    }
}


// Function for choosing seats

int seat(int p)
{
```

```c
int i;

printf("\t      -:SEAT MATRIX:-    \n");

printf("\t(U)  (M)    (L)  (L) "

   "  (U)\n\n");

printf("\t01  02    03\t04     "

   "05\n\n");

printf("\t06  07    08\t09     "

   "10\n");

printf("\t11  12    13\t14     "

   "15\n\n");

printf("\t16  17    18\t19     "

   "20\n");

printf("\t21  22    23\t24     "

   "25\n\n");

printf("\t26  27    28\t29     "

   "30\n");

printf("\t31  32    33\t34     "

   "35\n\n");
```

```c
    printf("\t36   37     38\t39     "

        "40\n");

    printf("\t41   42     43\t44     "

        "45\n\n");

    printf("\t46   47     48\t49     "

        "50\n");

    printf("\t51   52     53\t54     "

        "55\n\n");

    printf("\t56   57     58\t59     "

        "60\n");

    printf("\tEnter Seat Numbers: \n");

    for (i = 0; i < p; i++)

        scanf("%d", &a[i]);
}


// Function for printing receipt

void bill(int y, int j)
{

    int i;

    Node* ptr = start;
```

```c
for (i = 1; i <= j; i++) {

  printf("\t\t\%dst Passenger Name: ", i);

  puts(ptr->name);

  printf("\t\t%dst Passenger Gender: ", i);

  puts(ptr->gen);

  printf("\t\t%dst Passenger Age: %d\n\n", i,

      ptr->age);

  ptr = ptr->link;

}

printf("\t\tSource Place: ");

puts(source);

printf("\t\tDestination Place: ");

puts(des);

printf("\t\tThe Boarding Station: ");

puts(station);

printf("\t\tTrain Is: ");

puts(train);

printf("\t\tAllocated Class: ");

puts(cla);
```

```c
    printf("\t\tBoarding Time: %d:%d\n", time1, time2);

    printf("\t\tTotal Bill Amount: %d\n", y);

    printf("\t\tAllocated Seats Are: \n");

    for (i = 0; i < j; i++) {

        printf("\t\t%d ", a[i]);

    }

    printf("\n");

    printf("\t\t\t\tThank You......\n");
}+
```

OUTPUT:

Enter Number Of Passengers: 4

Enter The 1th Passenger Name: sathvi

Enter The 1th Passenger Gender: female

Enter The 1th Passenger Age: 18

Enter The 2th Passenger Name: ashwini

Enter The 2th Passenger Gender: female

Enter The 2th Passenger Age: 18

Enter The 3th Passenger Name: sravan

Enter The 3th Passenger Gender: male

Enter The 3th Passenger Age: 18

Enter The 4th Passenger Name: sandeep

Enter The 4th Passenger Gender: male

Enter The 4th Passenger Age: 18

Enter The Source Place: hyderabad

Enter The Destination Place: bengaluru

      The Following Trains Are Available.....

      1. Rajdhani Express.........10:00 a.m........Sealdah Station

      2. Satabdi Express..........05:00 p.m........Howrah Station

      3. Humsafar Express..........11:00 p.m........Kolkata Chitpur Station

      4. Garib-Rath Express.........05:00 p.m........Sealdah Station

      5. Duronto Express............07:00 a.m.........SantraganchiStation

4

      Enter Your Choice......

      1. Slepper Class....

      2. A.C Class.......

2

      Enter Your Choice....

      1. 3A Class....

2. 2A Class....

3. 1st Class A.C.....

3

Total Bill Amount: 31902

Now Book Your Seats......

-:SEAT MATRIX:-

(U) (M)   (L) (L)   (U)

01 02   03   04   05

06 07   08   09   10

11 12   13   14   15

16 17   18   19   20
21 22   23   24   25

26 27   28   29   30
31 32   33   34   35

36 37   38   39   40
41 42   43   44   45

46 47   48   49   50
51 52   53   54   55

56 57   58   59   60
Enter Seat Numbers:

26

27

28

29

1st Passenger Name:
1st Passenger Gender: female
1st Passenger Age: 18

2st Passenger Name:
2st Passenger Gender: female
2st Passenger Age: 18

3st Passenger Name: sravan
3st Passenger Gender: male
3st Passenger Age: 18

4st Passenger Name: sandeep
4st Passenger Gender: male
4st Passenger Age: 18

Source Place: hyderabad
Destination Place: bengaluru
The Boarding Station: Sealdah Station
Train Is: Garib-Rath Express
Allocated Class: 1st Class A.C.
Boarding Time: 5:0
Total Bill Amount: 31902
Allocated Seats Are:
26   27   28   29
              Thank You......

Process returned 0 (0x0)   execution time : 84.845 s
Press any key   .