Lab Manual

☞ Assignment 1 : Basic data types and I/O operations

GQ. Write a program that reads two numbers from key board and gives their addition, subtraction, multiplication, division and modulo.

☑ Ans. :

Program on arithmetic operations

```
#include <stdio.h>
 main()
{
    int n1,n2,r;
   printf("Enter two numbers : ");
    scanf("%d %d",&n1,&n2);

    r = n1 + n2;
    printf("\n Addition : %d",r);

    r = n1 - n2;
    printf("\n Subtraction : %d",r);

    r = n1 * n2;
    printf("\n Multiplcation : %d",r);

   r = n1 % n2;
    printf("\n Modulo : %d",r);

      getch();
}
```

Output

```
Enter two numbers : 10 2

 Addition : 12
 Subtraction : 8
 Multiplcation : 20
 Modulo : 0
```

GQ. Develop an application program to convert and print distance between two cities in meters, feet, inches & centimeters. The distance between two cities (In KM) is input through key board.

☑ Ans. : Program to convert distance

```
#include <stdio.h>

void main()
{

   float Distance_In_KiloMeters = 0;
   float Distance_In_Meters = 0;
   float Distance_In_Feet = 0;
   float Distance_In_Inches = 0;
   float Distance_In_Centimeters = 0;


   printf("Enter the distance between write cities in kilometers
: ");
   scanf("%f", &Distance_In_KiloMeters);



   Distance_In_Meters = Distance_In_KiloMeters * 1000;
   Distance_In_Feet = Distance_In_KiloMeters * 3280.84;
   Distance_In_Inches = Distance_In_KiloMeters * 39370.1;
   Distance_In_Centimeters = Distance_In_KiloMeters *
100000.054;


   printf("\nDistance in meters : %.2f", Distance_In_Meters);
   printf("\nDistance in feet : %.2f", Distance_In_Feet);
   printf("\nDistance in inches : %.2f", Distance_In_Inches);
   printf("\nDistance in centimeters : %.2f",
Distance_In_Centimeters);


   printf("\n\nPress any key to exit.");
   getch();
}
```

Output

```
Enter the distance between write cities in kilometers : 100

Distance in meters : 100000.00
Distance in feet : 328084.00
Distance in inches : 3937010.00
Distance in centimeters : 10000005.00

Press any key to exit.
```

GQ. getchar() and putchar() with suitable example

Example

```
# include<stdio.h>      //including header file
int main()
{
int a= getchar();
putchar(a);
return 0;
}
```

Output

```
A
A
--------------------------------
Process exited after 2.625 seconds with return value 0
Press any key to continue . . .
```

getch() and putch()

```
# include<stdio.h>      // including header file
int main()
{
char ch=getch();
return 0;
}
```

- If we press p then it will store the character in ch but will not display anything on the screen and exit from the program.
- And if we write the same program with putch(ch) as follows :

```
# include<stdio.h>      // including header file
int main()
{
char ch=getch();
putch(ch);
return 0;
}
```

- And press P then due to putch ( ) function the output will be :

```
P
--------------------------------
Process exited after 3.428 seconds with return value 0
Press any key to continue . . .
```

gets() and puts()

```
# include<stdio.h>      // including header file
int main()
{
puts("Hello");
return 0;
}
```

```
Hello

--------------------------------
Process exited after 0.3857 seconds with return value 0
Press any key to continue . . .
```

☞ Assignment 2 : Branching Statements

GQ. Write a program to accept a number from user and check whether it is more than 100.

☑ **Soln. :**

Program

```
#include<stdio.h>
#include<conio.h>                    } → Includes header files
int main()
{
int n;

printf("\n Enter a number : ");       } → Accepts number from user
scanf("%d",&n);


if(n>100)                            → Checks whether number is greater than 100; If Yes then Message will be display.
{

printf("\n Number is greater than 100");
}
return 0;
}
```

Output

```
TC
Enter a number : 110
Number is greater than 100
```

GQ. Write a program accept a number from user and check whether it is more than 100. If the given number is greater than 100 then print one message and if it is less than 100 then print another message. (5 Marks)

Program

```
#include<stdio.h>
#include<conio.h>
main()
{
int n;
printf("\n Enter a number : ");
scanf("%d",&n);

if(n>100)
{
printf("\n Number is greater than 100");
}
else
{
printf("\n Number is less than 100");
}
}
```

Includes header files

Accepts number from user

If the condition is true this message will be displayed

If condition is false then this message will be displayed.

Output

```
C:\Users\Administrator\Documents\kla.exe
Enter a number : 50
Number is less than 100
--------------------------------
```

GQ. Write a program to accept a number from user and check whether it is even or odd. (5 Marks)

Program

```
#include<stdio.h>
#include<conio.h>
main()
{
int n;
printf("\n Enter a number : ");
scanf("%d",&n);
if(n%2==0)
{
printf("\n Number is even");
}
else
{

printf("\n Number is odd");

}
}
```

Checks whether number is completely divisible by 2.

This statement is executed if number is exactly divisible by 2.

This statement is executed if number is not exactly divisible by 2

Output

```
C:\Users\Administrator\Documents\kla.exe
Enter a number : 4
Number is even
```

GQ. Write a program to accept marks of 3 subjects from student. Calculate the total and average of marks. If the average is >= 40 then give the remark as pass otherwise fail.

Program

```
#include<stdio.h>
#include<conio.h>
main()
{
int hindi,marathi,english,total,average;

printf("\n Enter a marks of 3 subects : ");
scanf("%d %d %d",&hindi,
&marathi,&english);

total = hindi + marathi + english;
average = total / 3;

printf("\n Total marks : %d",total);
printf("\n Average : %d",average);

if(average>=40)
{

printf("\n Pass");
}
else
{
printf("\n Fail");
}
}
```

Accepts marks from user

Calculates total and average of marks.

Checks whether average is greater than 40

If average is greater than or equal to 40 then this message will be displayed.

If average is less than 40 then this message will be displayed

Output

```
C:\Users\Administrator\Documents\kla.exe
Enter a marks of 3 subects : 90 80 70

Total marks : 240
Average : 80
Pass
```

GQ. Write a program to accept marks of 3 subjects from student. Calculate the total and average of marks. If the average is >= 80 then give the grade as "A" , if average>= 60 then give the grade as "B", if average>= 40 then give the grade as "C" and below 40 "Fail". (5 Marks)

Program

```
#include<stdio.h>
#include<conio.h>
main()
{
int hindi,marathi,english,total,average;
printf("\n Enter marks marathi, hindi and english : ");
scanf("%d %d %d",&marathi,&hindi,&english);

total = marathi + hindi + english;
average = total / 3;

if(average>=80)
{
printf("\n Grade - A");
}
else if(average>=60)
{
printf("\n Grade - B");
}

else if(average>=40)
{
printf("\n Grade - C");
}

else
{
printf("\n Fail...");
}

}
```

Accepts marks from user

Calculate total and average of marks

If average>= 80 then this message will be displayed.

If above condition is not satisfied instead of that average>= 60 condition is then this message will be displayed

If both the above conditions are not satisfied and average >=40 condition is satisfied then this message will be displayed

If all of the above conditions are unsatisfied then this message will be displayed

Output

```
C:\Users\Administrator\Documents\kla.exe
Enter marks marathi,hindi and english : 90 80 70
Grade - A
```

Switch Statement

GQ. Write a menu driven program which should accepts two numbers from user and print the result of addition, subtraction, multiplication or division as per user's choice. (5 Marks)

Note : In division case if the second number entered by user is zero then print an error message.

