

EXPT. NO.	NAME OF THE EXPERIMENT	DATE OF PERFORMANCE
1	WAP to evaluate algebraic expressions after reading necessary values from user.	16/1/17
2	(i) WAP to print largest of 5 numbers (ii) WAP to print factorial of a no.	23/1/17
3	WAP to convert given character into ASCII & vice versa.	23/1/17
4	(i) WAP to print Fibonacci Series. (ii) WAP to print given pattern.	30/1/17
5	(a) WAP to print sum of $1 + 1/2 + 1/3 + \dots + 1/N$ (b) WAP to find sum of $1 + 1/x + 1/x^2 + 1/x^3 + \dots + 1/x^n$	13/2/17
6	WAP to illustrate switch function.	6/3/17
7	WAP to illustrate switch & union.	6/3/17
8	(i) WAP to perform Linear Search (ii) WAP to perform binary search	20/3/17
9	WAP to find length of string, Concatenate, reverse & to copy to another.	3/4/17
10	(i) Recursive program for tower of Hanoi. (ii) Recursive prog. to find factorial using function.	3/4/17
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Experiment 1

- Ques: Write a program to evaluate the following algebraic expression after reading necessary values from user -

(i) $(ax+b)/(ax-b)$

(ii) $2.5 \log(x) - \cos(30) + 1 x^2 - y^2 / + \sqrt{2xy}$

(iii) $x^5 + 10x^4 + 3x^3 + 4x + 2$

- Software Used: TURBO C

Source Code

(i) $(ax+b)/(ax-b)$

```
#include <stdio.h>
#include <conio.h>
void main()
{
    float a, x, b, y;
    clrscr();
    printf("Enter a, b & x: ");
    scanf("%f %f %f", &a, &b, &x);
    y = ((a*x)+b)/((a*x)-b);
    printf("Value of y is %f", y);
    getch();
}
```

$$ii) 2.5 \log x - \cos 30^\circ + |x^2 - y^2| + \sqrt{2xy}$$

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
void main()
{
    float x, y, z;
    clrscr();
    printf("Enter x & y : ");
    scanf("%f %f", &x, &y);
    z = (2.5 * log(x) - cos(30) + abs(pow(x, 2) - pow(y, 2))
        + sqrt(2 * x * y));
    printf("Value of z is %f", z);
    getch();
}
```

$$iii) x^5 + 10x^4 + 8x^3 + 4x + 2$$

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

```
    float x, y;
```

```
    clrscr();
    printf("Enter value of x : ");
    scanf("%f", &x);
```

```
y = (pow(x, 5)) + (10 * pow(x, 4)) + (8 * pow(x, 3)) + (4 * x) + 2;
```

```
    printf("Value of y is %f", y);
    getch(); }
```

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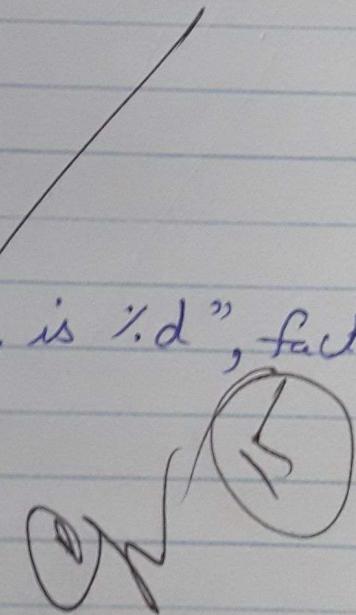
Experiment 2

- Aim: Write a program to print the largest of five numbers.
- Software Used: TURBO C
- Source Code

```
# include < stdio.h >
# include < conio.h >
void main ()
{
    int x, count = 0;
    clrscr();
    printf ("Enter 5 numbers to display the largest : ");
    for (int i=0; i<5; i++)
    {
        scanf ("%d", &x);
        if (x > count)
        {
            count = x;
        }
    }
    printf ("The largest of five numbers is : %d ", count);
    getch();
}
```

- Aim : To calculate & print the factorial of a given number.
- Software Used : TURBO C
- Source Code

