UNIVERSITY COLLEGE OF ENGINEERING,TIRUCHIRAPALLI

(BIT CAMPUS)

C-Programming

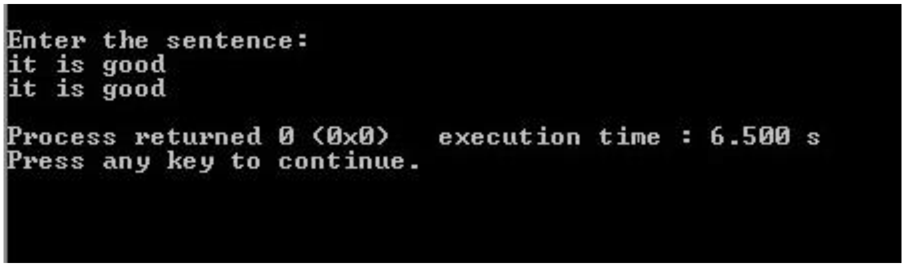
LABORATORY MANUAL

I/0 STATEMENTS

1.Programs using I/O statements and expressions.

EX.1:

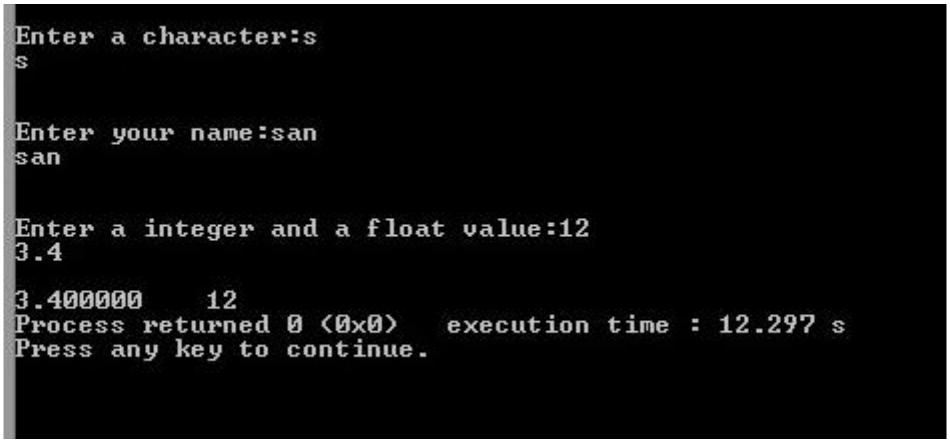
```
#include<stdio.h>
int main()
{
   char s[25];
   /*use of gets and puts*/
puts("\nEnter the sentence:");
 gets(s);
 puts(s);
return 0;
}
```



```
Enter the sentence:
it is good
it is good

Process returned 0 (0x0)   execution time : 6.500 s
Press any key to continue.
```

EX.2:

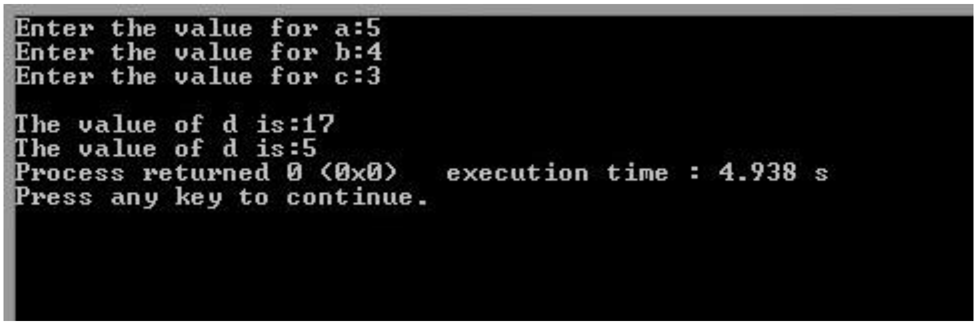
```
#include<stdio.h>
int main()
{
   char c,name[15];
   int a;
   float b;
   /*use of getchar and putchar*/
printf("\nEnter a character:");
c=getchar();
putchar(c);
/*use of printf and scanf*/
printf("\n\n\nEnter your name:");
scanf("%s",name);
printf("%s",name);
/*usage of format specifier in printf and scanf*/
printf("\n\n\nEnter a integer and a float value:");
scanf("%d%f",&a,&b);
printf("\n%f    %d",b,a);
return 0;
}
```



```
Enter a character:s
s


Enter your name:san
san


Enter a integer and a float value:12
3.4

3.400000    12
Process returned 0 (0x0)   execution time : 12.297 s
Press any key to continue.
```

EX.3:

```
#include<stdio.h>
#include<string.h>
int main()
{
int a,b,c,d;
printf("Enter the value for a:");
scanf("%d",&a);
printf("Enter the value for b:");
scanf("%d",&b);
printf("Enter the value for c:");
scanf("%d",&c);
d=a+(b*c);
printf("\nThe value of d is:%d",d);
d=a*(b/c);
printf("\nThe value of d is:%d",d);
return 0;
}
```



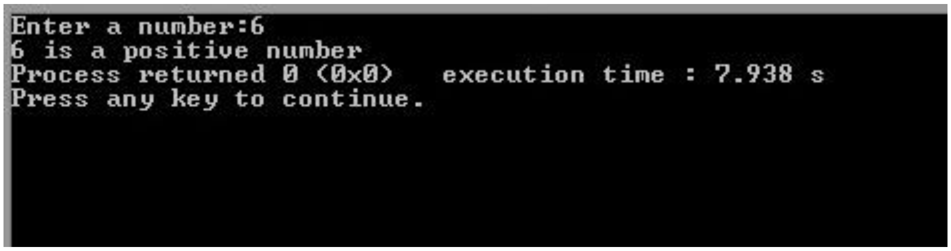
```
Enter the value for a:5
Enter the value for b:4
Enter the value for c:3

The value of d is:17
The value of d is:5
Process returned 0 (0x0)   execution time : 4.938 s
Press any key to continue.
```

DESCISION MAKING STATEMENTS

2. Programs using decision-making constructs.

```
#include<stdio.h>
int main()
{
        int a;
        /*checking for positive or negative*/
        printf("Enter a number:");
        scanf("%d",&a);
```

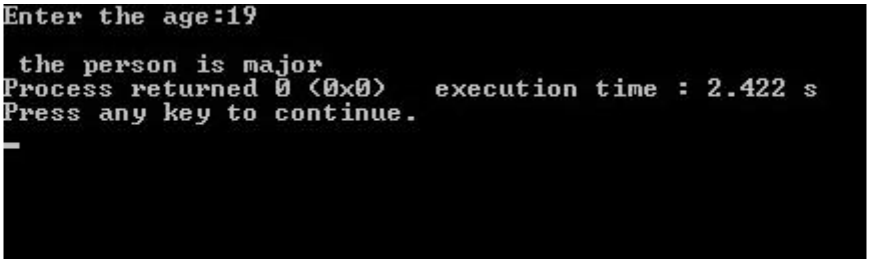
```
            if(a>0)
               printf("%d is a positive number",a);
            else
                        printf("%d is a negative number",a);
            return 0;
}
```



```
Enter a number:6
6 is a positive number
Process returned 0 (0x0)   execution time : 7.938 s
Press any key to continue.
```

(or)

```
#include<stdio.h>
int main()
{
            int a;
            /*checking for minor or major*/
            printf("Enter the age:");
            scanf("%d",&a);
            if(a>=18)
                        printf("\n the person is major");
            else
                        printf("\n the person is minor");
            return 0;

}
```

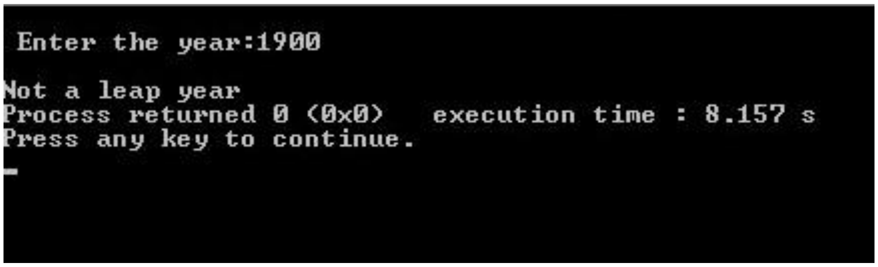


```
Enter the age:19

 the person is major
Process returned 0 (0x0)   execution time : 2.422 s
Press any key to continue.
```

LEAP YEAR OR NOT

3. Write a program to find whether the given year is leap year or Not? (Hint: not every centurion year is a leap. For example 1700, 1800 and 1900 is not a leap year)

```
#include<stdio.h>
 int main()
{
     int year;
     printf("\n Enter the year:");
    scanf("%d", &year);
    if ( (year % 4 == 0 && year % 100 != 0 ) || year % 400 == 0)
        printf("\n leap year");
    else
      printf("\nNot a leap year");
   return 0;
}
```

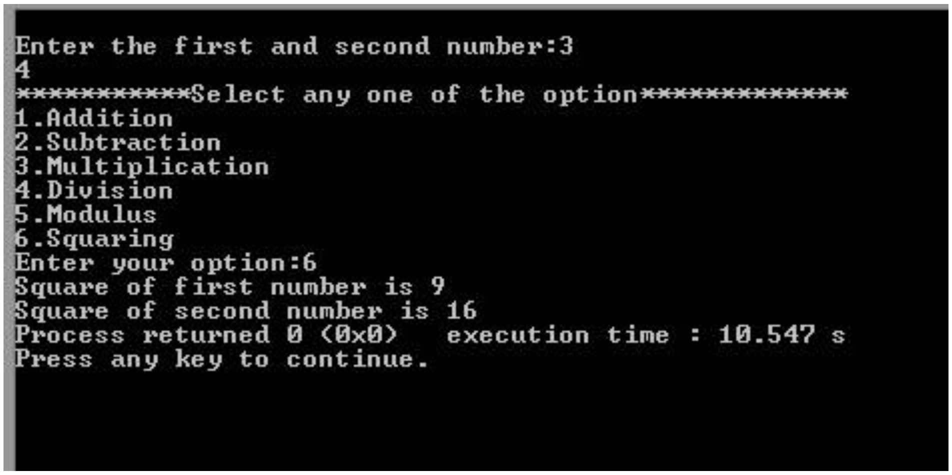


```
 Enter the year:1900

Not a leap year
Process returned 0 (0x0)   execution time : 8.157 s
Press any key to continue.
```

