Bangalore University

CA-C4P: Problem Solving Lab using C

1. program to read radius of a circle and to find area and circumference

```
#include<stdio.h>
#include<conio.h>
#define PI 3.142
void main()
{
 int r;
 double area,circum;
 clrscr();
 printf("\n Enter radius of a circle : ");
 scanf("%d",&r);
 area=PI*r*r;
 circum=2*PI*r;
 printf("\n Area of a circle = %0.2lf",area);
 printf("\n Circumference of a circle = %0.2lf",circum);
 getch();

}
```

```
Enter radius of a circle : 5

Area of a circle = 78.55
Circumference of a circle = 31.42
```

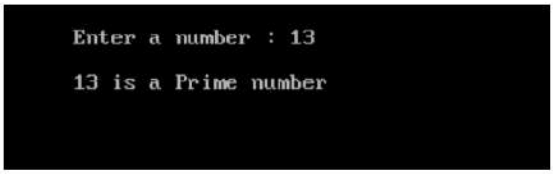
2. Program to read three numbers and find biggest of three

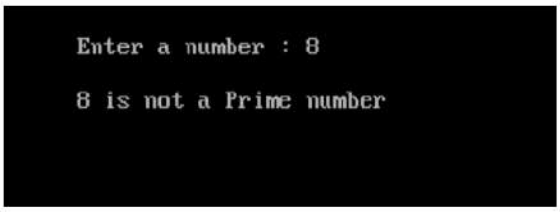
```
# include<stdio.h>
# include<conio.h>
# define MAX(a,b) (a>b ? a : b)
void main()
{
  int a,b,c,L1,L2;
  clrscr();
  printf("\n Enter three numbers(a,b,c) :
  ");scanf("%d %d %d",&a,&b,&c);
  L1=MAX(a,b);
  L2=MAX(c,L1);
  printf("\n Biggest number = %d",L2);
  getch();

}
```

```
Enter three numbers(a,b,c) : 10 -12 7

Biggest number = 10_
```

3. Program to check whether the number is prime or not

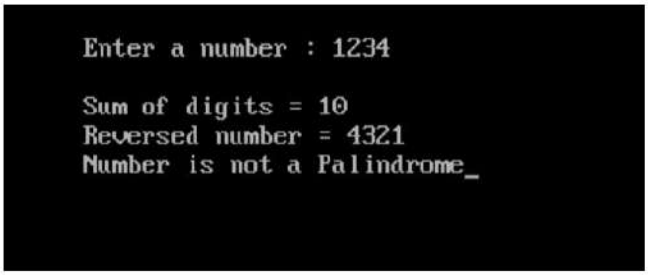
```
#include<stdio.h>
#include<conio.h>
void main()
{
   int num,count=0,i;
   clrscr();
   printf("\n Enter a number : ");
   scanf("%d",&num);
   for(i=1;i<=num;i++)
   {
         if(num%i==0)
         count++;
   }
   if(count==2)
         printf("\n %d is a Prime number",num);
   else
         printf("\n %d is not a Prime number",num);
   getch();
 }
```





4. C program to read a number, find the sum of the digits reverse the number and check it for palindrome

```
# include<stdio.h>
# include<conio.h>
void main()
{
     int num,orgnum;
     int sum=0,rev=0,rem;
     clrscr();
     printf("\n Enter a number : ");
     scanf("%d",&num);
     orgnum=num;
     while(num>0)
     {
          rem=num%10;
          sum=sum+rem;
```



```
        rev=rev*10+rem;
        num=num/10;
    }
    printf("\n Sum of digits = %d",sum);
    printf("\n Reversed number = %d",rev);
    if(orgnum==rev)
        printf("\n Number is a Palindrome");
    else
        printf("\n Number is not a Palindrome");

    getch();
}
```

```
Enter a number : 1221

Sum of digits = 6
Reversed number = 1221
Number is a Palindrome
```

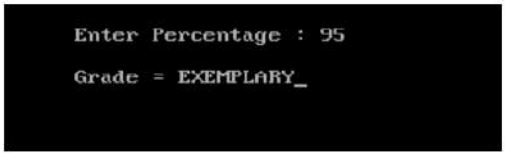
5. Program to read numbers from keyboard continuously till the user presses 999 and find the sum of only positive numbers