UQ. Write an program to implement calculator with following operations.

(i) Add two numbers

(ii) Subtract two numbers.

(iii) Division two numbers

(iv) Multiply two numbers.

MU - Dec. 14, 6 Marks

☑ **Ans. :**

Program

```
#include<stdio.h>
#include<conio.h>
main()
{
int n1,n2,result,choice;
printf("\n--------Menu---------");
printf("\n 1 : Addition");
printf("\n 2 : Subtraction");
printf("\n 3 : Multiplication");
printf("\n 4 : Division");
printf("\n Select your choice : ");
scanf("%d",&choice);
if(choice>= 1 && choice<=4)
{
printf("\n Enter two numbers :" );
scanf("%d %d",&n1,&n2);
}
switch(choice)
{
case 1:
result = n1 + n2;
printf("\n Addition is %d",result);
break;
case 2:
result = n1 - n2;
printf("\n Subtraction is %d",result);
break;
```

Accepts user's choice from given menu and store it in choice variable.

Only if user choice is in between 1 to 4 then only two numbers will be accepted.

Addition if choice matches with 1.

Subtraction if choice matches with 2

```
case 3:
result = n1 * n2;
printf("\n Multiplication is %d",result);
break;

case 4:

if(n2!=0)
{
result = n1 / n2;
printf("\n Division is %d",result);
}
else
{
printf("\n Cannot divide by zero");
}
break;

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

Multiplication if choice matches with 3.

Division if choice matches with 4

If none of the above case is satisfied then this message will be displayed.

Output

```
C:\Users\Administrator\Documents\kla.exe

-------------Menu-------------
 1 : Addition
 2 : Subtraction
 3 : Multiplication
 4 : Division
 Select your choice : 1

 Enter two numbers :10 5

 Addition is 15
```

☞ Assignment 3 : Loop Statements

UQ. Write a program to check if the entered number is Armstrong or not. MU - Dec. 15, 10 Marks

☑ Ans. :

e.g. 153 is Armstrong number. The summation of cubes of all the digits should be exactly equal to the number

153 = (1*1*1) + (5*5*5) + (3*3*3) = 1 + 125 + 27 =153

☑ Soln. :

Program

```
#include<stdio.h>
#include<conio.h>
main()
{

    int n,n1,rem,sum;
    sum = 0;
    printf("\n Enter a number : ");
    scanf("%d",&n);
    n1 = n;
    while(n>0)
    {
        rem = n % 10;
       sum = sum + (rem*rem*rem);
        n = n / 10;
    }

    if(sum==n1)
    printf("\n Number is Armstrong");
    else
    printf("\n Number is not Armstrong");

}
```

Until the number becomes 0 it will repeat the loop statements. To get digits from the number we calculate the remainder by dividing the number with 10

If given number is same as addition of cubes of digits of the number then it is Armstrong number.

Output

```
C:\Users\Administrator\Documents\Untitled1.exe

Enter a number : 153

Number is Armstrong
```

UQ. Write a program to check whether the given number is palindrome or not. i.e. if no is 12421 it is palindrome. MU - May 14 , 10 Marks.

☑ Ans. :

Program

```
#include <stdio.h>
int main()
{
   int n, reverse_no = 0, rem, original_no;
   printf("Enter a a number : ");
   scanf("%d", &n);
   original_no = n;
```

```
  while( n!=0 )
  {
     rem = n%10;
     reverse_no = reverse_no*10 + rem;
     n = n/10;
  }
```

Until the value of n is not 0 loop will be executed repeatedly Loop reverses the given number.

```
  if (original_no == reverse_no)
     printf("The number is palindrome.");
```

Prints if the given number and the reverse are same.

```
    else
    printf("The number is not palindrome.");
     return 0;
}
```

Output

```
C:\Users\Administrator\Documents\Untitled1.exe
Enter a a number : 121
The number is palindrome.
```

UQ. Write a program to display Armstrong numbers between 1 to 1000. **MU - May 13, 6 Marks**

☑ **Ans. :**

```
#include <stdio.h>

main()
{
   int number, temp, digit1, digit2, digit3;

   printf("Print all Armstrong numbers between 1 and
1000:\n");
   number = 001;
   while (number <= 900)
   {
      digit1 = number - ((number / 10) * 10);
      digit2 = (number / 10) - ((number / 100) * 10);
      digit3 = (number / 100) - ((number / 1000) * 10);
      temp = (digit1 * digit1 * digit1) + (digit2 * digit2 *
digit2) + (digit3 * digit3 * digit3);
      if (temp == number)
      {
         printf("\n  %d", temp);
      }
      number++;
   }
}
```

Output

```
D:\armstrong.exe
Print all Armstrong numbers between 1 and 1000:

  1
  153
  370
  371
  407
```

UQ. Write a program to find GCD and LCM of 2 nos. **MU - Dec. 14, 6 Marks**

☑ **Ans. :**

```
#include <stdio.h>

main()
{
   int num1, num2, gcd, lcm, remainder, numerator,
denominator;

   printf("Enter two numbers : ");
   scanf("%d %d", &num1, &num2);
   if (num1 > num2)
   {
      numerator = num1;
      denominator = num2;
   }
   else
   {
      numerator = num2;
      denominator = num1;
   }
   remainder = numerator % denominator;
   while (remainder != 0)
   {
      numerator   = denominator;
      denominator = remainder;
      remainder   = numerator % denominator;
   }
   gcd = denominator;
   lcm = num1 * num2 / gcd;
   printf("GCD of %d and %d = %d\n", num1, num2, gcd);
   printf("LCM of %d and %d = %d\n", num1, num2, lcm);
}
```

Output

```
D:\test.exe
Enter two numbers : 30 40
GCD of 30 and 40 = 10
LCM of 30 and 40 = 120
```

UQ. Write a program to find out binary equivalent of given decimal number. **MU - May 15, 5 Marks**

☑ **Ans. :**

```
#include<stdio.h>

int main()
{

   int decimalnum, rem, temp = 1;
   long binarynum = 0;

   printf("Enter a Decimal Number: ");
   scanf("%d", &decimalnum);
    while (decimalnum!=0)
   {
      rem = decimalnum%2;
      decimalnum = decimalnum / 2;
      binarynum = binarynum + rem*temp;
      temp = temp * 10;
   }

   printf("Equivalent Binary Number is: %ld", binarynum);
}
```

Output:

```
D:\pat.exe
Enter a Decimal Number: 123
Equivalent Binary Number is: 1111011
```

GQ. Write a program to print Fibonacci series.

Program

```
#include<stdio.h>
#include<conio.h>
main()
{
    int a,b,c,i;
    a = 1;
    b = 2;
    i = 1;
    printf("1 2 ");
    do
    {
        c = a + b;
        printf (" %d ",c);
        a = b;
        b = c;
        i = i + 1;
    }while(i<5);
}
```

Loop will execute until i is less than 5 In Fibonacci series every number is addition of its previous two numbers.

Output

```
C:\Users\Administrator\Documents\Untitled1.exe
1 2  3  5  8  13
```

UQ. Write a algorithm and program to generate a factor of given number **MU - May 15, 8 Marks**

☑ **Ans. :**

```
#include <stdio.h>
int main() {
   int num, i;
   printf("Enter a positive integer: ");
   scanf("%d", &num);
   printf("Factors of %d are: ", num);
   for (i = 1; i < num; ++i) {
      if (num % i == 0) {
         printf("%d ", i);
      }
   }
   return 0;
}
```

Output:

```
D:\test.exe
Enter a positive integer: 6
Factors of 6 are: 1 2 3
```

UQ. Write a program to display the following :

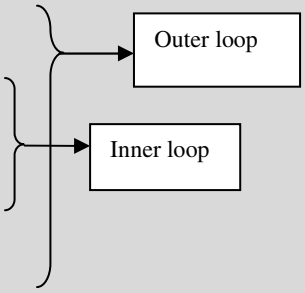
```
*
**
***
****
*****
```

MU - Dec. 15, 5 Marks

☑ **Ans. :**

Program

```
#include<stdio.h>
#include<conio.h>
main()
{
    int i,j;

    for(i=1;i<=5;i++)
    {
        for(j=1;j<=i;j++)
        {
            printf("* ");
        }
        printf("\n");
    }
}
```



UQ. Write a program to generate prime nos between 1 to 100. **MU - Dec. 13, 10 Marks**

☑ **Ans. :**

```
#include <stdio.h>
int main()
{
 int i, Number, count;

 printf(" Prime Number from 1 to 100 are: \n");
 for(Number = 1; Number <= 100; Number++)
 {
  count = 0;
  for (i = 2; i <= Number/2; i++)
  {
   if(Number%i == 0)
   {
    count++;
    break;
   }
  }
  if(count == 0 && Number != 1 )
  {
   printf("\n  %d ", Number);
  }
 }
 return 0;
}
```

Output

```
D:\test.exe
Prime Number from 1 to 100 are:

  2
  3
  5
  7
  11
  13
  17
  19
  23
  29
  31
  37
  41
  43
  47
  53
  59
  61
  67
  71
  73
  79
  83
  89
  97
```

UQ. Write a program to display pascal triangle.

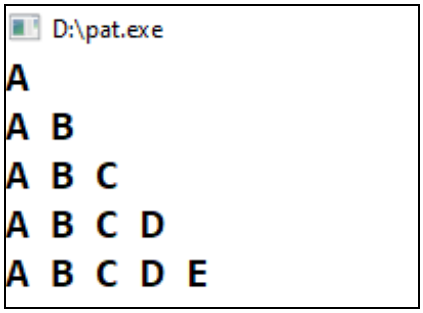
```
A
A B
A B C
A B C D
A B C D E
```

MU - May 13, 6 Marks

☑ **Ans. :**

```
#include<stdio.h>
int main() {
  int i, j;
   for(i=1;i<=5;i++)
   {
    for(j=1;j<=i;j++)
    {
     printf("%c ",'A' + j-1);
    }
    printf("\n");
   }
}
```

Output



UQ. Write a program to generate following patterns.

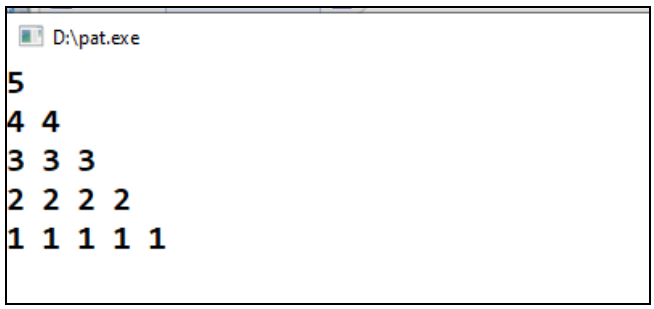
```
5
4  4
3  3  3
2  2  2  2
1  1  1  1  1
```

MU - Dec. 13, 10 Marks

☑ **Ans. :**

```
#include<stdio.h>
int main() {
  int a, i;
for(a = 5; a >= 1; a--)
{
for(i = a;i <= 5;i++)
{
printf("%d ", a);
}
printf("\n");
}
return 0;
}
```

Output



UQ. Write a program to generate following patterns.

```
1
2 3
4 5 6
7 8 9 10
```

MU - May 14, 5 Marks

☑ **Ans. :**

```
#include<stdio.h>
int main() {
  int i,j, k=1;

for(i=1;i<=5;i++)
{
for(j=1;j<i;j++)
{
printf("%d ",k);
k++;
}
printf("\n");
}
return 0;
}
```

UQ. Write a program to calculate summation of series. 1/2 – 3/4 + 5/6 – 7/8 + …….. upto n terms.

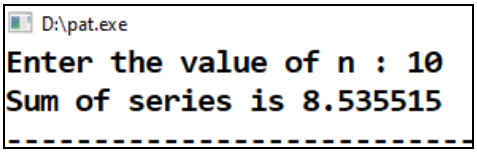
MU - May 14, 10 Marks

☑ **Ans. :**

```
#include<stdio.h>
int main() {
    int i,j,n;
     float sum = 0;
     printf("Enter the value of n : ");
     scanf("%d",&n);
     for(i=1,j=1;i<=n; i++,j=j+2)
      {
        sum=sum+(float)(j)/(j+1);
```

```
    }
    printf("Sum of series is %f",sum);

}
```

Output:



Q. Write a program to print the following pattern.
(Note : Not only 4 lines, it should print n lines taken from user)

A
B B
C C C
D D D D

MU - Dec. 14, 8 Marks

☑ **Ans. :**

```
#include<stdio.h>
int main() {
    int i,j;
    for(i='A';i<'E';i++)
    {
        for(j='A';j<=i;j++)
        {
            printf("%c ",i);
         }
         printf("\n");
     }
}
```

UQ. Write a program to display following pattern.

ABCD
ABC
AB
A

MU - May 15, 5 Marks

☑ **Ans. :**

```
#include<stdio.h>

int main()
{

   int i, j;

    for (i=1; i <=4; i++)
    {
        for (j=1; j <=i-1; j++)
        {
            printf (" ");
        }
        for (j=1; j <=5-i; j++)
        {
            printf ("%c",(char)(j+64));
        }
        printf ("\n");
    }

}
```

UQ. Write a Program to calculate summation of series. $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8!$ upto n terms.

MU - Dec. 15, May 16, 10 Marks

☑ **Ans. :**

```
#include<stdio.h>

int main()
{

   int counter,f_coun;
   float sum=0,x,power,fact;

   printf("\nEQUATION SERIES : 1- X^2/2! + X^4/4! -
X^6/6! + X^8/8! - X^10/10!");

   printf("\n\tENTER VALUE OF X : ");
   scanf("%f",&x);

   for(counter=0, power=0; power<=10;
counter++,power=power+2)
   {
      fact=1;
      //Factorial of POWER value.
      for(f_coun=power; f_coun>=1; f_coun--)
         fact *= f_coun;
      //The main equation for sum of series is...
      sum=sum+(pow(-1,counter)*(pow(x,power)/fact));
   }

   printf("\nSUM : %f",sum);

}
```

Output

```
D:\pat.exe

EQUATION SERIES : 1- X^2/2! + X^4/4! - X^6/6! + X^8/8! - X^10/10!
        ENTER VALUE OF X : 3

SUM : -0.991049
```

UQ. Generate the following pattern of digits using nested loops. **MU - Dec. 15, Dec. 17, 5 Marks**

1

2 3 2

3 4 5 4 3

4 5 6 7 6 5 4

☑ **Ans. :**

```
#include<stdio.h>

int main()
{

    int i, space, rows, k=0, count = 0, count1 = 0;

   printf("Enter number of rows: ");
   scanf("%d",&rows);

   for(i=1; i<=rows; ++i)
   {
     //print space until sapce value is not equal/less than
(sapce-i), where
      // i is current row Number
      for(space=1; space <= rows-i; ++space)
      {
         printf(" ");
         ++count; //increment count after each space
      }

      //after printing all spaces, let's start number printing loop
      // here while loop is used and it will print unless
      //k is not euqal to 2*CurrentRow-1
      while(k != 2*i-1)
      {
        //Now, looking at pattern formula is to print
I(CurrentRow)+ Current K
        // if Count is less than TotalRow -1
         if (count <= rows-1)
         {
            printf("%d ", i+k);
            ++count;
         }

         else
         {
            ++count1;
            printf("%d ", (i+k-2*count1));
         }
         ++k;
      }
      //reset all values to 0,except CurrentRow value and total
row value
      count1 = count = k = 0;

      printf("\n");
   }
   return 0;

}
```

UQ. Write a program to generate following pattern.

A

C B

F E D

J I H G

O N M L K **MU - May 16, 5 Marks**

☑ **Ans. :**

```
#include<stdio.h>

int main()
{

    int n,i,j,m=65,k=64;
n = 5;
for(i=1;i<=n;i++)
    {
        k=k+i;
        m=k;
        for(j=0;j<=n-i;j++)
        printf(" ");
        for(j=1;j<=i;j++)
        printf("%c", m--);
        printf("\n");
}
}
```

UQ. Write a program to generate following pattern.

