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	Date: 27/05/2021	**Week Number: 4**

1 Write a function to display an array elements in the reverse order using multiple files.

a) using index

b) using pointer

Input:

Enter the size of an array

5

Enter elements

11

22

33

44

55

Output:

Array elements:

11 22 33 44 55

Reversed array:

55 44 33 22 11

Program:

CLIENT FILE- Program1.c

```
#include<stdio.h>
#include "reverse.h"
int main()
{
        int a[100],i,n;
        printf("Enter the number of elements ");
        scanf("%d",&n);
        printf("Enter the elements ");
        for(i=0;i<n;i++)
        {
                scanf("%d",&a[i]);
        }
        printf("The array is ");
        for(i=0;i<n;i++)
        {
                printf("%d ",a[i]);
        }
        printf("\nThe reversed array using index is ");
        reverse(a,n);
        printf("\nThe reversed array using pointers is ");
        reverse1(a,n);
        return 0;
}
```

reverse.h

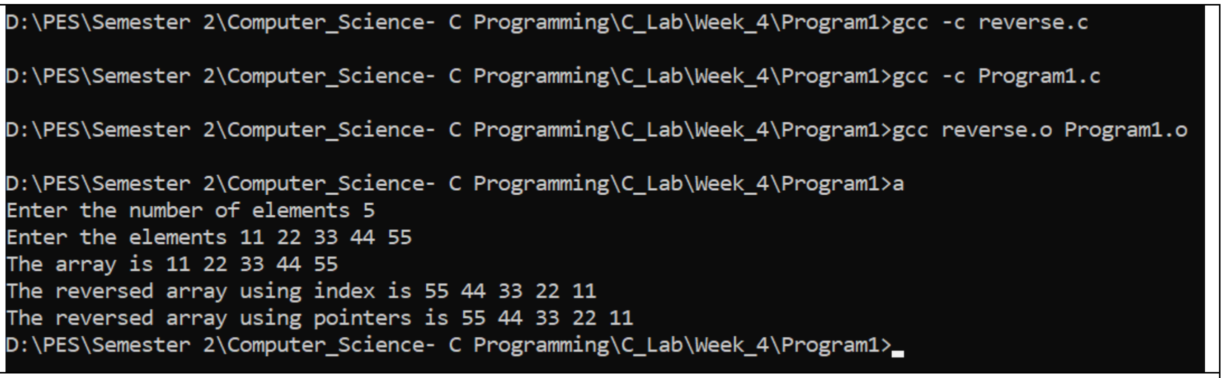
```
void reverse(int a[], int n);
void reverse1(int *a, int n);
```

reverse.c

```
#include <stdio.h>

void reverse(int a[], int n)
{
        int i;
        for(i=n-1;i>=0;i--)
        {
                printf("%d ",a[i]);
        }
}
void reverse1(int *a, int n)
{
        int i;
        for(i=n-1;i>=0;i--)
        {
                printf("%d ",*(a+i));
        }
}
```

Output Screenshot:



```
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program1>gcc -c reverse.c

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program1>gcc -c Program1.c

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program1>gcc reverse.o Program1.o

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program1>a
Enter the number of elements 5
Enter the elements 11 22 33 44 55
The array is 11 22 33 44 55
The reversed array using index is 55 44 33 22 11
The reversed array using pointers is 55 44 33 22 11
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program1>_
```

2 Write a function for factorial using recursion and use it to find C(n, r) using multiple files.

Input:

5 2

Output:

ncr is: 10

Program:

CLIENT FILE – Program2.c

```
#include<stdio.h>
#include "factorial.h"
int main()
{
        int num,factorial,n,r,comb;
        printf("Enter a number ");
        scanf("%d",&num);
        factorial = fact(num);
        printf("The factorial of %d is %d ",num,factorial);
        printf("\nEnter n and r for C(n,r) in the respective order ");
        scanf("%d %d",&n,&r);
        comb = combination(n,r);
        printf("The combination is %d ",comb);
        return 0;
}
```