CALCULATOR

4. Design a calculator to perform the operations, namely, addition, subtraction, multiplication, division and square of a number.

```
#include<stdio.h>
int main()
{
int a,b,c,num;
printf("\nEnter the first and second number:");
scanf("%d %d",&a,&b);
printf("***********Select any one of the option*************");
printf("\n1.Addition\n");
printf("2.Subtraction\n");
printf("3.Multiplication\n");
printf("4.Division\n");
printf("5.Modulus\n");
printf("6.Squaring\n");
printf("Enter your option:");
scanf("%d",&num);
switch(num)
{
case 1:c=a+b;
  printf("Sum of two numbers is %d",c);
  break;
case 2:c=a-b;
  printf("Sub of two numbers is %d",c);
  break;
case 3:c=a*b;
  printf("Multiplication of two numbers is %d",c);
  break;
case 4:c=a/b;
  printf("Division of two numbers is %d",c);
  break;
case 5:c=a%b;
  printf("Modulus of two numbers is %d",c);
  break;
case 6:c=a*a;
  printf("Square of first number is %d",c);
c=b*b;
  printf("Square of second number is %d",c);
  break;
default:printf("TRY AGAIN");
}
return 0;
}
```



```
Enter the first and second number:3
4
***********Select any one of the option*************
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Modulus
6.Squaring
Enter your option:6
Square of first number is 9
Square of second number is 16
Process returned 0 (0x0)   execution time : 10.547 s
Press any key to continue.
```

ARMSTRONG

5. Check whether a given number is Armstrong number or not?

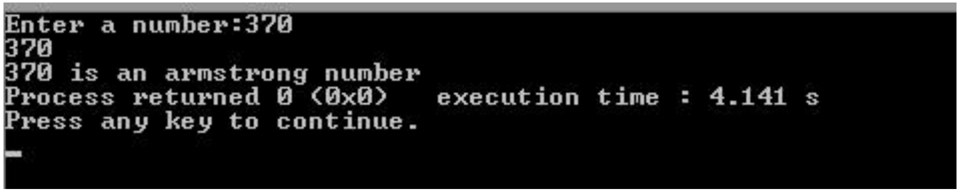
```
#include<stdio.h>
#include<math.h>
int main()
{
             int num,originalnumber,rem,result=0,n=0;
            printf("Enter a number:");
            scanf("%d",&num);
           originalnumber=num;
            while(originalnumber!=0)
          {
                    originalnumber/=10;
                    ++n;
               }
            originalnumber=num;
           while(originalnumber!=0)
       {
                    rem=originalnumber%10;
                   result+=pow(rem,n);
                   originalnumber/=10;
        }

                printf("%d",result);
              if(result==num)
                     printf("\n%d is an armstrong number",num);
               else
                    printf("\n%d is not an armstrong number",num);
              return 0;
}
```

(0R)

THREE DIGIT

```
#include<stdio.h>
#include<math.h>
int main()
{
   int num,rem,sum=0,temp;
   printf("Enter a number:");
   scanf("%d",&num);
   temp=num;
   while(temp!=0)
   {
      rem=temp%10;
```

```
        temp/=10;
        sum+=(rem*rem*rem);
    }
    if(sum==num)
            printf("\n%d is armstrong number",num);
    else
            printf("\n%d is not an armstrong number",num);
    return 0;
}
```



```
Enter a number:370
370
370 is an armstrong number
Process returned 0 (0x0)   execution time : 4.141 s
Press any key to continue.
```

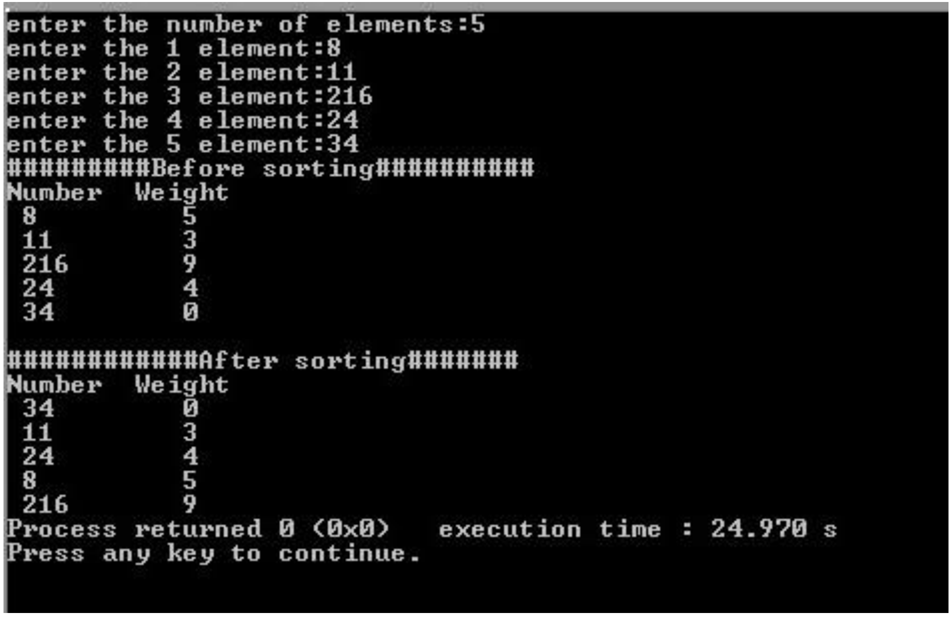
WEIGHT OF NUMBER

6. Given a set of numbers like , find sum of weights based on the following conditions.

- 5 if it is a perfect cube.
- 4 if it is a multiple of 4 and divisible by 6.
- 3 if it is a prime number

```
#include<stdio.h>
int percube(int num)
{
int i,flag=0;
for(i=0;i<=num/2;i++)
{
if((i*i*i)==num)
{
flag=1;
break;
}
}
return flag;
}
int prime(int num)
{
int i,flag=1;
for(i=2;i<=num/2;i++)
{
if(num%i==0)
{
flag=0;
break;
}
}
return flag;
}
int main()
{
int onum[100],wnum[100],num=6,i,k=1;
printf("enter the number of elements:");
scanf("%d",&num);
for(i=0;i<num;i++)
{
printf("enter the %d element:",k);
scanf("%d",&onum[i]);
k=k+1;
}
for(i=0;i<num;i++)
{
```

```
wnum[i]=0;
if(percube(onum[i]))
wnum[i]+=5;
if((onum[i]%4==0)&&(onum[i]%6==0))
wnum[i]+=4;
if(prime(onum[i]))
wnum[i]+=3;
}
printf("#########Before sorting##########");
printf("\nNumber\tWeight");
for(i=0;i<num;i++)
{
printf("\n %-9d %d",onum[i],wnum[i]);
}
for(i=0;i<num;i++)
for(int j=0;j<num-1;j++)
{
if(wnum[j]>wnum[j+1])
{
int e;
int t=wnum[j];
wnum[j]=wnum[j+1];
wnum[j+1]=t;
e=onum[j];
onum[j]=onum[j+1];
onum[j+1]=e;

}
}
printf("\n\n############After sorting#######");
printf("\nNumber\tWeight");
for(i=0;i<num;i++)
{
printf("\n %-9d %d",onum[i],wnum[i]);
}
return 0;
}
```



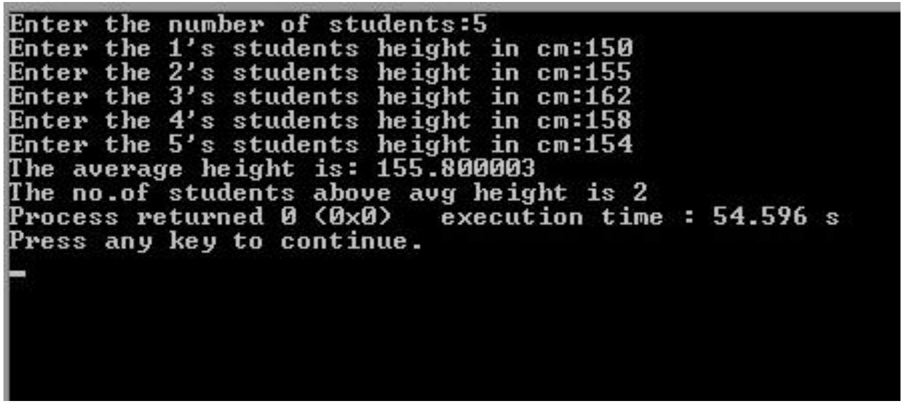
```
enter the number of elements:5
enter the 1 element:8
enter the 2 element:11
enter the 3 element:216
enter the 4 element:24
enter the 5 element:34
#########Before sorting##########
Number  Weight
 8        5
 11       3
 216      9
 24       4
 34       0

############After sorting#######
Number  Weight
 34       0
 11       3
 24       4
 8        5
 216      9
Process returned 0 (0x0)   execution time : 24.970 s
Press any key to continue.
```

AVERAGE HEIGHT

7. Populate an array with height of persons and find how many persons are above the average height.

```
#include<stdio.h>
```

```
int main()
{
 int num,i,height[100],sum=0,k=1,count=0;
 float avg;
 printf("Enter the number of students:");
 scanf("%d",&num);
 for(i=0;i<num;i++)
 {
   printf("Enter the %d\'s students height in cm:",k++);
                  scanf("%d",&height[i]);
                  sum+=height[i];
 }
 avg=(float)sum/num;
 printf("The average height is:  %f",avg);
 for(i=0;i<num;i++)
 if(avg<height[i])
  count+=1;
 printf("\nThe no.of students above avg height is %d",count);
 return 0;
 }
```