```
        5
      5 4
    5 4 3
  5 4 3 2
5 4 3 2 1
```

MU - May 17, 5 Marks

☑ **Ans. :**

```
#include<stdio.h>
int main()
{
int i,j,k;

    for(i=1;i<=5;i++)
    {
        for(j=1;j<=5-i;j++)
        {
            printf("  ");
        }
        for(j=1,k=5;j<=i;j++)
        {
            printf("%d ",k--);
        }
        printf("\n");
    }
}
```

UQ. Write a program for finding sum of series, 1 + 2 + 3 + 4 upto n terms. **MU - Dec. 17, 5 Marks**

☑ **Ans. :**

```
#include<stdio.h>
int main()
{
int n,i;
    int sum=0;
    printf("Enter the n i.e. max values of series: ");
    scanf("%d",&n);
    sum = (n * (n + 1)) / 2;
    printf("Sum of the series: ");
    for (i =1;i <= n;i++) {
        if (i!=n)
                printf("%d + ",i); else
                printf("%d = %d ",i,sum);
    }
    return 0;
}
```

Output

```
D:\pat.exe
Enter the n i.e. max values of series: 5
Sum of the series: 1 + 2 + 3 + 4 + 5 = 15
```

☞ **Assignment 4 : Arrays**

UQ. Write a program in C to find minimum number in an array. **MU - Dec. 15, 10 Marks**

☑ **Ans. : Program**

```
#include<stdio.h>
#include<conio.h>
int main()
{
int array[5]={33,30,34,31,32},j;
printf("\n array elements are:\t");
for(j=0;j<5;j++)
{
    printf("%d\t",array[j]);
}
int min=array[0];
for(j=1;j<5;j++)
{
    if(array[j]<min)
    {
    min=array[j];
    }
}
printf("\n smallest number in 5-element integer array
                                        is:\t%d",min);
return 1;
}
```

Sets the minimum number is the first element of array.

Loop will continue 5 times

Finds smallest element and store it in **min** variable.

Output

```
C:\TURBOC3\st1.exe
array elements are:    33      30      34      31      32
smallest number in 5-element integer array is: 30
```

UQ. Write a program to search a number within the array. **MU - Dec. 15, 10 Marks**

☑ **Ans. : Program**

```
int main()
{
 int arr[5],num,i;
 printf("\nEnter 5 array eles : ");
```

```
for(i=0;i<5;i++)
{
    scanf("%d",&arr[i]);
}
printf("\nEnter number to search : ");
scanf("%d",&num);

for(i=0;i<5;i++)
{
if(num==arr[i])
{
    printf("\nNumber found");
    break;
}
}

if(i==5)
printf("\nNumber not found");
}
```

Output

```
D:\rs.exe

Enter 5 array eles : 89 678 65 56 78

Enter number to search : 65

Number found
```

UQ. Write a program to sort given numbers in ascending order. **MU - May 14, Dec. 17, 10 Marks**

☑ **Ans. : Program**

```
#include<stdio.h>
#include<conio.h>
int main()
{
int array[10],i, j,temp;
printf("enter 10 elements for array:");
for(i=0;i<10;i++)
{
scanf("%d",&array[i]);
}
for(i=0;i<9;i++)
{
for(j=i+1;j<10;j++)
{
if(array[j]<array[i])
{
    temp=array[i];
    array[i]=array[j];
    array[j]=temp;
}
}
}
printf("\n ascending ordered array :\n");
for(i=0;i<10;i++)
{
    printf("%d\t",array[i]);
}
return 1;
}
```

Accepts 10 elements from user and store it in array.

Used to compare i^{th} element with all the remaining elements in the array.

Compare array[i] with array[j]

If condition satisfies Swap the array[i] and array[j].

Prints the sorted array in ascending order.

Output

```
enter 10 elements for array:40
46
24
73
80
10
79
44
21
23

ascending ordered array :
10      21      23      24      40      44      46      73      79      80
--------------------------------
```

UQ. Write a program to sort list elements in descending order. **MU - May 13, 8 Marks**

OR Write a program to sort given nos in descending order. **MU - Dec. 13, 10 Marks**

☑ **Ans. : Program**

```
#include<stdio.h>
#include<conio.h>
int main()
{
int array[10],i, j,temp;
printf("enter 10 elements for array:");
for(i=0;i<10;i++)
{
scanf("%d",&array[i]);
}
for(i=0;i<9;i++)
{
for(j=i+1;j<10;j++)
{
if(array[j]>array[i])
```

Accepts 10 elements from user and store it in array.

Used to compare i^{th} element with all the remaining elements in the array.

Compare array[i] with array[j]

```
{
    temp=array[i];
    array[i]=array[j];
    array[j]=temp;
}
}
}
```

If condition satisfies Swap the array[i] and array[j].

```
printf("\n ascending ordered array :\n");
for(i=0;i<10;i++)
{
    printf("%d\t",array[i]);
}
return 1;
}
```

Prints the sorted array in ascending order.

```
D:\test.exe
enter 10 elements for array: 89 67 54 34 7 32 76 99 55 8

 Descneding ordered array :
99      89      76      67      55      54      34      32      8       7
```

UQ. Write a program in C to accept an ARRAY A with n elements and Separate it into two different arrays B and C in such a way that B contains Odd numbers and C contains Even numbers. i.e. if ARRAY A contains A = {3,2,4,2,5,7,8} then B = {3,5,7} and C = {2,4,2,8}.

MU - May 16, 10 Marks

☑ **Ans. :**

Program

```
#include <stdio.h>
  void main()
  {

     long int ARR[10], OAR[10], EAR[10];
     int i, j = 0, k = 0, n;

     printf("Enter the size of array   : ");
     scanf("%d", &n);

     printf("Enter the elements of the array : ");
     for (i = 0; i < n; i++)
     {
        scanf("%d", &ARR[i]);

     }

     for (i = 0; i < n; i++)
     {
        if (ARR[i] % 2 == 0)
        {
           EAR[j] = ARR[i];
           j++;
        }
        else
        {
           OAR[k] = ARR[i];
           k++;
        }
     }

     printf("\nThe elements of OAR are : ");
     for (i = 0; i < k; i++)
     {
        printf("%d  ", OAR[i]);
     }

     printf("\nThe elements of EAR are : ");
     for (i = 0; i < j; i++)
     {
        printf("%d  ", EAR[i]);
     }

  }
```

Output

```
D:\rs.exe
Enter the size of array   : 5
Enter the elements of the array : 1 2 3 4 5

