```
1: //                                                  THEORY
   ASSIGNMENT NO-06
2: // Name- Prerana Rajesh Gajare      Class-SEIT
   RollNo-SI41
3: /*PROBLEM STATEMENT:-
4:    Implement Phone Directory using Hashing (Use your
   own hash function which will result in less coliision).
5:    Your task is to implement 1. Insert record 2.
   Search record
6: */
7: //Source code:-
8: #include <iostream>
9: using namespace std;
10:
11: struct Directory{
12:     string name;
13:     string mob_no;
14:     int ID;
15: };
16:
17: //TO FIND THE INDEX IN ARRAY USING HASH FUNCTION WHERE
   DATA IS STORED
18: int hash(int key,int n)
19: {
20:     int index;
21:     index=(key%n);
22:     return index;
23: }
24:
25: //IF THE MEMORY OF THAT INDEX IS OCCUPIED INCREMENT
   THE INDEX BY 1 AND TAKE ITS MOD .
26: int hashnext(int index,int n)
27: {
28:     index=(index+1)%n;
29:     return index;
30: }
31:
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32:
33: //TO INSERT AN RECORD IN DIRECTORY USING GETDATA
    FUNCTION
34: void  getdata(struct Directory data[],int n)
35: {
36:     int id;
37:     cout<<"\nEnter your ID : ";
38:     cin>>id;
39:     int index=hash(id,n);
40:     while(1)
41:     {
42:         if(data[index].ID==0)//IF INDEX IN ARRAY IS
    EMPTY ENTER THE DATA
43:         {
44:            data[index].ID=id;
45:            cout<<"\nEnter your Name: ";
46:            cin>>data[index].name;
47:            cout<<"\nEnter your Mobile number: ";
48:            cin>>data[index].mob_no;
49:            break;
50:         }
51:         else//ELSE MOVE ON TO NEXT INDEX IN ARRAY
    USING HASHNEXT FUNCTION
52:         {
53:            index=hashnext(index,n);
54:         }
55:     }
56: }
57:
58: //TO SEARCH AN RECORD IN DIRECTORY USING SEARCH
    FUNCTION
59: void search(struct Directory data[],int n)
60: {
61:     int ITEM;
62:     cout<<"\nEnter ID to search : ";
63:     cin>>ITEM;
64:     int index=hash(ITEM,n);//SEARCH THE ITEM USING
    ITEM(ID) AND RETURN THE VALUE OF INDEX WHERE IT IS
    PRESENT.
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65:     int flag=0;
66:     int i=0;
67:
68:     while(i<n)
69:     {
70:         if(data[index].ID==ITEM)//IF ENTERED ID VALUE
    AND INDEX IN ARRAY MATCHES PRINT RECORD
71:         {
72:
73:             flag=1;
74:             cout<<"Record is present at"<<index<<"
    index\n";
75:             cout<<"\nName  "<<"\t\t"<<"ID
    "<<"\t"<<"Mob_no   "<<endl;
76:
    cout<<data[index].name<<"\t\t"<<data[index].ID<<"\t"<<data[in
77:             break;
78:         }
79:         else//ELSE SEARCH ON NEXT INDEX IN ARRAY USING
    HASHNEXT FUNCTION
80:         {
81:             index=hashnext(index,n);//
82:         }
83:         i++;
84:     }
85:     if(flag==0)//IF ITEM NOT FOUND PRINT RECORD NOT
    FOUND
86:     {
87:         cout<<"Record not found"<<endl;
88:     }
89: }
90:
91: //TO PRINT THE PHONE DIRECTORY IMPLMENTED USING HASH .
92: void display(struct Directory data[],int n)
93: {
94:
95:  cout<<"\n"<< "Name"<<"\t"<<"ID"<<"\t"<<"mob_no"<<" \t
    ";
```

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 96:  for(int j=0;j<n;j++)
 97:  {
 98:
      cout<<"\n"<<data[j].name<<"\t"<<data[j].ID<<"\t"<<data[j].mob
 99:  }
100: }
101: int main()
102: {
103:     struct Directory data[50];//  Array of Object of
     structure class
104:     int n;
105:     //ACCEPTING THE SIZE OF HASH ARRAY
106:     cout<<"\nEnter the size of Hash Array : ";
107:     cin>>n;
108:
109:     for(int i=0;i<n;i++)
110:     {
111:         data[i].ID=0;//INITIALISING ID OF FIRST INDEX
     AS 0.
112:     }
113:     int l;
114:     do
115:     {
116:         cout<<"\nWhich operation would you like to
     perform:\n1)Insert\n2)Search\n3)Display\n4)Exit\n(1,2,
     3,4):";
117:         cin>>l;
118:
119:         switch(l)
120:         {
121:             case 1:
122:                 for(int i=0;i<n;i++)
123:                 {
124:                     getdata(data,n);//CALLING GETDATA
     FUNCTION
125:                 }
126:                 break;
```

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127:             case 2:
128:                 search(data,n);//CALLING SEARCH
    FUNCTION
129:                 break;
130:             case 3:
131:                 display(data,n);//CALLING DISPLAY
    FUNCTION
132:                 break;
133:             case 4:
134:                 cout<<"The End";
135:                 break;
136:             default:
137:                 cout<<"Wrong choice";
138:         }
139:     }while(l!=4);
140:
141: }
```

C:\Users\Dell\OneDrive\Documents\PRERANA.CPP\P.CPP\hashing.exe

```
Enter the size of Hash Array : 3

Which operation would you like to perform:
1)Insert
2)Search
3)Display
4)Exit
(1,2,3,4):1

Enter your ID : 1

Enter your Name: RAM

Enter your Mobile number: 4152637485

Enter your ID : 2

Enter your Name: KISHAN

Enter your Mobile number: 4152631232

Enter your ID : 3

Enter your Name: SHIV

Enter your Mobile number: 4152631233

Which operation would you like to perform:
```

C:\Users\Dell\OneDrive\Documents\PRERANA.CPP\P.CPP\hashing.exe

```
Which operation would you like to perform:
1)Insert
2)Search
3)Display
4)Exit
(1,2,3,4):2

Enter ID to search : 2
Record found at 2 index

Name            ID      Mob_no
KISHAN          2       4152631232

Which operation would you like to perform:
1)Insert
2)Search
3)Display
4)Exit
(1,2,3,4):3

Name    ID      mob_no
SHIV    3       4152631233
RAM     1       4152637485
KISHAN  2       4152631232
Which operation would you like to perform:
1)Insert
2)Search
3)Display
4)Exit
```

C:\Users\Dell\OneDrive\Documents\PRERANA.CPP\P.CPP\hashing.exe

```
(1,2,3,4):2

Enter ID to search : 2
Record found at 2 index

Name            ID      Mob_no
KISHAN          2       4152631232

Which operation would you like to perform:
1)Insert
2)Search
3)Display
4)Exit
(1,2,3,4):3

Name    ID      mob_no
SHIV    3       4152631233
RAM     1       4152637485
KISHAN  2       4152631232
Which operation would you like to perform:
1)Insert
2)Search
3)Display
4)Exit
(1,2,3,4):4
The End
--------------------------------
Process exited after 68.75 seconds with return value 0
Press any key to continue . . .
```