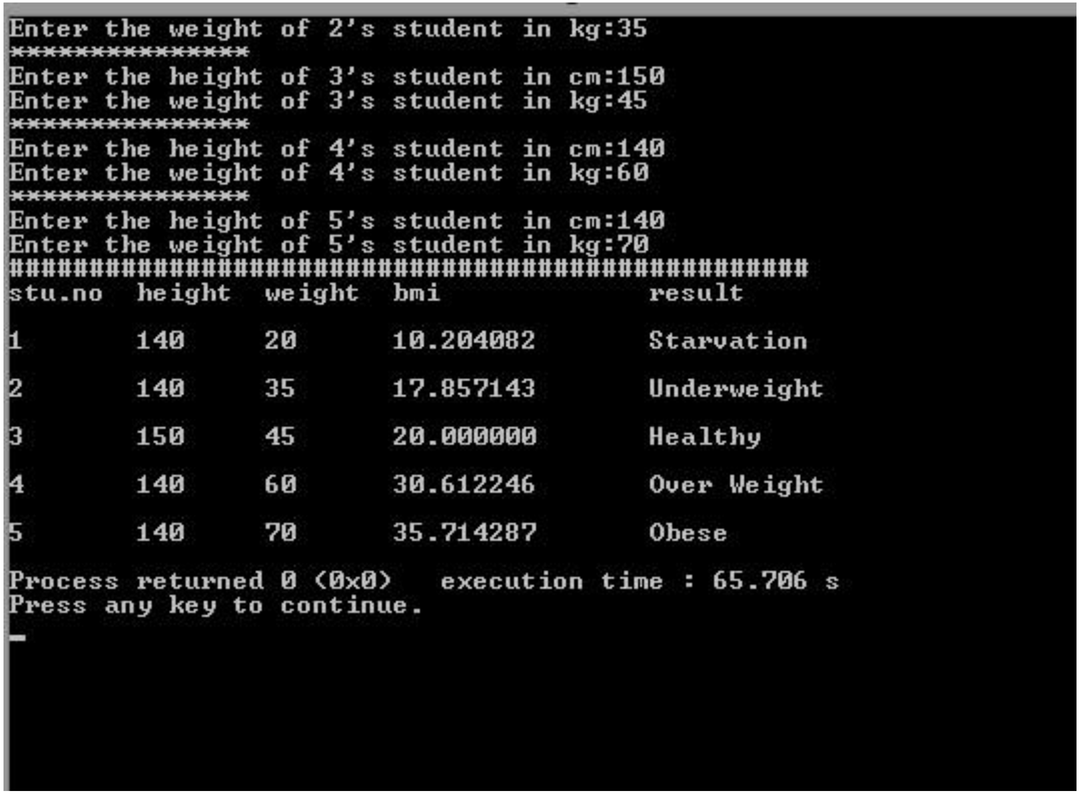


```
Enter the number of students:5
Enter the 1's students height in cm:150
Enter the 2's students height in cm:155
Enter the 3's students height in cm:162
Enter the 4's students height in cm:158
Enter the 5's students height in cm:154
The average height is: 155.800003
The no.of students above avg height is 2
Process returned 0 (0x0)   execution time : 54.596 s
Press any key to continue.
```

BODY MASS INDEX CALCULATION

8.Populate a two dimensional array with height and weight of persons and compute the Body Mass Index of the individuals.

```
#include<stdio.h>
int main()
{
 int i,n,data[100][2],k=1;
 float h,bmi[100];
 printf("Emter the number of students:");
 scanf("%d",&n);
 for(i=0;i<n;i++)
 {
 printf("***************\n");
  printf("Enter the height of %d\'s student in cm:",k);
  scanf("%d",&data[i][0]);
  printf("Enter the weight of %d\'s student in kg:",k);
  scanf("%d",&data[i][1]);
  k++;
  }
  for(i=0;i<n;i++)
  {
  h=(float)data[i][0]/100;
  bmi[i]=data[i][1]/(h*h);

  }
  printf("######################################################");
  printf("\nstu.no\theight\tweight\tbmi\t\tresult\n");
 k=1;
 for(i=0;i<n;i++)
 {
  printf("\n%-6d\t%-6d\t%-6d\t%-6f\t",k++,data[i][0],data[i][1],bmi[i]);
  if(bmi[i]<15)
     printf("Starvation\n");
  else if(bmi[i]>14 && bmi[i]<18)
     printf("Underweight\n");
  else if(bmi[i]>17 && bmi[i]<26)
     printf("Healthy\n");
  else if(bmi[i]>25 && bmi[i]<31)
     printf("Over Weight\n");
  else if(bmi[i]>30 && bmi[i]<36)
     printf("Obese\n");
  else
     printf("Severe Obese\n");
  }
  return 0;
  }
```

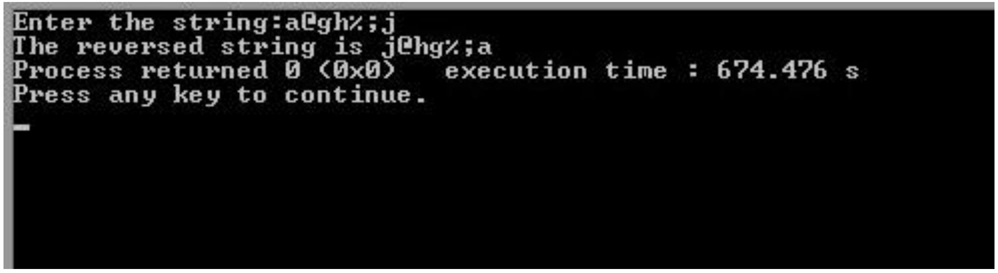


```
Enter the weight of 2's student in kg:35
***************
Enter the height of 3's student in cm:150
Enter the weight of 3's student in kg:45
***************
Enter the height of 4's student in cm:140
Enter the weight of 4's student in kg:60
***************
Enter the height of 5's student in cm:140
Enter the weight of 5's student in kg:70
##################################################
stu.no  height  weight  bmi             result

1       140     20      10.204082       Starvation

2       140     35      17.857143       Underweight

3       150     45      20.000000       Healthy

4       140     60      30.612246       Over Weight

5       140     70      35.714287       Obese

Process returned 0 (0x0)   execution time : 65.706 s
Press any key to continue.
_
```

REVERSING STRING

9.Given a string —a$bcd./fg   find its reverse without changing the position of special characters. (Example input:a@gh%;j and output:j@hg%;a)

```
#include<stdio.h>
#include<string.h>
void swap(char *a,char *b);
void reverse(char str[]);
int alpha(char x);
int main()
{
 char str[100];int len;
 printf("Enter the string:");
 gets(str);
 reverse(str);
 printf("The reversed string is %s",str);
 return 0;
 }
void reverse(char str[])
{
   int i=0,r=strlen(str)-1;
   while(i<r)
   {
     if(!alpha(str[i]))
                     i++;
                   else if(!alpha(str[r]))
                     r--;
                   else
                   {
                     swap(&str[i],&str[r]);
                     i++;
                     r--;
                    }
     }
}
int alpha(char x)
{
   return((x>='a' && x<= 'z')||( x>='A' && x<= 'Z'));
  }
 void swap(char *a,char *b)
 {
    char t;
                  t=*a;
                  *a=*b;
                  *b=t;

                  }
```



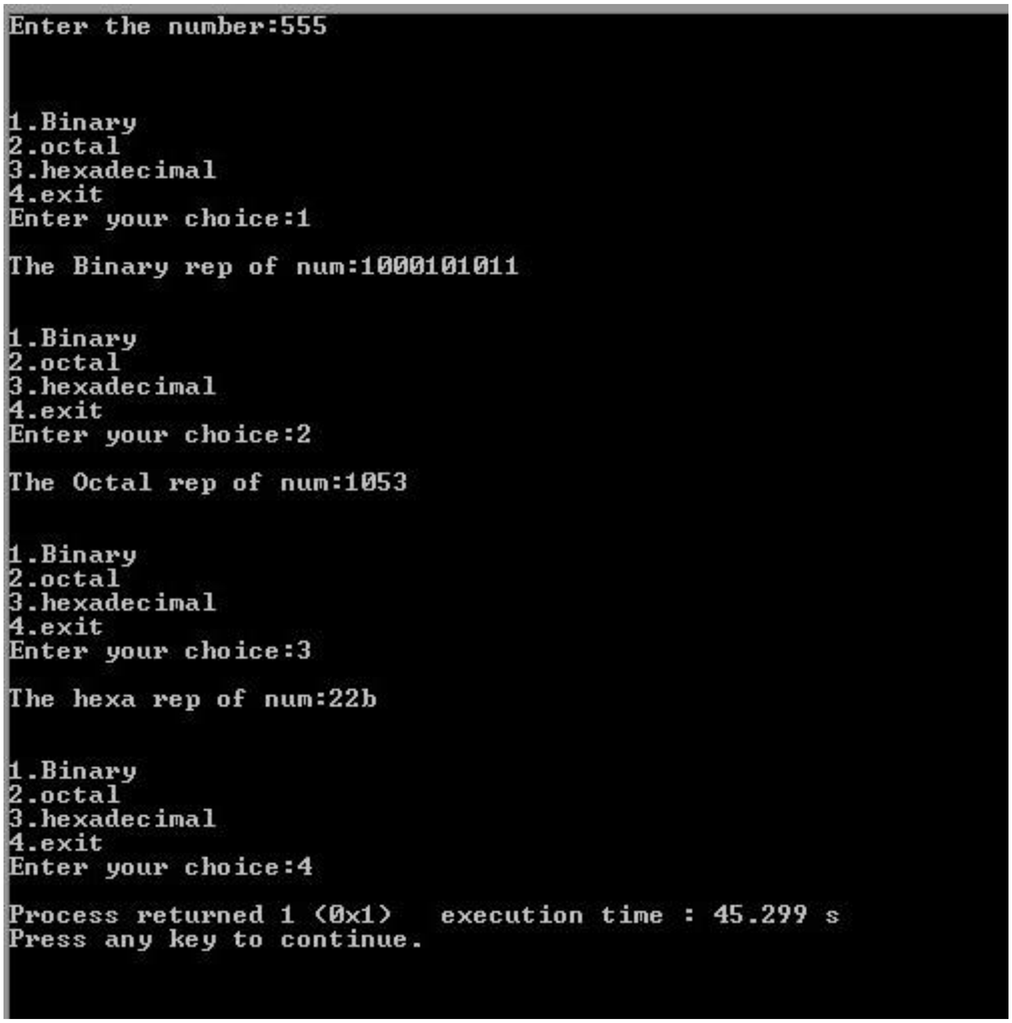
```
Enter the string:a@gh%;j
The reversed string is j@hg%;a
Process returned 0 (0x0)   execution time : 674.476 s
Press any key to continue.
```