The elements of OAR are : 1  3  5
The elements of EAR are : 2  4
```

UQ. Write a program which will accept 2 dimensional square matrix and find out transpose of it. Program should not make use of another matrix.

MU - Dec. 13, May 14, Dec. 15, 10 Marks

☑ **Ans. :**

```
# include<stdio.h>
int main()
{
int matrix[2][2],i=0,j=0;
```

```
for (i=0;i<2;i++)
{
for(j=0;j<2;j++)
{
printf("Enter matrix[%d][%d] element : ",i, j);

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

printf("\n Original matrix:\n\t");
for (i=0;i<2;i++)
{
for (j=0;j<2;j++)
{
printf("%d\t",matrix[i][j]);
}
printf("\n\t");
}
printf("\n Transposed matrix:\n\t");
for (i=0;i<2;i++)
{
for (j=0;j<2;j++)
{
printf("%d\t",matrix[j][i]);
}
printf("\n\t");
}
}
```

Output

```
D:\test.exe
Enter matrix[0][0] element : 1
Enter matrix[0][1] element : 2
Enter matrix[1][0] element : 3
Enter matrix[1][1] element : 4

 Original matrix:
        1       2
        3       4

 Transposed matrix:
        1       3
        2       4
```

UQ. Write a C program to

i. **Create a 2D array (Matrix) [in main function]**
ii. **Write a function to read 2D array (Matrix)**
iii. **Write a function that will return true (1) if entered matrix is symmetric or false (0) is not symmetric.**
iv. **Print whether entered matrix is symmetric or not [in main function]**

MU - May 18, 10 Marks

☑ **Ans. :**

Program

```
#include<stdio.h>
#include<conio.h>
void accept(int a[10][10], int rows, int cols)
{
    int i,j;
    for(i=0;i<=rows-1;i++)
    {
        printf("Enter elements : ");
        for(j=0;j<=cols-1;j++)
        {
            scanf("%d",&a[i][j]);
        }
    }
}
int is_symmetric(int a[10][10],int rows,int cols)
{
    int i,j;
    if(rows!=cols) return 0;
    for(i=0;i<=rows-1;i++)
    {
        for(j=0;j<=cols-1;j++)
        {
            if(a[i][j]!=a[j][i]) return 0;
        }
    }
    return 1;
}
 main()
{
    int a[10][10],rows,cols,r;

    printf("Enter the number of rows and columns : ");
    scanf("%d %d",&rows,&cols);
    accept(a,rows,cols);
```

```
    r = is_symmetric(a,rows,cols);
    if(r==1)
    printf("Symmetric Matrix");
    else
    printf("Not Symmetric Matrix");

}
```

Output:

```
D:\rs.exe
Enter the number of rows and columns : 2 2
Enter elements : 1 2 2 1
Enter elements : Symmetric Matrix
```

UQ. Write a program to calculate matrix multiplication and transpose for a matrix.

MU - May 13, Dec.17,Dec.18, 8 Marks

☑ **Ans. :**

Multiplication of Matrices

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int mat1[3][3], mat2[3][3], mat3[3][3], sum=0, i, j, k;
    printf("Enter first matrix element (3*3) : ");
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            scanf("%d",&mat1[i][j]);
        }
    }
    printf("Enter second matrix element (3*3) : ");
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            scanf("%d",&mat2[i][j]);
        }
    }
    printf("Multiplying two matrices...\n");
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            sum=0;
            for(k=0; k<3; k++)
            {
                sum = sum + mat1[i][k] * mat2[k][j];
            }
            mat3[i][j] = sum;
        }
    }
    printf("\nMultiplication of two Matrices : \n");
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            printf("%d  ", mat3[i][j]);
        }
        printf("\n");
    }
    getch();
}
```

Output

```
C:\multi.exe
Enter first matrix element (3*3) :
1 2 3
4 5 6
7 8 9
Enter second matrix element (3*3) :
1 1 1
2 2 2
3 3 3
Multiplying two matrices...

Multiplication of two Matrices :
14  14  14
32  32  32
50  50  50
```

Transpose of matrix

```
# include<stdio.h>
int main()

{
int orign_matrix[3][3], trans_matrix[3][3],i=0,j=0;
for (i=0;i<3;i++)

{
for(j=0;j<3;j++)
{
printf("Enter matrix[%d][%d] element ",i, j);

scanf("%d", &orign_matrix[i][j]);
```

```
trans_matrix[j][i] = orign_matrix[i][j];
```

Accepts element of 3 × 3 matrix and store it in i^{th} row and j^{th} column of origin matrix.

```
}
}
printf("\n Original matrix:\n\t");
for (i=0;i<3;i++)
```

Copies the entered element at j^{th} row and i^{th} column of trans_matrix.

```
{
fo
{
printf("%d\t",orign_matrix[i][j]);
}
printf("\n\t");
}
```

Prints original matrix.

```
printf("\n Transposed matrix:\n\t");
for (i=0;i<3;i++)
{
for (j=0;j<3;j++)
{
printf("%d\t",trans_matrix[i][j]);
}
printf("\n\t");
}
}
```

Prints transpose of original matrix.

Output

```
E:\teju\pheonix\transpose.exe
Enter matrix[0][0] element 10
Enter matrix[0][1] element 20
Enter matrix[0][2] element 30
Enter matrix[1][0] element 40
Enter matrix[1][1] element 50
Enter matrix[1][2] element 60
Enter matrix[2][0] element 70
Enter matrix[2][1] element 80
Enter matrix[2][2] element 90

 Original matrix:
        10      20      30
        40      50      60
        70      80      90

 Transposed matrix:
        10      40      70
        20      50      80
        30      60      90

--------------------------------
Process exited after 38.47 seconds
Press any key to continue . . .
```

☞ Assignment 5 : Strings

UQ. Write a program to calculate sum of list by passing array to a function.

MU - May 13, 5 Marks

☑ **Ans. :**

Program

```
cal(int arr1[])
{
    int sum,i;
    sum = 0;
    for(i=0;i<5;i++)
    {
        sum = sum + arr1[i];
    }
    printf("\nSum of array elements : %d",sum);
}

main()
{
 int arr[5], i;
 printf("\nEnter 5 els : ");
 for(i=0;i<5;i++)
 scanf("%d",&arr[i]);

 cal(arr);
}
```

Output

```
D:\test.exe

Enter 5 els : 1 2 3 4 5

Sum of array elements : 15
--------------------------------
```

UQ. Write a program to validate whether accepted string is palindrome or not.

MU - May 13, 5 Marks, Dec. 13, May 14, Dec. 18, 10 Marks

☑ **Ans. : Program**

```
# include<stdio.h>
#include<string.h>
int main()
{
```

```
int len=0, i=0;
char str[10];
int flag=0;
printf("Enter string : ");
scanf("%s", str);
len = strlen(str);

while(i<len/2)
{
if(str[i]!=str[len-i-1])
{
flag=1;
break;
}
i++;
}
if(flag==0)

printf("\n String is palindrome");

else

printf("\n String is not palindrome");
getch();
}
```

Accept string from user and store it in a character array str.

Loop will continue until **i** become half of the length of **str** array.

If condition satisfies the flag is set to 1

Prints if initial value of flag is not changed.

Prints if initial value of flag is changed.

Output

```
C:\TURBOC3\rt1.exe
Enter string : nayan
 String is palindrom
```

UQ. Write a program to find reverse of given string without using string library function.