factorial.h

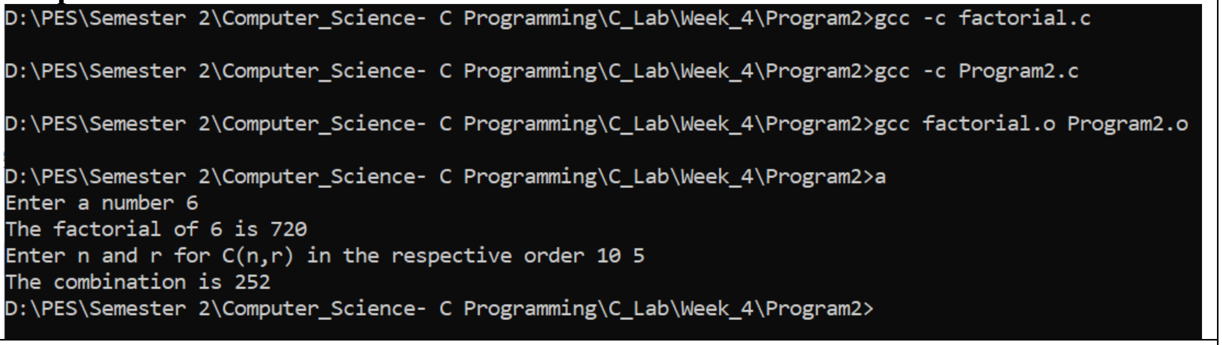
```
int fact(int num);
int combination(int n, int c);
```

factorial.c

```
int fact(int n)
```

```
{
        if(n==0)
                return 1;
        else
                return n*fact(n-1);
}
int combination(int n, int r)
{
        return fact(n)/(fact(r)*(fact(n-r)));
}
```

Output Screenshot:



```
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program2>gcc -c factorial.c

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program2>gcc -c Program2.c

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program2>gcc factorial.o Program2.o

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program2>a
Enter a number 6
The factorial of 6 is 720
Enter n and r for C(n,r) in the respective order 10 5
The combination is 252
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program2>
```

3 Write a C program to print all unique elements of an array using Make file

Input:

Input the number of elements to be stored in the array: 5

Input 5 elements in the array :

element - 0 : 1

element - 1 : 2

element - 2 : 1

element - 3 : 3

element - 4 : 3

Output:

The unique elements found in the array are:

List of Unique Array Elements in this Array are : 2

Program:

CLIENT FILE – Program3.c

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

```
{
        int a[100],i,n;
        printf("Enter the number of elements ");
        scanf("%d",&n);
        printf("Enter the elements ");
        for(i=0;i<n;i++)
                scanf("%d",&a[i]);
        unique(a,n);
        return 0;
}
```

unique.c

```
#include<stdio.h>
int unique(int a[], int n)
{
        int b[100],i,count,j,flag;
        b[0]=a[0];
        count = 1;
        for(i=1;i<n;i++)
        {
     flag = 0;
                for(j=0;j<count;j++)
                {
                        if(a[i]!=b[j])
                                continue;
                        else
                        {
                                flag = 1;
                                break;
                        }
                }
                if(!flag)
                {
                        b[count] = a[i];
                        count++;
                }
        }
        printf("The unique elements in the array is ");
        for(j=0;j<count;j++)
                printf("%d ",b[j]);
}
```

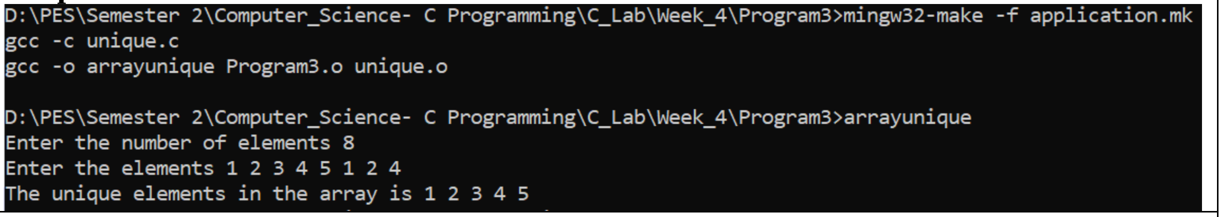
unique.h

```
int unique(int a[], int n);
```

makefile

```
arrayunique : Program3.o unique.o
	gcc -o arrayunique Program3.o unique.o
Program3.o : Program3.c unique.h
	gcc -c Program3.c
unique.o : unique.c unique.h
	gcc -c unique.c
```

Output Screenshot:



```
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program3>mingw32-make -f application.mk
gcc -c unique.c
gcc -o arrayunique Program3.o unique.o

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program3>arrayunique
Enter the number of elements 8
Enter the elements 1 2 3 4 5 1 2 4
The unique elements in the array is 1 2 3 4 5
```

4 Write a C program to Calculate the power of any number using recursion and multiple files

Input:

Recursion : Calculate the power of any number :

Input the base value : 4

Input the value of power : 2

Output:

The value of 4 to the power of 2 is : 16

Program:

CLIENT FILE – Program4

```
#include<stdio.h>
#include "p.h"
int main()
{
	int base,pow,p;
	printf("Enter the base and power ");
```

```
        scanf("%d %d",&base,&pow);
        p = power(base,pow);
        printf("The power of %d^%d is %d ",base,pow,p);
        return 0;
}
```