CONVETING TO OTHER BASES

10. Convert the given decimal number into binary, octal and hexadecimal numbers using user defined functions

```
#include<stdio.h>
#include<stdlib.h>
int convert(int num,int base)
{
    int rem;
              rem=num%base;
              if(num==0)
               return 0;
              convert(num/base,base);
              if(rem<10)
                printf("%d",rem);
              else
                printf("%c",rem-10+'a');
}
int main()
{
  int num,opt;
  printf("Enter the number:");
  scanf("%d",&num);
  while(1)
  {
```

```
  printf("\n\n\n1.Binary\n2.octal\n3.hexadecimal\n4.exit");
  printf("\nEnter your choice:");
  scanf("%d",&opt);
   switch(opt)
             {
             case 1:
    {
               printf("\nThe Binary rep of num:");
               convert(num,2);
               break;
              }
             case 2:
   {
               printf("\nThe Octal rep of num:");
               convert(num,8);
               break;
             }
             case 3:
             {
               printf("\nThe hexa rep of num:");
               convert(num,16);
               break;
             }
             case 4:
             {
               exit(1);
               break;
              }
             default:
             printf("\nEnter the crt option:");

             }
 }

 return 0;
}
```



```
Enter the number:555



1.Binary
2.octal
3.hexadecimal
4.exit
Enter your choice:1

The Binary rep of num:1000101011


1.Binary
2.octal
3.hexadecimal
4.exit
Enter your choice:2

The Octal rep of num:1053


1.Binary
2.octal
3.hexadecimal
4.exit
Enter your choice:3

The hexa rep of num:22b


1.Binary
2.octal
3.hexadecimal
4.exit
Enter your choice:4

Process returned 1 (0x1)   execution time : 45.299 s
Press any key to continue.
```

(OR)

```
#include<stdio.h>
int toBin(int ipNum)
{
  int rem,quo,i=0,j,a[100];
  while(!quo==0)
  {
   rem=ipNum%2;
a[i]=rem;
quo=ipNum/2;
i++;
ipNum=quo;
  }
  printf("\n the binary value is:");
  for(j=i-1;j>=0;j--)
  {
   printf("%d",a[j]);
  }
  return 0;
}
int toHex(int ipNum)
{
    int i=0,j,rem;
char a[100];
while(ipNum!=0)
{
rem=ipNum%16;
if(rem<10)
{
```

```
rem=rem+48;
a[i]=rem;
i++;
}
else
{
rem=rem+55;
a[i]=rem;
i++;
}
ipNum/=16;
}
for(j=i-1;j>=0;j--)
{
printf("%c",a[j]);
}

return 0;
}

int toOctal(int ipNum)
{
int i=0,j,rem;
char a[100];
while(ipNum!=0)
{
rem=ipNum%8;
a[i]=rem;
i++;
ipNum/=8;
}
printf("the octalrepresentation of %d is \n");
for(j=i-1;j>=0;j--)
printf("%d",a[j]);
return 0;
}


int main()
{
int ipNum =0, convertOption=0;
printf("Enter the number :");
scanf("%d", &ipNum);
printf("\n ================================Enter the number conver Option=====:");
printf("\n 1. Decimal to Binar ");
printf("\n 2. Decimal to Hex ");
printf("\n 3. Decimal to Octal ");
printf("\n 4. EXit\n ");

printf("Enter the number convert Option :");
scanf("%d", &convertOption);
switch (convertOption)
{
case 1:
toBin(ipNum);
break;
case 2:
toHex(ipNum);
break;
case 3:
toOctal(ipNum);
break;

case 4:
break;
```

```
default :
break;
}
return 0;
}
```

STRING OPERATIONS

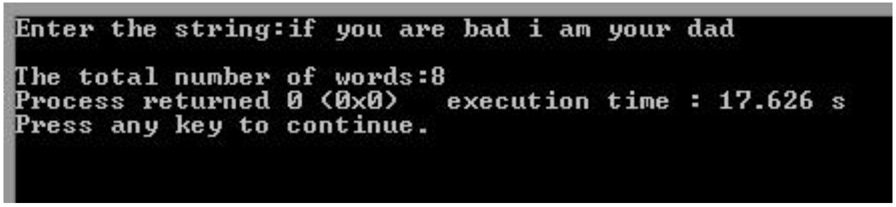
11. From a given paragraph perform the following using built-in functions:
a. Find the total number of words.

b. Capitalize the first word of each sentence.

c. Replace a given word with another word.

A

```
#include <stdio.h>
#include <stdlib.h>
#include <ctype.h>
#include <string.h>
int main()
{
   char str[80];
   char s[4] = " .";
   char *token;
   int i=0;
   printf("Enter the string:");
   gets(str);
   token = strtok(str,s);
while  (token != NULL)
{
   i++;
   token = strtok(NULL,s);
}
printf("\nThe total number of words:%d",i);
return 0;
}
```



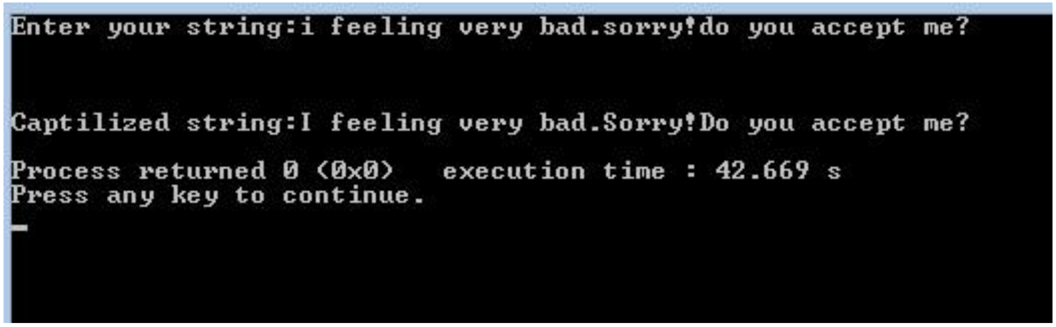
```
Enter the string:if you are bad i am your dad

The total number of words:8
Process returned 0 (0x0)   execution time : 17.626 s
Press any key to continue.
```

OR

```
#include<stdio.h>
#include<string.h>
#include<ctype.h>
int main()
{
   char str[80];
   printf("Enter your string:");
   gets(str);
   int i=0,word=1;
   while(str[i]!='\0')
   {
      if(str[i]==' '||str[i]=='.')
      {
         word++;
      }
      i++;
   }
   printf("The number of words:%d",word);
   return 0;
}
```

B

```
#include<stdio.h>
#include<string.h>
#include<ctype.h>
int main()
{
    char str[80];
    printf("Enter your string:");
    gets(str);
    int i=0;
    str[0]=toupper(str[0]);
    while(str[i]!='\0')
    {
        if(str[i]=='!'||str[i]=='?'||str[i]=='.')
        {
            i++;
           if(str[i]==' ')
           {
               i++;
               str[i]=toupper(str[i]);
           }
           else
            str[i]=toupper(str[i]);

        }
        i++;
    }
    printf("\n\n\nCaptilized string:");
        puts(str);
    return 0;
}
```

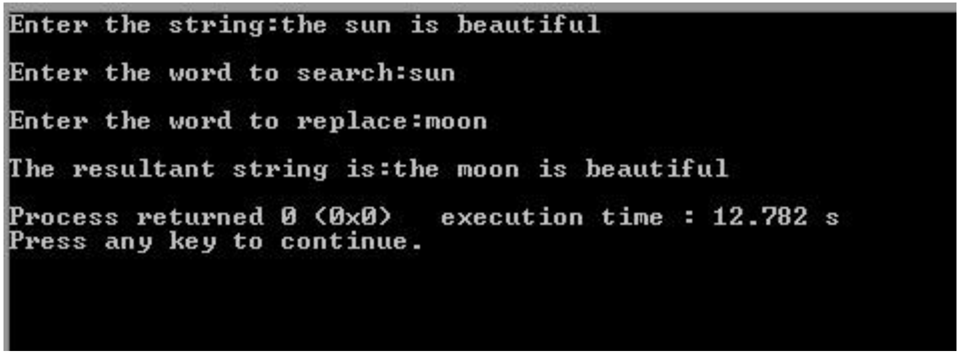


```
Enter your string:i feeling very bad.sorry!do you accept me?


Captilized string:I feeling very bad.Sorry!Do you accept me?

Process returned 0 (0x0)   execution time : 42.669 s
Press any key to continue.
_
```

C

```
#include <stdio.h>
#include <stdlib.h>
#include <ctype.h>
#include <string.h>
int main()
{
    char str[80];
    char rsltStr[128]="";
    char s[3] = " ";
    char *token;
    char sch[15];
    char rpl[15];
    int i=0;
```

```
   printf("Enter the string:");
   gets(str);
   printf("\nEnter the word to search:");
   gets(sch);
   printf("\nEnter the word to replace:");
   gets(rpl);

   token = strtok(str,s);
while  (token != NULL)
{
   if (strcmp (token,sch)==0)
{
   char newtok[32];
   strcpy (newtok,rpl);
   strcat (rsltStr, newtok);
   strcat (rsltStr, " ");
   i=1;
 }

              else
  {
    strcat (rsltStr, token);
    strcat (rsltStr, " ");
   }
   token = strtok(NULL,s);
}
if(i==0)
{
   printf("\nSearch not found\n");
}
printf("\nThe resultant string is:");
puts(rsltStr);
return 0;
}
```