```
#include <stdio.h>
#include<conio.h>
void main()
{
    int i = 1, fact = 1, a;
    clrscr();
    printf("Enter the no. to calculate factorial : ");
    scanf("%d", &a);
    while (i <= a)
    {
        fact = fact * i;
        i++;
    }
    printf("Factorial of the given no. is %d", fact);
    getch();
}
```



Experiment 3

- Aim: To convert the given character into ASCII & vice versa.
- Software Used: TURBO C
- SOURCE CODE

(i) #include <stdio.h>
#include <conio.h>
void main()
{
 char ch;
 clrscr();
 printf("Enter character to print it's ASCII code: ");
 scanf("%c", &ch);
 printf("%d", ch);
 getch();
}

(ii) #include <stdio.h>
#include <conio.h>
void main()
{ int a;
 clrscr();
 printf("Enter no.:");

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```
scanf ("%d", &a);
printf ("%c", *a);
getch();
}
```

Experiment - 34 (a)

- Aim: W.A.P. to print Fibonacci Series.
- Software Used: TURBO C
- SOURCE CODE

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int i, a=0, b=1, fib;
    clrscr()
    printf("Enter no. till you want to print the series:");
    scanf("%d", &n);
    printf("First two numbers are: %d %d\n", a, b);
    for(i=0; i<n; i++)
    {
        if (i<=1)
        {
            fib = i;
        }
        else{
            fib = a+b;
            printf("%d", fib);
        }
    }
}
```

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a = b ;

b = fib;

}

} getch();

Experiment 4(b)

- Ques: W.A.P to print the following pattern :
- 1
2 2
3 3 3
4 4 4 4 ...

- Software Used : TURBO C

- SOURCE CODE

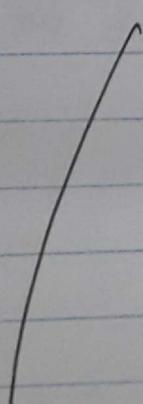
```
#include <stdio.h>
#include <conio.h>
void main()
{
    int n, i, j;
    clrscr();
    printf("Enter no. upto which you want to print
            the pattern : ");
    scanf("%d", &n);
    for(i=0; i<n; i++)
    {
        printf("\n");
        for(j=0; i<1; j++)
        {
            printf("%d", i);
        }
    }
    getch();
}
```

(15) Ch

Experiment 4c

Aim: Write a program to print prime nos from 1 to 100

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int i, f, n, a = 0;
    printf("Enter the range of n");
    scanf("%d", &n);
    for (i = 2; i <= n; i++)
    {
        if (i % f == 0)
            a++;
    }
    if (a == 1)
        printf("%d", i);
    a = 0;
}
getch();
clrscr();
```



Experiment 5(a)

Aim: WAP to program to find sum of the foll. series
 $1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{N}$

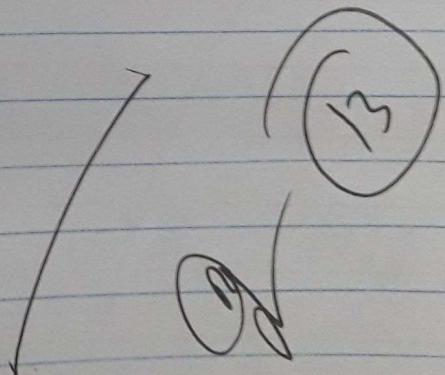
Program Used : TURBO C

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
void main()
{
    int i, n;
    float sum;
    printf ("Enter the no. of terms ");
    scanf ("%d", &n);
    for (i = 1; i <= n; i++)
    {
        sum += pow (i, -1);
    }
    printf ("The sum of the series is %.f", sum);
    getch();
    clrscr();
}
```

2.) WAP to find sum of the following series ...

$$1 + \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \dots + \frac{1}{x^n}$$