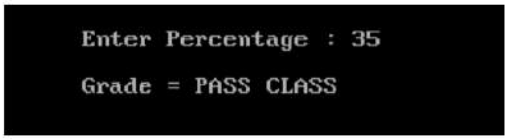
```
# include<stdio.h>
# include<conio.h>

void main()
{
  int num,sum=0;
  clrscr();
  do
  {
    printf("\n Enter a number : ");
    scanf("%d",&num);
    if(num > 0 && num!=999)
    sum = sum + num;
    printf("\n Sum = %d",sum);
  }while(num!=999);
  printf("\n You have pressed 999 : STOP");
  getch();
 }
```

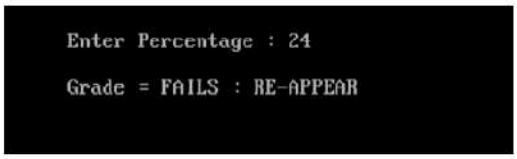
```
Enter a number : 10

Sum = 10
Enter a number : 20

Sum = 30
Enter a number : 30

Sum = 60
Enter a number : 40

Sum = 100
Enter a number : 999

Sum = 100
You have pressed 999 : STOP
```

6. Program to read percentage of marks and to display appropriate message
Demonstration of (else-if) ladder

Percentage	Grade
> 90%	Exemplary
// 80% - 90%	Outstanding
// 70% - 79%	First Division with Distinction
// 60% - 69%	First Division
// 50% - 59%	Second Division
// 35% - 49%	Pass class
// < 35%	Fails : Re-appear








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

void main()
{
  float per;
  clrscr();
  printf("\n Enter Percentage : ");
  scanf("%f",&per);
  if(per > 90.0)
    printf("\n Grade = EXEMPLARY");
  else if(per >=80.0 && per < 90.0)
    printf("\n Grade = OUTSTANDING");
  else if(per >=70.0 && per < 80.0)
    printf("\n Grade = FIRST DIVISION WITH DISTINCTION");
  else if(per >=60.0 && per < 70.0)
    printf("\n Grade = FIRST DIVISION");
  else if(per >=50.0 && per < 60.0)
    printf("\n Grade = SECOND DIVISION");
  else if(per >=35.0 && per < 50.0)
    printf("\n Grade = PASS CLASS");
  else
    printf("\n Grade = FAILS : RE-APPEAR");
  getch();
}
```

7. Program to find roots of quadratic equation using Switch-Case

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

void main()
{
    int a,b,c,choice;
    double
    disc,root1,root2,real,img;
    clrscr();
    printf("\n Enter a,b,c : ");
    scanf("%d %d
    %d",&a,&b,&c);

    disc=(b*b) - (4.0*a*c);
    if(disc > 0)
          choice=1;
    else if(disc < 0)
          choice=2;
    else
          choice=3;

    switch(choice)
    {
          case 1 :
                    {
                      printf("\n Real and Distinct Roots");
                      root1= ( -b + sqrt(disc) ) / (2.0 * a);
                      root2= ( -b - sqrt(disc) ) / (2.0 * a);
                      printf("\n Root1 = %0.2lf",root1);
                      printf("\n Root2 = %0.2lf",root2);
                    }
                    break;

          case 2 :
                    {
                      printf("\n Roots are complex and imaginary");
                      real = -b/(2.0 * a);
                      img = sqrt(abs(disc))/(2.0 * a);
                      printf("\n Root1 = %0.2lf +i %0.2lf",real,img);
```

```
Enter a,b,c : 1 5 2

Real and Distinct Roots
Root1 = -0.44
Root2 = -4.56
```