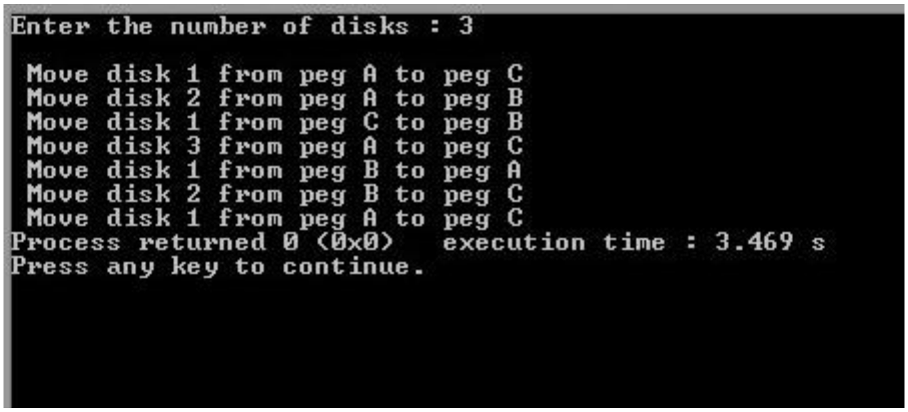


```
Enter the string:the sun is beautiful

Enter the word to search:sun

Enter the word to replace:moon

The resultant string is:the moon is beautiful

Process returned 0 (0x0)   execution time : 12.782 s
Press any key to continue.
```

TOWER OF HANOI

12. Solve towers of Hanoi using recursion.

```
#include <stdio.h>
void towerofhanoi(int n, char from, char to, char aux)
{
if (n == 1)
{
printf("\n Move disk 1 from peg %c to peg %c", from, to);
return;
}
towerofhanoi(n-1, from, aux, to);
printf("\n Move disk %d from peg %c to peg %c", n, from, to);
towerofhanoi(n-1, aux, to, from);
}
int main()
{
int n;
printf("Enter the number of disks : ");
scanf("%d",&n); // Number of disks
towerofhanoi(n, 'A', 'C', 'B'); // A, B and C are names of peg
return 0;
}
```

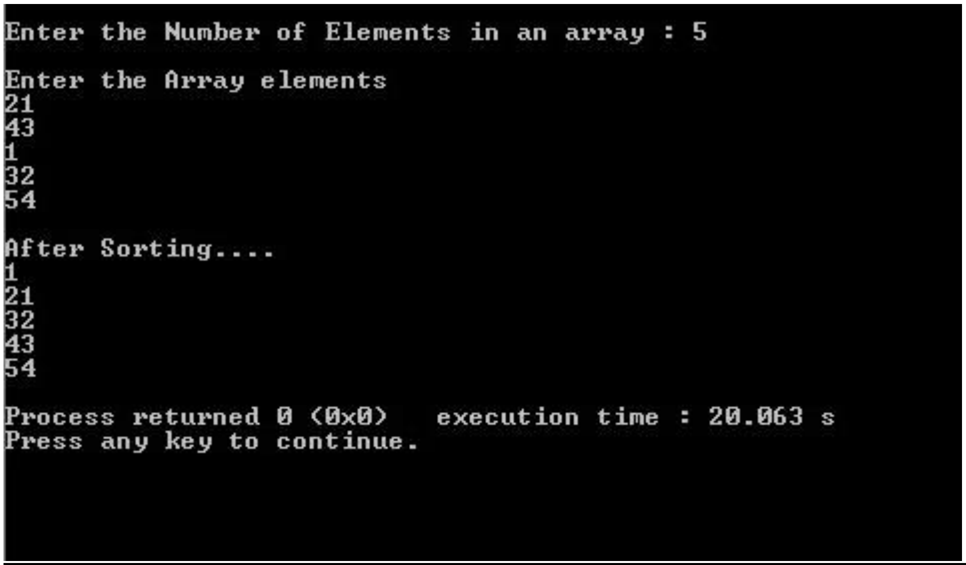


```
Enter the number of disks : 3

 Move disk 1 from peg A to peg C
 Move disk 2 from peg A to peg B
 Move disk 1 from peg C to peg B
 Move disk 3 from peg A to peg C
 Move disk 1 from peg B to peg A
 Move disk 2 from peg B to peg C
 Move disk 1 from peg A to peg C
Process returned 0 (0x0)   execution time : 3.469 s
Press any key to continue.
```

SORTING

13. Sort the list of numbers using pass by reference.

```
#include <stdio.h>
#include <conio.h>
int main()
{
int n,a[100],i;
void sortarray(int*,int);
printf("\nEnter the Number of Elements in an array : ");
scanf("%d",&n);
printf("\nEnter the Array elements\n");
for(i=0;i<n;i++)
scanf("%d",&a[i]);
sortarray(a,n);
printf("\nAfter Sorting....\n");
for(i=0;i<n;i++)
printf("%d\n",a[i]);
return 0;
}
void sortarray(int* arr,int num)
{
int i,j,temp;
for(i=0;i<num;i++)
for(j=i+1;j<num;j++)
if(arr[i] > arr[j])
{
temp=arr[i];
arr[i] = arr[j];
arr[j] = temp;
}
}
```

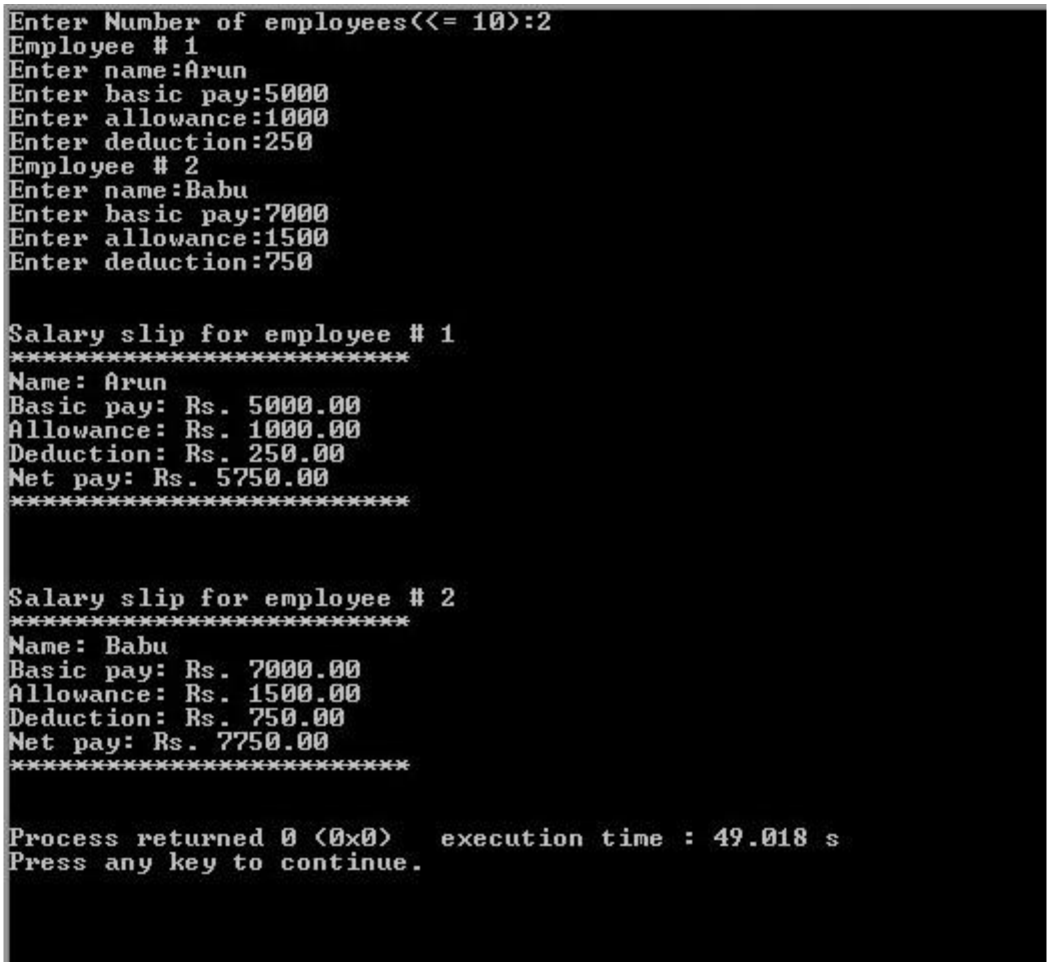


```
Enter the Number of Elements in an array : 5

Enter the Array elements
21
43
1
32
54

After Sorting....
1
21
32
43
54

Process returned 0 (0x0)   execution time : 20.063 s
Press any key to continue.
```

SALARY SLIP

14. Generate salary slip of employees using structures and pointers.

```
#include <stdio.h>
#define MAX 10
struct emp
{
int empno ;
char name[20];
float basic, allowance, deduction, netpay ;
};
void getDetails(struct emp *, int );
void display(struct emp *, int);
int main(void) {
struct emp staff[MAX];
int N;
printf("Enter Number of employees(<= %d):", MAX);
scanf("%d", &N);
getDetails(staff,N);
display(staff, N);
return 0;
}
void getDetails(struct emp * staff, int N)
{
int i;
for(i=0; i < N; i++)
{
printf("Employee # %d\n", i+1);
printf("Enter name:");
scanf("%s", staff[i].name);
printf("Enter basic pay:");
scanf("%f", &staff[i].basic);
printf("Enter allowance:");
scanf("%f", &staff[i].allowance);
printf("Enter deduction:");
scanf("%f", &staff[i].deduction);
staff[i].netpay = staff[i].basic + staff[i].allowance - staff[i].deduction;
}
}
void display(struct emp * staff, int N)
{
int i;
for(i=0; i < N; i++)
{
printf("\n\nSalary slip for employee # %d\n", i+1);
printf("*************************\n");
printf("Name: %s \n", staff[i].name );
printf("Basic pay: Rs. %.2f \n", staff[i].basic);
printf("Allowance: Rs. %.2f \n", staff[i].allowance);
printf("Deduction: Rs. %.2f \n", staff[i].deduction);
printf("Net pay: Rs. %.2f \n", staff[i].netpay);
printf("*************************\n\n");
}
}
```