MU - May 15, 5 Marks

☑ **Ans. :**

Program

```
int main()
{
  char s[1000], r[1000];
  int begin, end, count = 0;

  printf("Input a string\n");
  gets(s);

  // Calculating string length
  while (s[count] != '\0')
    count++;
  end = count - 1;

  for (begin = 0; begin < count; begin++) {
    r[begin] = s[end];
    end--;
  }

  r[begin] = '\0';

  printf("%s\n", r);
  return 0;
}
```

Output

```
D:\test.exe
Input a string
Hello
olleH
```

UQ. Implements string copy function STRCOPY (str1, str2) that copies a string str1 (source) to another string str2 (destination) without using library function. **MU -May 18, 5 Marks**

☑ **Ans. :**

Program

```
# include<stdio.h>
int main()

{
char first_str[20],second_str[20];
int count=0, i=0;
printf("\n Enter first string :\t");
scanf("%s", first_str);
printf("\n Enter Second string:\t");
scanf("%s", second_str);
printf("\n Before copy:\t First String=%s and Second
                        String=%s", first_str,second_str);

while (first_str[i]!='\0')
```

Until the end of string the loop will continue.

```
{
second_str[i]=first_str[i];
i++;
}

second_str[i]='\0';

printf("\nAfter copy:\t First String=%s and Second
String=%s", first_str,second_str);
printf("\nNumber of characters copied are %d", i);
return 1;
}
```

Copies character at first_str[i] into second_str[i].

Copies null character at the end.

Output

```
E:\teju\pheonix\strcpy.exe

 Enter first string :string

 Enter Second string:array

 Before copy:    First String=string and Second String=array
After copy:      First String=string and Second String=string
Number of characters copied are 6
```

UQ. Write a user defined function to copy one string to another. **MU - Dec. 14, 5 Marks**

☑ **Ans. :**

Program

```
#include <string.h>
#include <stdio.h>
void copy(char s1[],char s2[],int l1,int l2);
int main(void)

{
    char org_string[20], new_string[20];
    printf("Enter first string: \t");
    gets(org_string);
    printf("Enter second string:\t");
    gets(new_string);

    int l1 = strlen(org_string);
    int l2 = strlen(new_string);

     copy(org_string,new_string,l1,l2);

   return 1;

}
void copy(char s1[], char s2[], int l1, int l2)
{
    int i=0,j=0;
        if(l1+l2<20)
    {
        for(i; i<l2;i++)
        {
            s1[i]=s2[i];
        }
        s1[i]='\0';
    }
    else
    {
        printf("string is too large can't be copied.");
    }
    printf("\nAfter copy\nFirst string: \t%s",s1);
    printf("\nSecond string:\t%s",s2);
}
```

Checks whether memory is sufficient to copy a string or not

Specifies the end of string after copy

Output

```
E:\teju\pheonix\ptr.exe
Enter first string:     mumbai
Enter second string:    pune

After copy
First string:   pune
Second string:  pune
--------------------------------
```

UQ. Write user defined functions to implement following string operations
(i) strcat (ii) strlen
MU - May 16, Dec. 17, 10 Marks

☑ **Ans. :**

Program

```
#include <stdio.h>
  int main()
  {
   getstrlen();
   strconcat();

  }

  void getstrlen()
  {
    char s1[20];
    int i = 0;
    printf("\n\nEnter a string : ");
```

```
  gets(s1);
  while(s1[i]!='\0')
  {
      i++;
  }
  printf("\nLength of %s is %d",s1,i);
}

void strconcat()
{
  int i,j;
    char str1[20],str2[20];
  printf("\n\nEnter first string : ");
  gets(str1);
  printf("\nEnter second string : ");
  gets(str2);
  for(i=0; str1[i]!='\0'; ++i);

/* This loop would concatenate the string str2 at
 * the end of str1
 */
for(j=0; str2[j]!='\0'; ++j, ++i)
{
  str1[i]=str2[j];
}

// \0 represents end of string
str1[i]='\0';
printf("\nOutput: %s",str1);
}
```

Output

```
D:\rs.exe

Enter a string : Kunal

Length of Kunal is 5

Enter first string : hi

Enter second string : Friends

Output: hiFriends
```

☞ Assignment 6 : Functions

UQ. Write a program to calculate compound interest and amount.

Using formula A=P(1+R/100)^n, where P=Principal Amt., R is Rate of interest, n = number of years. Your program should make use of user defined function to calculate power. Program should accept P, R and N, Display interest earned for each year.

MU - May 16, 10 Marks

☑ Ans. : Program

```
#include<stdio.h>
#include<math.h>
 main()
{
float R,P,CI;
int N;
float comp_int_calc(float,float,int);

printf("ENTER THE PRINCIPAL AMOUNT : ");
scanf("%f",&P);
printf("ENTER THE NUMBER OF YEAR(S) : ");
scanf("%d",&N);
printf("ENTER THE RATE OF INTEREST(%) : ");
scanf("%f",&R);
R=R/100;
CI=comp_int_calc(P,R,N);
printf("THE CALCULATED SIMPLE INTEREST IS RUPEES
: %.2f",CI);
getch();
}
float comp_int_calc(float AMT,float RATE,int YEARS)
{
   float COMP_INT=0;
   COMP_INT=pow(1+RATE,YEARS);
   COMP_INT=AMT*COMP_INT;
   return COMP_INT;
}
```

Output

```
D:\test.exe
ENTER THE PRINCIPAL AMOUNT : 5000
ENTER THE NUMBER OF YEAR(S) : 5
ENTER THE RATE OF INTEREST() : 2
THE CALCULATED SIMPLE INTEREST IS RUPEES : 5520.40
```

UQ. Write a menu driven program to perform arithmetic operations on two integers. The menu should be repeated until the user selects 'STOP' option. Program should have independent user defined function for each case.

MU - May 17, 10 Marks

☑ **Ans. : Program**

```
#include<stdio.h>
#include<conio.h>
int result;
add(int n1,int n2)
{
    result = n1 + n2;
printf("\n Addition is %d",result);
}
sub(int n1,int n2)
{
result = n1 - n2;
printf("\n Subtraction is %d",result);
}
mul(int n1,int n2)
{
    result = n1 * n2;
printf("\n Multiplication is %d",result);
}
div(int n1,int n2)
{
    if(n2!=0)
{
result = n1 / n2;
printf("\n Division is %d",result);
}
else
{
printf("\n Cannot divide by zero");
}
}
main()
{
int n1,n2,choice;
while(choice!=5)
{
printf("\n--------Menu---------");
printf("\n 1 : Addition");
printf("\n 2 : Subtraction");
printf("\n 3 : Multiplication");
printf("\n 4 : Division");
printf("\n 5 : STOP");
printf("\n Select your choice : ");
scanf("%d",&choice);
if(choice>= 1 && choice<=4)
{
printf("\n Enter two numbers :" );
scanf("%d %d",&n1,&n2);
}
switch(choice)
{
case 1:
add(n1,n2);
break;
case 2:
sub(n1,n2);
break;
case 3:
mul(n1,n2);
break;
case 4:
div(n1,n2);
break;
case 5:
    break;

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

Output

```
D:\test.exe

--------Menu---------
 1 : Addition
 2 : Subtraction
 3 : Multiplication
 4 : Division
 5 : STOP
 Select your choice : 1

 Enter two numbers :10 2

 Addition is 12
--------Menu---------
 1 : Addition
 2 : Subtraction
 3 : Multiplication
 4 : Division
 5 : STOP
 Select your choice : 5
```

☞ Assignment 7 : Recursion

UQ. Write a recursive program to calculate factorial of accepted number. **MU - May 13, 6 Marks**

☑ **Ans. :**

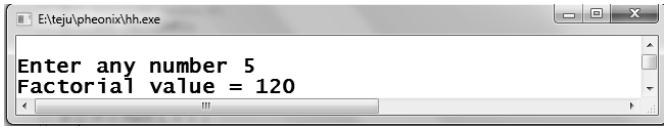
Program