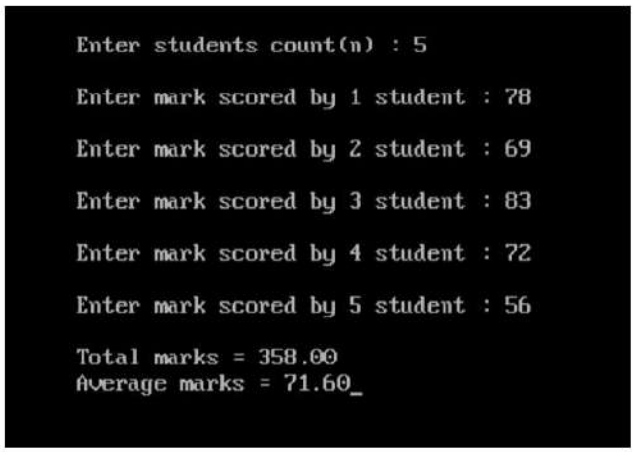
```
Enter a,b,c : 1 2 3

Roots are complex and imaginary
Root1 = -1.00 +i 1.41
Root2 = -1.00 -i 1.41
```

```
Enter a,b,c : 1 2 1

Roots are Equal
Root1 = -1.00
Root2 = -1.00_
```

```
                printf("\n Root2 = %0.2lf -i %0.2lf",real,img);
            }
            break;
        case 3 :
            {
                printf("\n Roots are Equal");
                root1 = -b/(2.0 * a);
                root2 = -b/(2.0 * a);
                printf("\n Root1 = %0.2lf",root1);
                printf("\n Root2 = %0.2lf",root2);
            }
            break;

        default : printf("\n Invalid inputs");
    }
    getch();
}
```

8. Program to read marks scored by n students and find the average of marks

```
// Demonstration of single dimension array
# include<stdio.h>
# include<conio.h>
void main()
{
  int n,i;
  float marks[10],
  tot_marks=0.0,avg_marks=0.0;clrscr();
  printf("\n Enter students count(n) : ");
  scanf("%d",&n);
  for(i=0;i<n;i++)
  {
    printf("\n Enter mark scored by %d student
    : ",i+1);scanf("%f",&marks[i]);
    tot_marks=tot_marks + marks[i];
  }
  avg_marks = tot_marks / n;
  printf("\n Total marks = %0.2f",tot_marks);
  printf("\n Average marks = %0.2f",avg_marks);
```



```
  getch();
}
```

9. C program to remove duplicate element in single dimensional array

```
# include<stdio.h>
# include<conio.h>
void main()
{
    int a[20],n,i,j,ele;
    clrscr();
    printf("\n Enter array limit(n) : ");
    scanf("%d",&n);
    for(i=0;i<n;i++)
    {
     printf("\n Enter a[%d] : ",i);
     scanf("%d",&a[i]);
    }
    // remove duplicate
    for(i=0;i<n-1;i++)
    {
          ele=a[i];
          for(j=i+1;j<n;j++)
          {
            if(ele==a[j] && a[j]!=-111)
            {
              printf("\n %d Duplicate entry!!!",a[j]);
              a[j]=-111; //set -111 for duplicate entry
            }
          }
    }
     printf("\n Final Array list\n");
     for(i=0;i<n;i++)
     {
          if(a[i]!=-111)
          printf("%5d",a[i]);
     }
     getch();
}
```

```
Enter array limit(n) : 5

Enter a[0] : 10

Enter a[1] : 20

Enter a[2] : 10

Enter a[3] : 30

Enter a[4] : 10

10 Duplicate entry!!!
10 Duplicate entry!!!
Final Array list
  10   20   30
```

10.program to perform addition and subtraction of Matrices

```
# include<stdio.h>
# include<conio.h>
void main()
{
   int a[10][10], b[10][10], c[10][10], d[10][10];
   int i,j,n;
   clrscr();
   printf("\n Enter order of square matrix(n) : ");
   scanf("%d",&n);

   printf("\n Enter A matrix elements\n");
   for(i=0;i<n;i++)
   {
     for(j=0;j<n;j++)
     {
           printf("\n Enter a[%d][%d] : ",i,j);
           scanf("%d",&a[i][j]);
     }
   }

   printf("\n Enter B matrix elements\n");
   for(i=0;i<n;i++)
   {
     for(j=0;j<n;j++)
     {
           printf("\n Enter b[%d][%d] : ",i,j);
           scanf("%d",&b[i][j]);
     }
   }

   printf("\n Addition of matrices\n");
   for(i=0;i<n;i++)
   {
     for(j=0;j<n;j++)
     {
          c[i][j] = a[i][j] + b[i][j];
          printf("%4d",c[i][j]);
     }
```