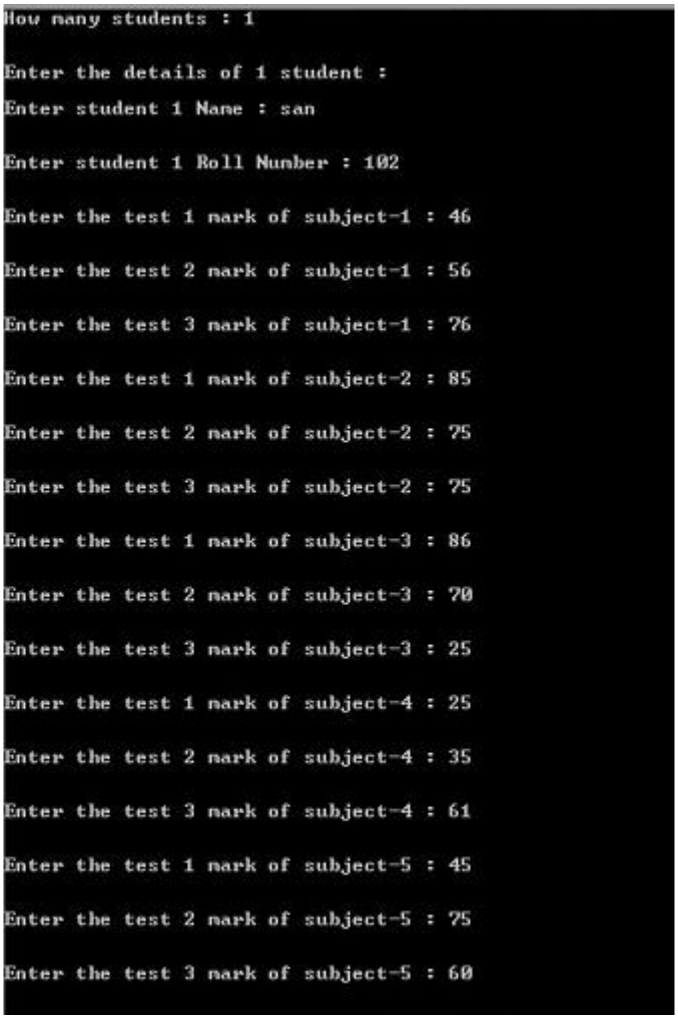


```
Enter Number of employees(<= 10):2
Employee # 1
Enter name:Arun
Enter basic pay:5000
Enter allowance:1000
Enter deduction:250
Employee # 2
Enter name:Babu
Enter basic pay:7000
Enter allowance:1500
Enter deduction:750


Salary slip for employee # 1
*************************
Name: Arun
Basic pay: Rs. 5000.00
Allowance: Rs. 1000.00
Deduction: Rs. 250.00
Net pay: Rs. 5750.00
*************************



Salary slip for employee # 2
*************************
Name: Babu
Basic pay: Rs. 7000.00
Allowance: Rs. 1500.00
Deduction: Rs. 750.00
Net pay: Rs. 7750.00
*************************


Process returned 0 (0x0)   execution time : 49.018 s
Press any key to continue.
```

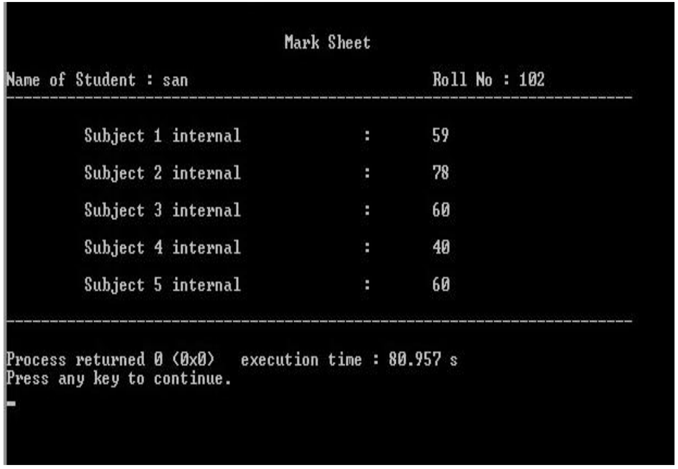
INTERNAL MARKS

15. Compute internal marks of students for five different subjects using structures and functions.

```
#include<stdio.h>
struct stud{
char name[20];
long int rollno;
int marks[5][3];
int i[5];
}students[10];
void calcinternal(int);
int main(){
int a,b,j,n;
printf("How many students :");
scanf("%d",&n);
for(a=0;a<n;++a){
printf("\n\nEnter the details of %d student : ", a+1);
printf("\n\nEnter student %d Name : ", a+1);
scanf("%s", students[a].name);
printf("\n\nEnter student %d Roll Number : ", a+1);
scanf("%ld", &students[a].rollno);
for(b=0;b<=4;++b){
for(j=0;j<=2;++j){
printf("\n\nEnter the test %d mark of subject-%d : ",j+1, b+1);
scanf("%d", &students[a].marks[b][j]);
}
}
}
calcinternal(n);
for(a=0;a<n;++a){
printf("\n\n\t\t\t\tMark Sheet\n");
printf("\nName of Student : %s", students[a].name);
printf("\t\t\t\t Roll No : %ld", students[a].rollno);
printf("\n------------------------------------------------------------------------");
for(b=0;b<5;b++){
printf("\n\n\t Subject %d internal \t\t :\t %d", b+1, students[a].i[b]);
}
printf("\n\n------------------------------------------------------------------------\n");
}
return 0;
}
void calcinternal(int n)
{
int a,b,j,total;
for(a=0;a<=n;++a){
for(b=0;b<5;b++){
total=0;
for(j=0;j<=2;++j){
total += students[a].marks[b][j];
}
students[a].i[b]=total/3;
}
}
}
```



```
How many students : 1

Enter the details of 1 student :
Enter student 1 Name : san

Enter student 1 Roll Number : 102

Enter the test 1 mark of subject-1 : 46

Enter the test 2 mark of subject-1 : 56

Enter the test 3 mark of subject-1 : 76

Enter the test 1 mark of subject-2 : 85

Enter the test 2 mark of subject-2 : 75

Enter the test 3 mark of subject-2 : 75

Enter the test 1 mark of subject-3 : 86

Enter the test 2 mark of subject-3 : 70

Enter the test 3 mark of subject-3 : 25

Enter the test 1 mark of subject-4 : 25

Enter the test 2 mark of subject-4 : 35

Enter the test 3 mark of subject-4 : 61

Enter the test 1 mark of subject-5 : 45

Enter the test 2 mark of subject-5 : 75

Enter the test 3 mark of subject-5 : 60
```



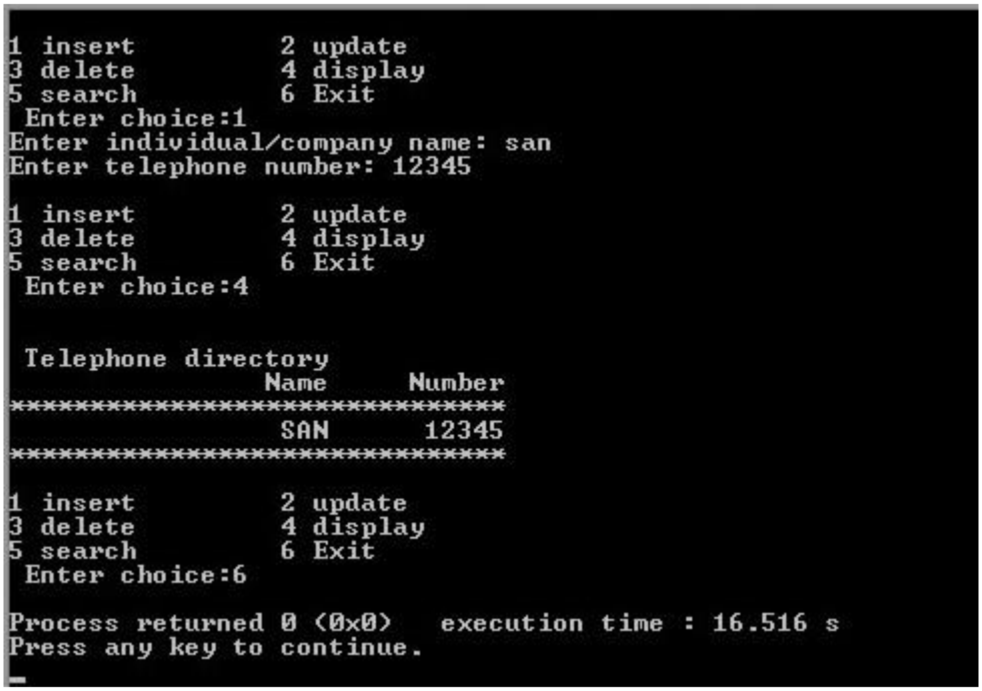
```
                              Mark Sheet
Name of Student : san                         Roll No : 102
----------------------------------------------------------------------

        Subject 1 internal            :       59
        Subject 2 internal            :       78
        Subject 3 internal            :       60
        Subject 4 internal            :       40
        Subject 5 internal            :       60

----------------------------------------------------------------------

Process returned 0 (0x0)   execution time : 80.957 s
Press any key to continue.
```