```
#include < stdio.h >
#include < conio.h >
#include < math.h >
void main()
{
    int i, n, x;
    float sum = 1;
    printf ("\n Enter the value of x");
    scanf ("%d", &x);
    printf ("\n Enter the value of n");
    scanf ("%d", &n);
    for (i=1; i<=n; i++)
    {
        sum += pow (x, -i);
    }
    printf ("The sum of the series is %.f", sum);
    getch();
    clrscr();
}
```



Experiment 5

- Aim: WAP to perform various operation on matrices (menu driven).
- Software Used : Turbo C
- ```
#include <stdio.h>
#include <conio.h>
int n, i, j, k, a[5][5], b[5][5], c[5][5];
void Enter 1()
{
 printf (" \n \nEnter 1st matrix : \n ");
 for(i=0; i<n; i++)
 {
 printf (" \nEnter row %.2d : \n ", i+1);
 for(j=0; j<n; j++)
 {
 printf (" \t");
 scanf ("%d", &a[i][j]);
 }
 }
 printf (" \n \nEnter 2nd matrix : \n ");
 for(i =0; i<n; i++)
 {
 printf (" \nEnter row %.2d : \n ", (i+1));
 for (j =0; j<n; j++)
 {
 printf (" \t");
 scanf ("%d", &b[i][j]);
 }
 }
}
```

void Enter 2()

```

{ printf (" \n Enter the matrix : \n ");
for (i = 0; i < n; i++)
{
 printf (" \n Enter row %d : \n ", i+1);
 for (j = 0; j < n; j++)
 {
 printf (" \t ");
 scanf ("%d", &a [i] [j]);
 }
}
}

```

void add()

```

{ printf (" \n The resultant matrix is : \n ");
for (i = 0; i < n; i++)
{
 printf (" \n ");
 for (j = 0; j < n; j++)
 {
 printf (" \t %d ", (a [i] [j] + b [i] [j]));
 }
}
}

```

void subtract()

```

{ printf (" \n The resultant matrix is : \n ");
for (i = 0; i < n; i++)
{
 printf (" \n ");
 for (j = 0; j < n; j++)
 {
 printf (" \t %d ", (a [i] [j] - b [i] [j]));
 }
}
}

```

```

void triangle ()
{
 printf ("\n The upper triangle of matrix is : \n");
 for (i=0; i<n; i++)
 {
 printf ("\n");
 for (j=0; j<n; j++)
 {
 if (i < j)
 printf ("\t%d", a[i][j]);
 }
 }
 printf ("\n\n Lower triangle of the matrix : \n");
 for (i=0; i<n; i++)
 {
 printf ("\n");
 for (j=0; j<n; j++)
 {
 if (i > j)
 printf ("\t%d", a[i][j]);
 }
 }
}

void multiply()
{
 int k, s=0;
 for (i=0; i<n; i++) { for (j=0; j<n; j++)
 {
 s=0;
 for (k=0; k<n; k++)
 {
 s += (a[i][k] * b[k][j]);
 }
 c[i][j] = s;
 }
}
printf ("\n The resultant matrix is : \n");
for (i=0; i<n; i++) { printf ("\n");
 for (j=0; j<n; j++) { printf ("\t%d", c[i][j]);
 }
}
}

```

```
void transpose ()
{ for (i=0; i<n; i++)
{ for (j=0; j<n; j++)
{ c[i][j] = a[j][i]; }}}
```

```
printf ("\\n Transpose of the matrix is : \\n");
for (i=0; i<n; i++)
{ printf ("\\n");
 for (j=0; j<n; j++)
 { printf ("\\t");
 printf ("\\d", c[i][j]);
 }}
```