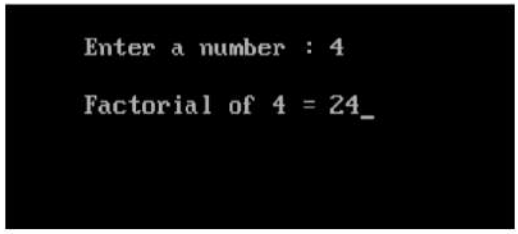
```
Enter order of square matrix(n) : 2

Enter A matrix elements

Enter a[0][0] : 1

Enter a[0][1] : 2

Enter a[1][0] : 3

Enter a[1][1] : 4

Enter B matrix elements

Enter b[0][0] : 5

Enter b[0][1] : 6

Enter b[1][0] : 7

Enter b[1][1] : 8
```

```
Addition of matrices
  6   8
 10  12

Subtraction of matrices
 -4  -4
 -4  -4
```

```
    printf("\n");
  }

  printf("\n Subtraction of matrices\n");
  for(i=0;i<n;i++)
  {
    for(j=0;j<n;j++)
    {
        d[i][j] = a[i][j] - b[i][j];
        printf("%4d",d[i][j]);
    }
    printf("\n");
  }

  getch();
}
```

11. Program to find the factorial of a number

```
# include<stdio.h>
# include<conio.h>
void main()
{
  int num,i;
  long int fact=1;
  clrscr();
  printf("\n Enter a number : ");
  scanf("%d",&num);
  for(i=1;i<=num;i++)
  {
    fact=fact*i;
  }
  printf("\n Factorial of %d = %ld",num,fact);
  getch();
}
```

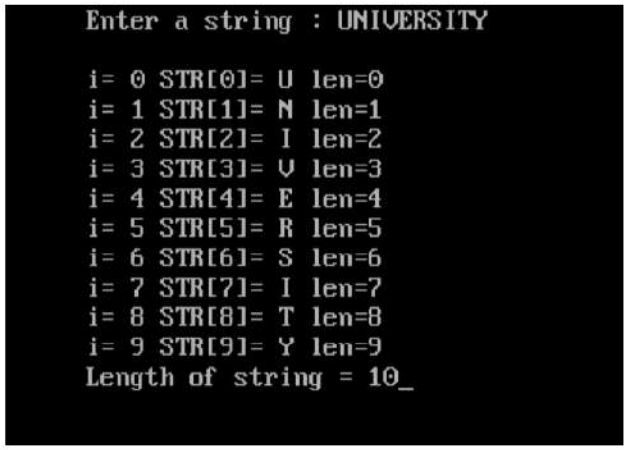


12. Program to generate fibonacci series

```
# include<stdio.h>
# include<conio.h>
void main()
{
  int n,i;
  int F=0,S=1,NXT;
  clrscr();
  printf("\n Enter series limit(n) : ");
  scanf("%d",&n);
  printf("\n ******* FIBONACCI SERIES *******\n");
  printf("%d \t %d",F,S);
  for(i=3;i<=n;i++)
  {
    NXT=F+S;
    printf("\t %d",NXT);
    F = S;
    S = NXT;
  }
  getch();
}
```

14. program to find length of string without using built-in function

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

void main()
{
   int len=0,i=0;
   char *str;
   clrscr();
   printf("\ Enter a string : ");
   scanf("%s",str);
   while(str[i]!='\0')
   {

     len++;
     i++;
```



```
    }
    printf("\n Length of string = %d",len);
    getch();
}
```

15. Program to demonstrate string functions

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

    void main()
    {
      char *str1="Bangalore";
      char *str2="University";
      clrscr();
      printf("\n String 1 = %s String 2 = %s\n",str1,str2);
      printf("\n 1. Length of %s = %d",str1,strlen(str1));
      printf("\n 2. String copy in str2 = %s",strcpy(str2,"CITY"));
      printf("\n 3. Concatenation = %s", strcat(str1,str2));
      printf("\n 4. Compare str1 & str2 %d",strcmp(str1,"bangalore"));
      printf("\n 5. String in lower case = %s",strlwr(str1));
      printf("\n 6. String in upper case  = %s",strupr(str1));
      printf("\n 7. Substring search = %s",strchr(str1,'L'));
      printf("\n 8. Duplicate string = %s",strdup(str1));
      printf("\n 9. String reverse = %s",strrev(str1));
      printf("\n 10. Set all character to # = %s",strset(str1,'#'));
      getch();
```

```
String 1 = Bangalore  String 2 = University

1. Length of Bangalore  = 9
2. String copy in str2 = CITY
3. Concatenation = BangaloreCITY
4. Compare str1 & str2 -32
5. String in lower case  = bangalorecity
6. String in upper case  = BANGALORECITY
7. Substring search = LORECITY
8. Duplicate string = BANGALORECITY
9. String reverse = YTICEROLAGNAB
10. Set all character to # = ##############
```

```
}
```