TELEPHONE DIRECTORY

16. Insert, update, delete and append telephone details of an individual or a company into a telephone directory using random access file.

```
#include <stdio.h>
#include <string.h>
#include<stdlib.h>
#include<fcntl.h>
```

```
struct dir
{
char name[20];
char number[10];
};
void insert(FILE *);
void update(FILE *);
void del(FILE *);
void display(FILE *);
void search(FILE *);
int record = 0;
int main(void) {
int choice = 0;
FILE *fp = fopen( "telephone.dat", "rb+" );
if (fp == NULL ) perror ("Error opening file");
while (choice != 6)
{
printf("\n1 insert\t 2 update\n");
printf("3 delete\t 4 display\n");
printf("5 search\t 6 Exit\n Enter choice:");
scanf("%d", &choice);
switch(choice)
{
case 1: insert(fp); break;
case 2: update(fp); break;
case 3: del(fp); break;
case 4: display(fp); break;
case 5: search(fp); break;
default: ;
}
}
fclose(fp);
return 0;
}
void insert(FILE *fp)
{
struct dir contact, blank;
fseek( fp, -sizeof(struct dir), SEEK_END );
fread(&blank, sizeof(struct dir), 1, fp);
printf("Enter individual/company name: ");
scanf("%s", contact.name);
printf("Enter telephone number: ");
scanf("%s", contact.number);
fwrite(&contact, sizeof(struct dir), 1, fp);
}
void update(FILE *fp)
{
char name[20], number[10];
int result;
struct dir contact, blank;
printf("Enter name:");
scanf("%s", name);
rewind(fp);
while(!feof(fp))
{
result = fread(&contact, sizeof(struct dir), 1, fp);
if(result != 0 && strcmp(name, contact.name) == 0)
{
printf("Enter number:");
scanf("%s", number);
strcpy(contact.number, number);
fseek(fp, -sizeof(struct dir), SEEK_CUR);
fwrite(&contact, sizeof(struct dir), 1, fp);
printf("Updated successfully\n");
return;
}
}
printf("Record not found\n");
}
void del(FILE *fp)
{
char name[20], number[10];
int result, record=0;
struct dir contact, blank = {"", ""};
printf("Enter name:");
scanf("%s", name);
rewind(fp);
while(!feof(fp))
{
result = fread(&contact, sizeof(struct dir), 1, fp);
if(result != 0 && strcmp(name, contact.name) == 0)
{
fseek(fp, record*sizeof(struct dir), SEEK_SET);
fwrite(&blank, sizeof(struct dir), 1, fp);
printf("%d Deleted successfully\n", record-1);
return;
}
record++;
}
printf("not found in %d records\n", record);
}
void display(FILE *fp)
{
struct dir contact;
int result;
rewind(fp);
printf("\n\n Telephone directory\n");
printf("%20s %10s\n", "Name", "Number");
printf("*******************************\n");
while(!feof(fp))
{
result = fread(&contact, sizeof(struct dir), 1, fp);
if(result != 0 && strlen(contact.name) > 0)
printf("%20s %10s\n",contact.name, contact.number);
}
printf("*******************************\n");
}
void search(FILE *fp)
{
struct dir contact;
int result; char name[20];
rewind(fp);
printf("\nEnter name:");
scanf("%s", name);
while(!feof(fp))
{
result = fread(&contact, sizeof(struct dir), 1, fp);
if(result != 0 && strcmp(contact.name, name) == 0)
{
printf("\n%20s %10s\n",contact.name, contact.number);
return;
}
}
printf("Record not found\n");
}
```



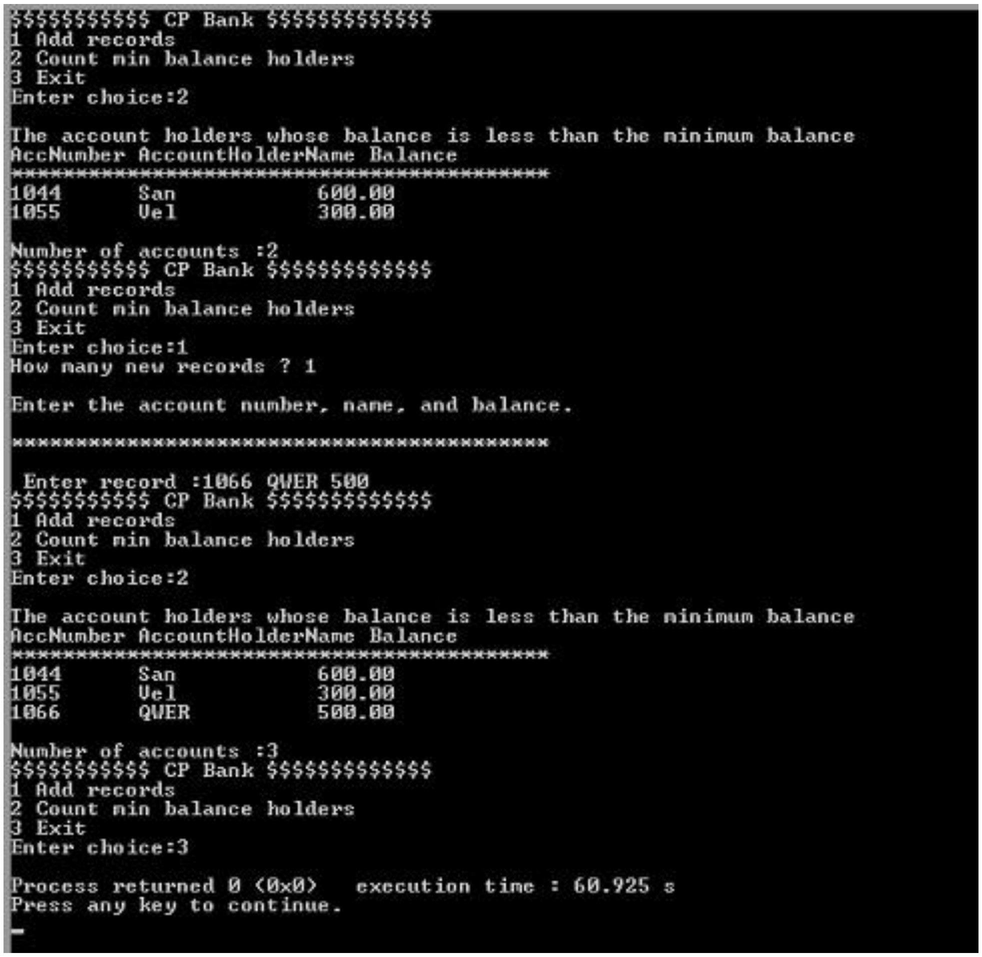
```
1 insert         2 update
3 delete         4 display
5 search         6 Exit
 Enter choice:1
Enter individual/company name: san
Enter telephone number: 12345

1 insert         2 update
3 delete         4 display
5 search         6 Exit
 Enter choice:4


 Telephone directory
                Name     Number
*******************************
                 SAN      12345
*******************************

1 insert         2 update
3 delete         4 display
5 search         6 Exit
 Enter choice:6

Process returned 0 (0x0)   execution time : 16.516 s
Press any key to continue.
```

MINIMUM BALANCE

17. Count the number of account holders whose balance is less than the minimum balance using sequential access file.

```
#include <stdio.h>
struct acc{
unsigned int number; // account number
char name[30]; // account name
double balance; // account balance
};
void insert();
void count(float);
int main(void){
int choice = 0;
float minBal = 5000.00;
while (choice != 3)
{
Printf(“$$$$$$$$ CP Bank  $$$$$$$$$$$”);
printf("\n1 Add records\n");
printf("2 Count min balance holders\n");
printf("3 Exit\n");
printf("Enter choice:");
scanf("%d", &choice);
switch(choice)
{
```

```
case 1: insert(); break;
case 2: count(minBal); break;
}
}
}
void insert()
{
FILE *fp;
struct acc account;
int records;
fp = fopen("clients.txt", "a");
if (fp == NULL) perror ("Error opening file");
printf("How many new records ? ");
scanf("%d", &records);
puts("\nEnter the account number, name, and balance.\n");
printf("***********************************************\n");
while (records > 0) {
printf("\n Enter record :");
scanf("%d%29s%lf", &account.number, account.name, &account.balance);
fprintf(fp, "%d %s %.2f\n", account.number, account.name, account.balance);
records--;
}
fclose(fp);
}
void count(float minBal)
{
FILE *fp;
struct acc account;
int count = 0;
fp = fopen("clients.txt", "r");
if (fp == NULL) perror ("Error opening file");
printf("\nThe account holders whose balance is less than the minimum balance\n");
printf("AccNumber AccountHolderName Balance\n");
printf("***********************************************\n");
fscanf(fp, "%d%29s%lf", &account.number, account.name, &account.balance);
while (!feof(fp)) {
if (account.balance < minBal)
{
printf("%-10d%-13s%7.2f\n", account.number, account.name, account.balance);
count++;
}
fscanf(fp, "%d%29s%lf", &account.number, account.name, &account.balance);
}
printf("\nNumber of accounts :");
printf("%d \n", count);
fclose(fp);
}
```



```
$$$$$$$$$$$ CP Bank $$$$$$$$$$$$$
1 Add records
2 Count min balance holders
3 Exit
Enter choice:2

The account holders whose balance is less than the minimum balance
AccNumber AccountHolderName Balance
******************************************
1044      San           600.00
1055      Vel           300.00

Number of accounts :2
$$$$$$$$$$$ CP Bank $$$$$$$$$$$$$
1 Add records
2 Count min balance holders
3 Exit
Enter choice:1
How many new records ? 1

Enter the account number, name, and balance.

******************************************

 Enter record :1066 QWER 500
$$$$$$$$$$$ CP Bank $$$$$$$$$$$$$
1 Add records
2 Count min balance holders
3 Exit
Enter choice:2

The account holders whose balance is less than the minimum balance
AccNumber AccountHolderName Balance
******************************************
1044      San           600.00
1055      Vel           300.00
1066      QWER          500.00

Number of accounts :3
$$$$$$$$$$$ CP Bank $$$$$$$$$$$$$
1 Add records
2 Count min balance holders
3 Exit
Enter choice:3

Process returned 0 (0x0)   execution time : 60.925 s
Press any key to continue.
_
```