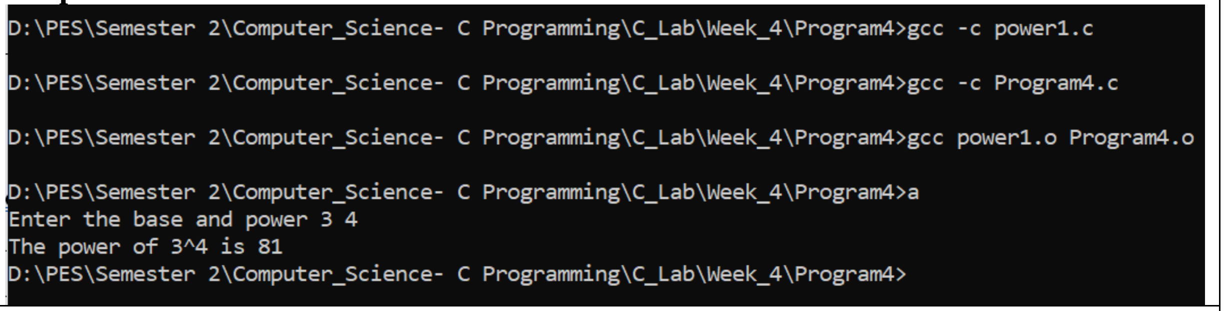
power1.c

```
int power(int base, int pow)
{
        if(base==0)
                return 0;
        else if(pow==0)
                return 1;
        else
                return base*power(base,pow-1);
}
```

power.h

```
int power(int base, int pow);
```

Output Screenshot:



```
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program4>gcc -c power1.c

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program4>gcc -c Program4.c

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program4>gcc power1.o Program4.o

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program4>a
Enter the base and power 3 4
The power of 3^4 is 81
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program4>
```

5 Write a function to check whether a given number is prime and use that to find the next prime number, greater than a given number.

Input1:

Enter a number

4

Output1:

Next prime number=5

Input2:

Enter a number

113

Ouput2:

```
Next prime number=127
```

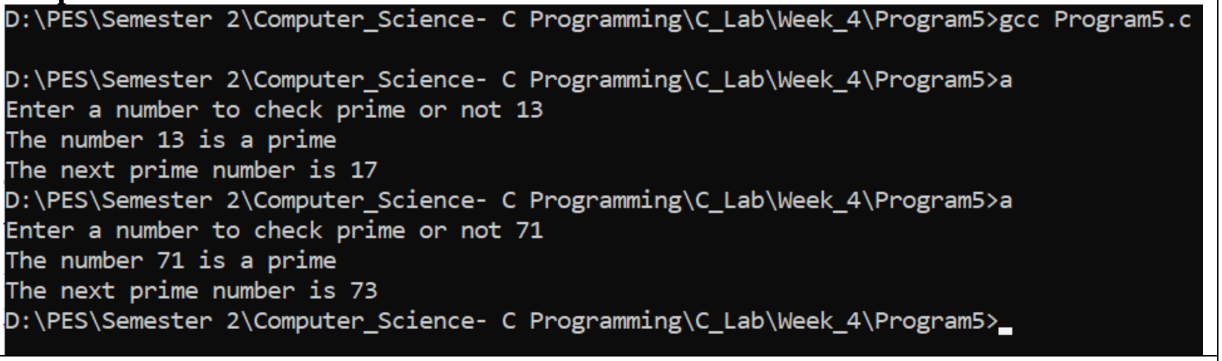
Program:

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

int isPrime(int num);
int nextPrime(int num);

int main()
{
    int num,np;
    printf("Enter a number to check prime or not ");
    scanf("%d",&num);
    if(isPrime(num))
        printf("The number %d is a prime ",num);
    else
        printf("The number %d is not a prime ",num);
    np = nextPrime(num);
    printf("\nThe next prime number is %d",np);
    return 0;
}
int isPrime(int num)
{
    int i;
    for(i=2;i<num;i++)
    {
        if(num%i==0)
            return 0;
    }
    return 1;
}
int nextPrime(int num)
{
    num = num+1;
    while(1)
    {
        if(isPrime(num))
            return num;
        num++;
    }
}
```

Output Screenshot:



```
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program5>gcc Program5.c

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program5>a
Enter a number to check prime or not 13
The number 13 is a prime
The next prime number is 17
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program5>a
Enter a number to check prime or not 71
The number 71 is a prime
The next prime number is 73
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\Program5>
```

Practice Programs

1 Write a program in C to find the maximum and minimum element in an array

Input:

Find maximum and minimum element in an array :

Input the number of elements to be stored in the array :5

Input 5 elements in the array :

element - 0 : 12

element - 1 : 10

element - 2 : 6

element - 3 : 7

element - 4 : 56

Output:

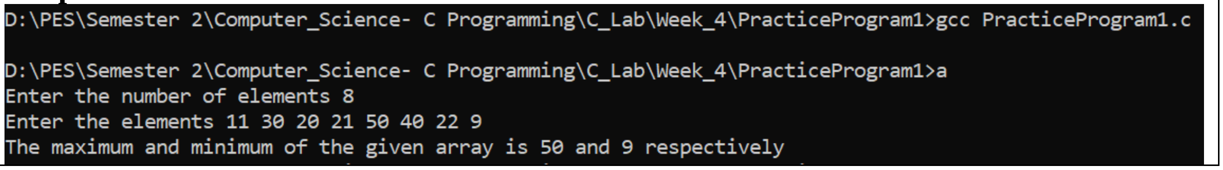
Maximum element is : 56

Minimum element is : 6

Program:

```
#include<stdio.h>
#include<conio.h>
int maximum(int a[],int n);
int minimum(int a[],int n);
int main()
{
        int min,max,a[50],i,n;
        printf("Enter the number of elements ");
        scanf("%d",&n);
        printf("Enter the elements ");
        for(i=0;i<n;i++)
                scanf("%d",&a[i]);
        max = maximum(a,n);
        min = minimum(a,n);
        printf("The maximum and minimum of the given array is %d and %d respectively",max,min);
        return 0;
}
int maximum(int a[],int n)
{
        int i,max;
        max = a[0];
        for(i=1;i<n;i++)
        {
                if(a[i]>max)
                        max = a[i];
        }
        return max;
}
int minimum(int a[],int n)
{
        int i,min;
        min = a[0];
        for(i=1;i<n;i++)
        {
                if(a[i]<min)
                        min = a[i];
        }
        return min;
}
```

Output Screenshot:



```
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\PracticeProgram1>gcc PracticeProgram1.c

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\PracticeProgram1>a
Enter the number of elements 8
Enter the elements 11 30 20 21 50 40 22 9
The maximum and minimum of the given array is 50 and 9 respectively
```

2 Write a function to populate an array with fibonacci numbers using make files

Input:

Enter how many Fibonacci numbers you want populate:

5

Output:

Fibonacci number are:

0

1

1

2

3

Program:

CLIENT FILE – PracticeProgram2.c

```
#include<stdio.h>
#include<conio.h>
#include "fib.h"
int main()
{
        int n;
        printf("Enter the number of terms ");
        scanf("%d",&n);
        fibonacci(n);
        return 0;
}
```

fib.h

```
void fibonacci(int n);
```

fib.c

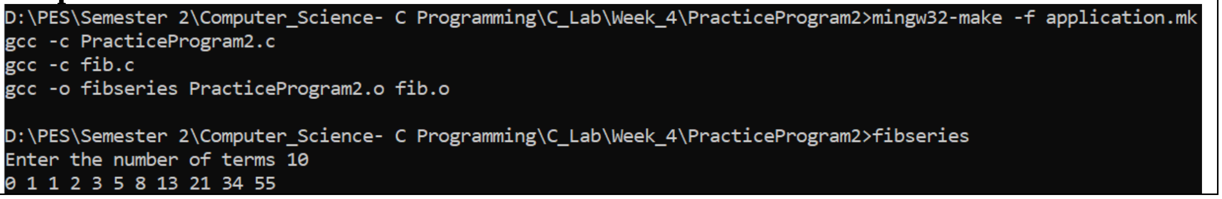
```
#include<stdio.h>
void fibonacci(int n)
{
        int i,a[50];
        a[0] = 0;
        a[1] = 1;
        printf("%d %d ",a[0],a[1]);
        for(i=2;i<=n;i++)
        {
                a[i] = a[i-2] + a[i-1];
                printf("%d ",a[i]);
        }

}
```

Makefile

```
fibseries : PracticeProgram2.o fib.o
        gcc -o fibseries PracticeProgram2.o fib.o
PracticeProgram2.o : PracticeProgram2.c fib.h
        gcc -c PracticeProgram2.c
fib.o : fib.c fib.h
        gcc -c fib.c
```

Output Screenshot:



```
D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\PracticeProgram2>mingw32-make -f application.mk
gcc -c PracticeProgram2.c
gcc -c fib.c
gcc -o fibseries PracticeProgram2.o fib.o

D:\PES\Semester 2\Computer_Science- C Programming\C_Lab\Week_4\PracticeProgram2>fibseries
Enter the number of terms 10
0 1 1 2 3 5 8 13 21 34 55
```