```
#include <stdio.h>
int fact(int);
int main( )
{
int n, f ;
printf ( "\nEnter any number " ) ;
scanf ( "%d", &n ) ;

f = fact ( n ) ;
printf ("Factorial value = %d", f );


return 1;
}
int fact (int num)
{
int f ;
if (num == 1)
{
    return (1) ;
}
else

{
    f = num * fact (num - 1) ;
}
return (f) ;
}
```

Suspend execution of **main()** and transfers control to definition of **fact()** and passes value of **n** to **num.**

Recursively calls itself

Output



UQ. Write a program to display Fibonacci series using recursion. **MU - May 13, 6 Marks**

OR Write a program using function to print first 'n' numbers in Fibonacci series.

MU - Dec. 14, May 17, 4 Marks

☑ **Ans. :**

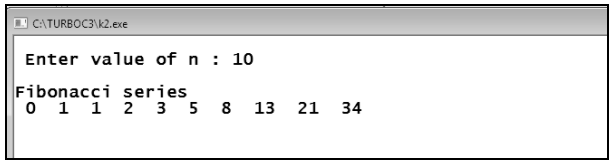
Program

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

int Fibbo(int);

int main()
{
  int n, i = 0, c;
 printf("\n Enter value of n : ");
  scanf("%d",&n);

  printf("\nFibonacci series\n");
  for (c = 1 ; c <= n ; c++)
  {
    printf(" %d ", Fibbo(i));
    i++;

  }

 getch();
}

int Fibbo(int n)

{
  if (n == 0)
    return 0;
  else if (n == 1)
    return 1;
  else
    return (Fibbo(n-1) + Fibbo(n-2) );
}
```

Loop will execute n times it will call Fibbo() each times and prints return value of Fibbo()

Recursively calls itself

Output



UQ. Write a program to reverse a number using recursion. **MU - May 16, 8 Marks**

☑ **Ans. :**

Program

```
#include <stdio.h>
long reverse(long);

int main()
{
  long n, r;
  printf("\n Enter a number : ");
  scanf("%ld", &n);

  r = reverse(n);

  printf("Reverse number is : %ld\n", r);

  return 0;
}

long reverse(long n) {
  static long r = 0;

  if (n == 0)
    return 0;

  r = r * 10;
  r = r + n % 10;
  reverse(n/10);
  return r;
}
```

Output

```
Enter a number : 123

Reverse number is : 321
```

UQ. Write a program to find x^y using recursion.

MU - Dec. 18, 4 Marks

☑ **Ans. : Program**

```
#include <stdio.h>

long power (int, int);

int main()
{
  int pow, num;
  long result;

  printf("Enter a number: ");
  scanf("%d", &num);
  printf("Enter it's power: ");
  scanf("%d", &pow);
  result = power(num, pow);
  printf("%d ^ %d is %ld", num, pow, result);
  return 0;
}

long power (int num, int pow)
{
  if (pow)
  {
    return (num * power(num, pow - 1));
  }
  return 1;
}
```

Output

```
D:\test.exe
Enter a number: 4
Enter it's power: 3
4^3 is 64
```

☞ **Assignment 8 : Structure and Union**

UQ Define a structure cricket which consist following members

(i) player name

(ii) country name

(iii) batting average

Input 20 player information of test playing county. Write a program which will display detail information of player with given player name.

MU - May 15, 6 Marks

☑ **Ans. :**

Program

```
#include<conio.h>
#include<stdio.h>
struct cricket
{
    char player_name[20], country_name[20];
```

```
    float batting_average;
};
int main ()
{
    struct cricket c1[25];
    int i;
    for(i=0;i<20;i++)
    {
        printf("Enter the  player_name, country_name and
average runs scored : ");
scanf("%s %s %f",c1[i].player_name,c1[i].country_name,
&c1[i].batting_average);
    }
printf("\nDetails : \n");
    for(i=0;i<20;i++)
{
    printf("%s\t%s\t%f\n",c1[i].player_name,c1[i].country_na
me,c1[i].batting_average);
 }

}
```

Output

```
D:\test.exe
Enter the  player_name, country_name and average runs scored : Rahul India 40000
```

UQ. A company needs to maintain data about their employees. Details to be maintained are Employee name, Department, Date of joining, Salary. Write a program which will store these details and list the employees whose salary is greater than Rs. 50000.00.

MU - May 16, 6 Marks

☑ **Ans. :**

Program

```
#include<conio.h>
#include<stdio.h>
struct company
{
    char emp_name[20], DOJ[20];
    float sal;
};
int main ()
{
    struct company c1[5];
    int i;
    for(i=0;i<5;i++)
    {
        printf("Enter the  emp_name, date of joing and salary :
");
scanf("%s %s %f",c1[i].emp_name,c1[i].DOJ, &c1[i].sal);
    }
printf("\nDetails of employess with salary > 50000 : : \n");
for(i=0;i<5;i++)
{
    if(c1[i].sal > 50000)
    printf("%s\t%s\t%.2f\n",c1[i].emp_name,c1[i].DOJ,c1[i].s
al);
 }

}
```

Output

```
D:\test.exe
Enter the  emp_name, date of joing and salary : Rahul 12-3-2018  40000
Enter the  emp_name, date of joing and salary : Ritesh 4-4-2017  54000
Enter the  emp_name, date of joing and salary : Raj 7-4-2018 28000
Enter the  emp_name, date of joing and salary : Kiran 9-2-2016 61000
Enter the  emp_name, date of joing and salary : Rohini 6-6-2018 32000

Details of employess with salary > 50000 : :
Ritesh  4-4-2017        54000.00
Kiran   9-2-2016        61000.00
```

UQ. Write a program to read Title, Author and Price of 10 books using array of structures. Display the records in ascending order of Price.

MU - May 17, 6 Marks

☑ **Ans. :**

```
#include<conio.h>
#include<stdio.h>
struct book
{
    char title[20], author[20];
    float price;
};
int main ()
{
    struct book c1[10],temp;
    int i,j,n;
    n = 10;
    for(i=0;i<10;i++)
    {
        printf("Enter title, author and price : ");
```

```
scanf("%s %s %f",c1[i].title,c1[i].author, &c1[i].price);
    }

    for(i=0;i<=n-1;i++)
    {
        for(j=0;j<=n-2;j++)
        {
            if(c1[j].price>c1[j+1].price)
            {
                temp=c1[j];
                c1[j]=c1[j+1];
                c1[j+1]=temp;
            }
        }
    }


printf("\nDetails of books in ascending order on price : \n");
for(i=0;i<10;i++)
{

    printf("%s\t%s\t%.2f\n",c1[i].title,c1[i].author,c1[i].price);
 }
}
```

Output

```
D:\test.exe
Enter title, author and price : Java aaa 300
Enter title, author and price : CProg bbb 200
Enter title, author and price : DS ccc 250
Enter title, author and price : C++ ddd 240
Enter title, author and price : PHP eee 190
Enter title, author and price : Python fff 320
Enter title, author and price : HTML ggg 150
Enter title, author and price : CSS hhh 180
Enter title, author and price : JS iii 245
Enter title, author and price : VB jjj 310

Details of books in ascending order on price :
HTML    ggg     150.00
CSS     hhh     180.00
PHP     eee     190.00
CProg   bbb     200.00
C++     ddd     240.00
JS      iii     245.00
DS      ccc     250.00
Java    aaa     300.00
VB      jjj     310.00
Python  fff     320.00
```