RAILWAY RESERVATION

----

18. Create a —Railway reservation system with the following modules

 Booking

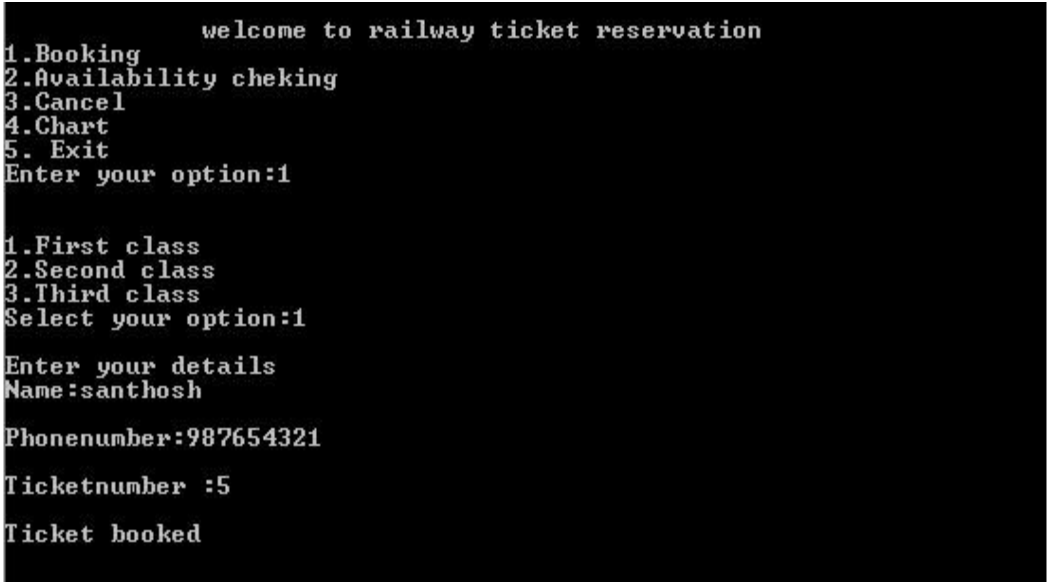
 Availability checking

 Cancellation

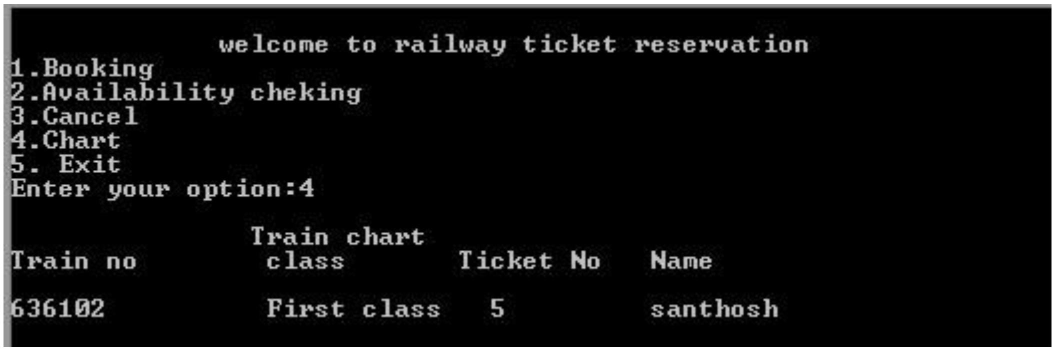
 Prepare chart

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
#include<string.h>
void tickets(int i,int tic);
int first=5,second=5,thired=5,train_no=636102;
struct node
{
char cls[15];
int ticketno;
char phoneno[12];
char name[100];
}s[15];
int i=0;
void booking()
{
   int opt;
   printf("\n\n1.First class\n2.Second class\n3.Third class");
   printf("\nSelect your option:");
   scanf("%d",&opt);
   switch(opt)
   {
case 1:
   tickets(i,first);
   strcpy(s[i].cls,"First class");
   first--;
   i++;break;
case 2:
   tickets(i,second);
   strcpy(s[i].cls,"second class");
   second--;
   i++;break;
case 3:
   tickets(i,thired);
   strcpy(s[i].cls,"Third class");
   thired--;
   i++;break;
default:
   printf("Select crt option");break;
   }

}
void tickets(int i,int tic)
{
printf("\nEnter your details");
printf("\nName:");
scanf("%s",s[i].name);
printf("\nPhonenumber:");
scanf("%s",s[i].phoneno);
printf("\nTicketnumber :");
printf("%d",tic);
s[i].ticketno=tic;
printf("\n\nTicket booked\n\n");

}
void availability()
{
int c;
printf("\n\nAvailability cheking");
printf("\n1.First class\n2.Second class\n3.Thired class\n");
printf("Enter the option");
scanf("%d",&c);
switch(c)
{
case 1:if(first>0)
{
printf("\nseat available\n");
printf("No of tickets available:%d\n",first);
}
else
{
printf("\nseat not available");
}
break;
case 2: if(second>0)
{
printf("\nseat available\n");
printf("No of tickets available:%d\n",second);
}
else
{
printf("\nseat not available");
}
break;
```

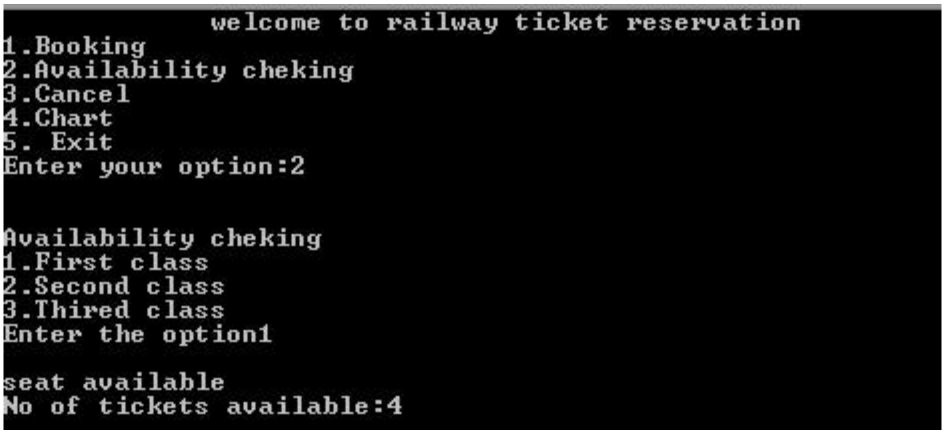
```
case 3:if(thired>0)
{
printf("\ nseat available\n");
printf("No of tickets available:%d\n",thired);
}
else
{
printf("\nseat not available");
}
break;
default:
break;
}
}
void cancel()
{
int c;
printf("\n\n\nCancel\n");
printf("Which class you want to cancel");
printf("\n1.First class\n2.Second class\n3.Thired class\n");
printf("Enter the option:");
scanf("%d",&c);
switch(c)
{
case 1:
first++;
break;
case 2:
second++;
break;
case 3:
thired++;
break;
default:
break;
}
printf("Ticket is canceled");
}
void chart()
{
int c;
printf("\n              Train chart           ");
printf("\nTrain no\tclass\t    Ticket No\tName\n\n");
for(c=0;c<i;c++)
{
printf("%-8d\t%-14s%-5d\t%s\n",train_no,s[c].cls,s[c].ticketno,s[c].name);
}
}
main()
{
int n;
while(1) {
printf("\n            welcome to railway ticket reservation\n");
printf("1.Booking\n2.Availability cheking\n3.Cancel\n4.Chart \n5. Exit\nEnter your option:");
scanf("%d",&n);
switch(n)
{
case 1: booking();
break;
case 2: availability();
break;
case 3: cancel();
break;
case 4:
chart();
break;
case 5:
printf("\n Thank you visit again!");
getch();
exit(0);
default:
break;
}
}
getch();
}
```



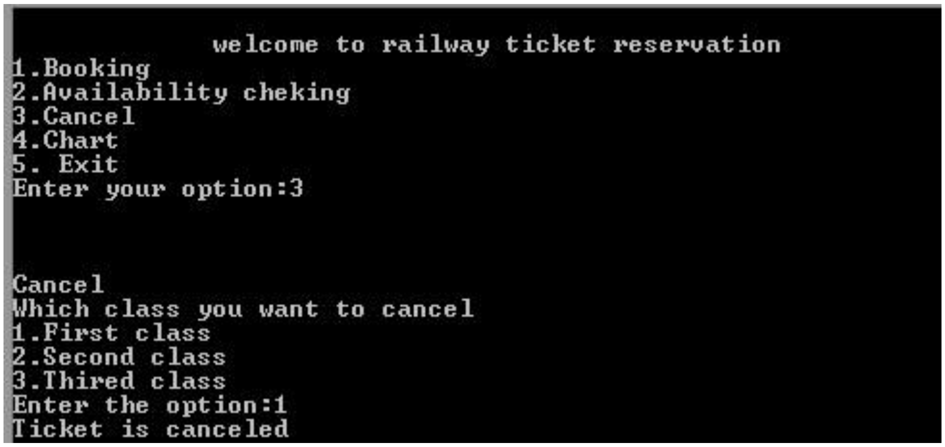
```
             welcome to railway ticket reservation
1.Booking
2.Availability cheking
3.Cancel
4.Chart
5. Exit
Enter your option:1


1.First class
2.Second class
3.Third class
Select your option:1

Enter your details
Name:santhosh

Phonenumber:987654321

Ticketnumber :5

Ticket booked
```



```
             welcome to railway ticket reservation
1.Booking
2.Availability cheking
3.Cancel
4.Chart
5. Exit
Enter your option:4

               Train chart
Train no        class        Ticket No    Name

636102          First class    5          santhosh
```



```
             welcome to railway ticket reservation
1.Booking
2.Availability cheking
3.Cancel
4.Chart
5. Exit
Enter your option:2


Availability cheking
1.First class
2.Second class
3.Thired class
Enter the option1

seat available
No of tickets available:4
```



```
              welcome to railway ticket reservation
1.Booking
2.Availability cheking
3.Cancel
4.Chart
5. Exit
Enter your option:3



Cancel
Which class you want to cancel
1.First class
2.Second class
3.Thired class
Enter the option:1
Ticket is canceled
```