```
void main ()
{
```

```
int ch();
```

```
char str [20];
```

```
clrscr ();
```

```
printf ("\\n..... Matrix Operation");
```

```
printf ("\\n 1. To perform addition ");
```

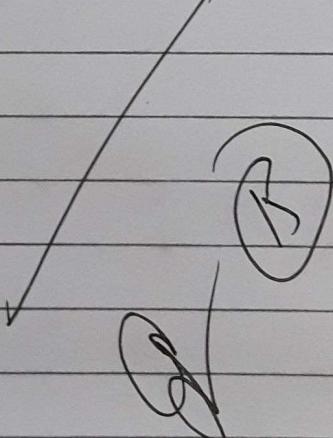
```
printf ("\\n 2. To perform subtraction ");
```

```
printf ("\\n 3. To find upper & lower triangle of a matrix");
```

```
printf ("\\n 4. To find transpose of matrix ");
```

```
printf ("\\n 5. To perform Multiplication ");
```

```
printf("In Enter your choice : \t");
scanf("%d", &ch);
clrscr();
printf("In In How many rows & columns you want
 to enter in the matrix : \t");
scanf("%d", &n);
switch(ch)
{
 case 1: Enter1(); add(); break();
 case 2: Enter1(); subtract(); break();
 case 3: Enter2(); triangle(); break();
 case 4: Enter2(); transpose(); break();
 case 5: Enter1(); multiply(); break();
 default: printf("In In Enter choice from menu only...!");
}
getch();
```



## Experiment 6

- dim: WAP to illustrate switch function.
- Software Used: Turbo C.
- Source Code

```
#include <stdio.h>
#include <conio.h>
int a, b, n;
void Enter()
{
 int a, b, n;
 printf("Enter two numbers to perform operation:");
 scanf("%d%d", &a, &b);
}
void add()
{
 n = a+b;
 print("The result is : ", n);
}
void subtract()
{
 n = a-b;
 print("The result is : ", n);
}
```

```
void multiply()
```

```
{ n = a * b;
```

```
} printf("The result is : ", n);
```

```
void divide()
```

```
{ n = a / b;
```

```
} printf("The result is : ", n);
```

```
void main()
```

```
{
```

```
printf("Enter the desired operation : \n 1: Add
 2: Subtract \n 3: Multiply \n 4: Divide ");
```

```
switch(n){
```

```
case 1: Enter(); add(); break;
```

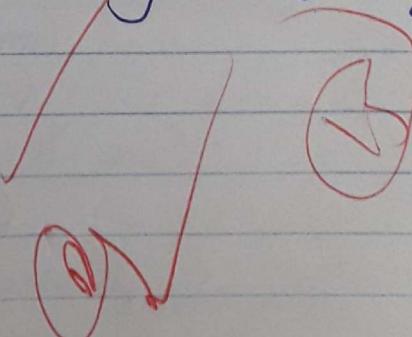
```
case 2: Enter(); subtract(); break;
```

```
case 3: Enter(); multiply(); break;
```

```
case 4: Enter(); divide(); break;
```

```
default: printf("Enter value from given set only !!");
```

```
}
```



## Experiment 7

- Ques: WAP. to illustrate struct and union.
- Software Used : Turbo C
- Source Code - With Struct :

```
#include < stdio.h >
#include < conio.h >
struct student
{
 int roll_no;
 char name[10];
 float marks;
}s[5];
void Enter()
{
 int i;
 for(i=0; i<5; i++)
 {
 printf("Enter Name : ");
 scanf("%s", &s[i].name);
 printf("Enter Roll no. : ");
 scanf("%d", &s[i].roll_no);
 printf("Enter Marks : ");
 scanf("%f", &s[i].marks);
 }
}
```

```
void main ()
{
 close ();
 enter ();
 display ();
 getch ();
}
```

(ii) With Union -

```
#include <stdio.h>
#include <conio.h>
union union student
{
 int roll-no;
 char name[5];
 float marks;
}
s[5];
void enter ()
{
 int i;
 for (i = 0; i < 5; i++)
 {
 printf("Enter name");
 scanf("%s", &s[i].name);
 }
}
```