17. to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters.

```
// C program to read a string and find the number of alphabets, digits,
// vowels, consonants, spaces and special characters

# include<stdio.h>
# include<conio.h>
# include<ctype.h>


void main()
{
   char str[100],ch;
   int acount=0, dcount=0, vcount=0, ccount=0, scount=0,spcount=0,i=0;
   clrscr();
   printf("\n Enter a string : ");
   gets(str);
   while(str[i]!='\0')
   {
          if(isalpha(str[i]))
          {
             acount++;
             ch=tolower(str[i]);
             switch(ch)
             {
                  case 'a':
                  case 'e':
                  case 'i':
                  case 'o':
                  case 'u': vcount++;
                            break;
                  default : ccount++;
             }
          }
         else if(isdigit(str[i]))
            dcount++;
         else if(isspace(str[i]))
           scount++;
         else
           spcount++;
           i=i+1;
```

```
Enter a string : COM_123*012 sims

No. of Alphabets = 7
No. of Vowels = 2
No. of Consonants = 5
No. of Spaces = 1
No. of Digits = 6
No. of Special symbols = 2
```

```
    }
    printf("\n No. of Alphabets = %d",acount);
    printf("\n No. of Vowels = %d",vcount);
    printf("\n No. of Consonants = %d",ccount);
    printf("\n No. of Spaces = %d",scount);
    printf("\n No. of Digits = %d",dcount);
    printf("\n No. of Special symbols = %d",spcount);
    getch();
}
```

18. to Swap Two Numbers using Pointers

```
// C program to swap two numbers using pointers
# include<stdio.h>
# include<conio.h>

void main()
{
  int n1,n2,*ptr1,*ptr2,temp;
  clrscr();
  printf("\n Enter two numbers : ");
  scanf("%d %d",&n1, &n2);

  printf("\n Before swapping n1 = %d  n2 = %d\n",n1,n2);

  ptr1=&n1;
  ptr2=&n2;

  //swapping
  temp=*ptr1;
  *ptr1=*ptr2;
  *ptr2=temp;

  printf("\n After swapping n1 = %d  n2 = %d\n",n1,n2);
  getch();
}
```

```
Enter two numbers : 10 20

Before swapping n1 = 10  n2 = 20

After swapping n1 = 20  n2 = 10
```

19. Program to demonstrate student structure to read & display records of n students

```
// To demonstrate student structure to read & display records of n students

# include<stdio.h>
# include<conio.h>

struct STUDENT
{
   int regno;
   char name[50];
   char grade;
```

```
}BCA[50];

void main()
{
  int n,i;
  clrscr();
  printf("\n Enter student count(n) :
  ");scanf("%d",&n);
  for(i=0;i<n;i++)
  {
    printf("\n Enter %d student(regno,name,grade) : ",i+1);
    scanf("%d %s %c", &BCA[i].regno, BCA[i].name, &BCA[i].grade);
  }

  printf("\n REGNO \t STUDENT NAME \t GRADE");
  for(i=0;i<n;i++)
  {
    printf("\n %d \t %s \t %c", BCA[i].regno, BCA[i].name, BCA[i].grade);
  }

  getch();
}
```

```
Enter student count(n) : 3

Enter 1 student(regno,name,grade) : 101 PRANAVI A

Enter 2 student(regno,name,grade) : 102 NAKUL B

Enter 3 student(regno,name,grade) : 103 RAMESH C

REGNO   STUDENT NAME    GRADE
101     PRANAVI         A
102     NAKUL   B
103     RAMESH          C
```

20. Program to demonstrate the difference between structure & union

```
// To demonstrate student structure to read & display records of n students

# include<stdio.h>
# include<conio.h>

struct EMP1
{
   int empid;        //2 bytes
   char name[50];    // 50 bytes
   float salary;     // 4 bytes    (Total = 2 + 50 + 4 = 56)
};

union EMP2
{
  int empid;        // 2 bytes
```

```
  char name[50];     // 50 bytes
  float salary;      // 4 bytes  (highest = 50 bytes)
};

void main()
{
  clrscr();
  printf("\n Size of Structure EMP1 = %d",sizeof(struct EMP1));
  printf("\n Size of Union EMP2 = %d",sizeof(union EMP2));
  getch();
}
```