UQ. Write a program using structure to create an Array of structure to store the details of N students. The details are,
Student name
Student Roll no.
Marks of Physics, Chemistry, Maths.
Calculate the total of P-C-M. Display the data in the format
Name Roll no Total marks

MU - Dec. 17, 8 Marks

☑ **Ans. :**

Program

```
#include<stdio.h>

main()
{
struct student
{
    int rno,Physics,Chemestry,Maths,total;
    char name[20];
}s[3];
int i;

for(i=0;i<3;i++)
{
    printf("\n Enter name, rollno and marks of
Physics,Chemestry,Maths : ");
    scanf("%s %d %d %d %d",&s[i].name,
&s[i].rno,&s[i].Physics,&s[i].Chemestry,&s[i].Maths);
    s[i].total = s[i].Physics + s[i].Chemestry + s[i].Maths;
}
   printf("\n Name \t Rno \t Total");
for(i=0;i<3;i++)

{
    printf("\n %s \t %d \t %d",s[i].name,s[i].rno,s[i].total);
}


}
```

Output

```
D:\test.exe

Enter name, rollno and marks of Physics,Chemestry,Maths : Kunal 101 90 98 99

Enter name, rollno and marks of Physics,Chemestry,Maths : Rahul 102 78 76 67

Enter name, rollno and marks of Physics,Chemestry,Maths : Kiran 103 98 78 65

Name    Rno     Total
Kunal   101     287
Rahul   102     221
Kiran   103     241
```

UQ. Define a structure consisting of following elements.
(1) Student roll_no
(2) Student name
(3) student percentage
Write a program to read records of 5 students and display same. **MU - Dec. 18, 10 Marks**

☑ **Ans. :**

Program

```
#include<stdio.h>
main()
{
struct student
{
    int rno;
    float per;
    char name[20];
}s[5];
int i;

for(i=0;i<5;i++)
{
    printf("\n Enter name, rollno and percentage : ");
    scanf("%s %d %f",&s[i].name, &s[i].rno,&s[i].per);
}
   printf("\n Name \t Rno \t Percentage");
for(i=0;i<5;i++)

{
    printf("\n %s \t %d \t %.2f",s[i].name,s[i].rno,s[i].per);
}

}
```

Output

```
D:\test.exe

Enter name, rollno and percentage : abc 101 90

Enter name, rollno and percentage : pqr 102 87

Enter name, rollno and percentage : xyz 103 80

Enter name, rollno and percentage : mnr 104 65

Enter name, rollno and percentage : ssv 105 77

Name    Rno     Percentage
abc     101     90.00
pqr     102     87.00
xyz     103     80.00
mnr     104     65.00
ssv     105     77.00
```

Program on Union

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

union student
{
        char name[20];
        char subject[20];
        float percentage;
};
int main()
{
   union student record1;
   union student record2;

   // assigning values to record1 union variable
      strcpy(record1.name, "Raju");
      strcpy(record1.subject, "Maths");
      record1.percentage = 86.50;

      printf("Union record1 values example\n");
      printf(" Name       : %s \n", record1.name);
      printf(" Subject    : %s \n", record1.subject);
      printf(" Percentage : %f \n\n", record1.percentage);

   // assigning values to record2 union variable
      printf("Union record2 values example\n");
      strcpy(record2.name, "Mani");
      printf(" Name       : %s \n", record2.name);

      strcpy(record2.subject, "Physics");
```

```
    printf(" Subject    : %s \n", record2.subject);

    record2.percentage = 99.50;
    printf(" Percentage : %f \n", record2.percentage);
    return 0;
}
```

Output

```
Union record1 values example
Name :
Subject :
Percentage : 86.500000;
Union record2 values example
Name : Mani
Subject : Physics
Percentage : 99.500000
```

☞ Assignment 9 : Pointers

UQ. Write program to swap to values by using call by reference concept. **MU - Dec . 17, 4 Marks**

☑ Ans. :

```
#include<stdio.h>
void swap(int *, int*);
int  main()
{
    int num1=50,num2=60;
    printf("\n value of num1 and num2 before swapping:");
        printf("\n value of num1 :\t%d",num1);
        printf("\n value of num1 :\t%d",num2);

    swap(&num1,&num2);

    printf("\n value of num1  and num2 after swapping:");
      printf("\n value of num1 :\t%d",num1);
      printf("\n value of num1 :\t%d",num2);
      return 1;
}
void swap(int *a,int *b)
{
```

Call by reference: passes address of two numbers to swap() function

Address of num1 stored in a and address of num2 stored in b

```
int temp=*a;
```

Assigns value pointed by a i.e. num1 =50 to temp

```
*a=*b;
```

Assigns value pointed by b i.e. num2 =60 to *a

```
*b=temp;
```

Assigns value of temp i.e. 50 to *b

```
}
```

Output

```
C:\Program Files\Dev-Cpp\k1.exe

value of num1 and num2 before swapping:
value of num1 :         50
value of num1 :         60
value of num1  and num2 after swapping:
value of num1 :         60
value of num1 :         50
```

which are swapped just now.

GQ. Write a program to find minimum of two numbers using pointer and function.

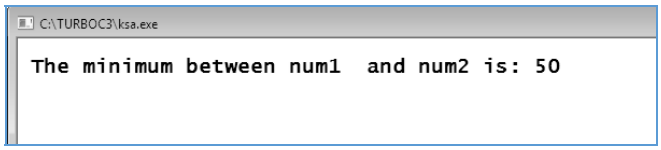
☑ Ans. : Program

```
#include<stdio.h>
#include<conio.h>
int* min(int *, int*);
int  main()
{
int m,num1=50,num2=60;
int *p;
p = min(&num1,&num2);

printf("\n The minimum between num1  and num2 is:
                                        %d",*p);
getch();
}
int* min(int *a,int *b)
{
    if(*a > *b)
    {
        return b;
    }
    else
    {
        return a;
    }
}
```

Function call min() accepts two parameters and returns a pointer back to calling function

If value pointed by a is less than value pointed by b then b is returned back otherwise a is return back to main()

Output



GQ. Write a program using pointers to compute the sum of all elements stored in an array. (5 Marks)

☑ **Ans. :**

Program

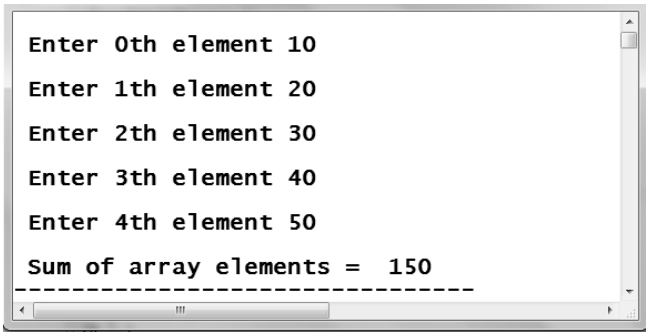
```
#include<conio.h>
#include<stdio.h>
int main()
{
int *ptr, sum=0, number[5],i=0;
    for(i=0;i<5;i++)
    {
    printf("\n Enter %dth element ",i);
    scanf("%d", &number[i]);
    }
```

Accepts array elements from user.

```
    i=0;
    ptr=&number[0];
    for(i=0;i<5;i++)
    {
        sum=sum+(*ptr++);
    }
    printf("\n Sum of array elements = %d", sum);
    return 1;
}
```

Calculates sum of all elements in array

Output



Chapter Ends…

❑❑❑