```

printf("Enter Rollno. : ");
scanf("%d%d", &s[i].roll_no);
printf("Enter Marks : ");
scanf("%d%f", &s[i].marks);
}

```

```

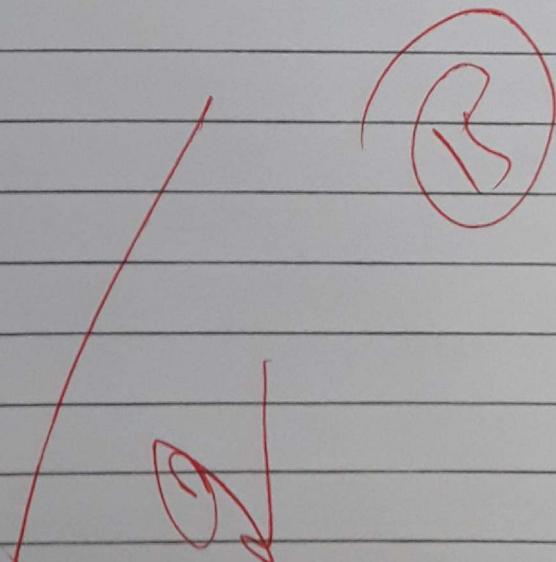
void display()
{
 int i;
 for(i=0; i<5; i++)
 {
 printf("Student name : %c", s[i].name);
 printf("Student roll no. : %d", s[i].roll_no);
 printf("Student Marks : %f", s[i].marks);
 }
}

```

```

void main()
{
 clrscr();
 Enter();
 display();
 getch();
}

```



## Experiment 8

(i). WAP to perform Linear Search in an array.

- Software Used : Turbo C

- Syntax

```
#include < stdio.h >
#include < conio.h >
void main()
{
 int a[10], i, n, m, p, c = 0;
 clrscr();
 printf("Enter the size of array : ");
 scanf("%d", &n);
 printf("Enter the elements of array : ");
 for(i=0; i<=n-1; i++)
 {
 scanf("%d", &a[i]);
 }
 printf("Enter the number to be searched : ");
 scanf("%d", &m);
 for(i = 0; i<=n-1; i++)
 {
 if(a[i] == m)
```

```
c = 1; p = i+1;
break;
}};
```

```
if (c == 0) {
 print ("The no. entered is not in array !! ");
} else printf ("The item is found at position %d", p);
getch();
```

(ii) WAP to perform Binary Search.

```
#include <stdio.h>
#include <conio.h>
void main()
clrscr();
int a[10], size, i, val = 0, beg, mid, end;
printf ("Enter size of array : ");
scanf ("%d", &size);
printf ("Enter the elements of array : ");
for (i = 0; i < size; i++)
{ scanf ("%d" & [i]); }
printf ("Enter the value to be searched : ");
scanf ("%d", &val);
printf ("Elements of the array are : ")
```

```
for (i=0; i<size; i++)
{
 printf ("%n %d", a[i]);
}

beg = 0;
end = (size - 1);
while (beg <= end)
{
 mid = (beg + end) / 2;
 if (a[mid] == val)
 {
 printf ("\n Value is found! \n");
 printf ("\n Location is : %d", mid + 1);
 break;
 }
 else if (a[mid] < val)
 {
 beg = (mid + 1);
 }
 else if (a[mid] > val)
 {
 end = mid - 1;
 }
}

 getch();
```



## Experiment 9

- AIM: WAP to perform the following without using string function
  - (a). To find length of string (b) Concatenate (c) Rev. of string (d). Copy a str. to another
- Software Used : Turbo C
- Source Code

(a). #include <stdio.h>  
# include <conio.h>  
# include <string.h>  
void main ()  
{  
 char str [30];  
 int i = 0;  
 printf ("Enter a string ");  
 gets (str);  
 while (str [i] != '\0')  
 {  
 i++;  
 }  
 printf ("Length of string is: %d", i);  
 getch();  
}

(b). Concatenate 2 strings

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
void main()
{
 char str1[20], str2[20];
 int i = 0, f = 0, l1, l2;
 printf("Enter string 1");
 gets(str1);
 printf("Enter string 2");
 gets(str2);
 l1 = strlen(str1);
 i = l1;
 while(str2[i] != '\0')
 {
 str1[i] = str2[i];
 i++;
 }
 puts(str1);
 getch();
 clrscr();
}
```

(c). To reverse a string

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
 char str[100], temp;
 int i, f = 0;
 printf("Enter the string : ");
 gets(str);
 i = 0;
 j = strlen(str) - 1;
 while(i < f)
 {
 temp = str[i];
 str[i] = str[j];
 str[j] = temp;
 i++;
 j--;
 }
 printf("\n Reverse string : %s", str);
 getch();
}
```

(d). To copy one string to another

```
#include <stdio.h>
#include <conio.h>
void main()
{
 char s1[100], s2[100], i;
 printf("Enter String ");
 gets(str);
 for (i=0; s1[i] != '\0'; i++)
 {
 s2[i] = s1[i];
 }
 s2[i] = '\0';
 printf("The string is %s, s2)
 getch();
 clrscr();
}
```

## Experiment 10 (Innovation Project)

(i) Write a recursive program for Tower of Hanoi.

\* Description

Tower of Hanoi is a mathematical puzzle. It consists of three poles and a number of disks of different sizes. The puzzle is that the disks need to be transferred from one tower to another in ascending order with the help of third tower.

It has <sup>three</sup> two rules -

- (i) Only one disk can be moved at a time.
- (ii) Large disk can't be placed on smaller one.
- (iii) Only uppermost disk can be moved.

• Software Used : Turbo C.

• Source Code

#include <stdio.h>

#include <stdlib.h>

void towerofhanoi(int n, char source, char destination, char aux)

```
{
 if (n == 1)
 {
```

```
printf("Move disk 1 from %c to %c", source, destination);
 }
}
else {
 tower_of_hanoi(n-1, source, auxi, destination);
 printf("Move %d from %c to %c", n, source, destination);
 tower_of_hanoi(n-1, auxi, destination, source);
}
int main()
{
 int n;
 printf("Enter the number of disks : ");
 scanf("%d", &n);
 printf("The sequence of moves involved in TOH are : \n");
 tower_of_hanoi(n, 'A', 'C', 'B');
 return 0;
}
```

### OUTPUT

Enter the number of disks : 3

The sequence of moves involved in TOH are :

Move disk 1 from A to C

Move disk 2 from A to B

Move disk 1 from C to B

Move disk 3 from A to C

Move disk 1 from B to A

Move disk 2 from B to C

Move disk 1 from A to C

~ . ~ . ~

(ii)

Write a recursive program to find factorial of a given number using function.

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

```
int factorial (int);
```

```
int main ()
```

```
{
```

```
 int n, result;
```

```
 printf ("\\nEnter a number to calculate its factorial: ");
```

```
 scanf ("%d", &n);
```

```
 if (n < 0)
```

```
{
```

```
 printf ("Factorial of negative number is not possible.");
```

```
}
```

```
else
```

```
{
```

```
 result = factorial (n);
```

```
 printf ("The factorial of %d is %d.", n, result);
```

```
}
```

```
}
```

```
int factorial (int n)
```

```
{
```

```
 if (n == 0 || n == 1)
```

```
{
```

```
 return 1;
```

```
}
```

```
else {
 } return (n * factorial (n - 1));
}
```

\* OUTPUT

Enter a number to calculate its factorial : 5  
The factorial of 5 is 120.

Enter a number to calculate it's factorial : -9  
Factorial of negative number is not possible.

Enter a number to calculate its factorial : 0  
The factorial of 0 is 1.

Ch