UNIT 2:

1.What is an array ? Different ways for initialising 1D array?

Answer:

An array is collection of items or elements stored at continuous memory locations.

Declaration:

datatype arrayname[maxsize];

Declaration and Initialization:

Storage class datatype arrayname[size] = {List of Value};

Different ways for initialising 1D array:

1. int arr[10]; // declaration for one dimensional array

2. int arr[] = {10, 20, 30, 40} // declaration and initialization above is same as

int arr[4] = {10, 20, 30, 40}

3. int arr[6] = {10, 20, 30, 40} above is same as

int arr[] = {10, 20, 30, 40, 0, 0}"

Memory Address of an array Elements are accessed by specifying the index (offset) of the desired element within square [ ] brackets after the array name.

2. List and explain any five string handling functions with examples.

Answer:

1 **strcpy(s1, s2)**; Copies string s2 into string s1.

2 **strcat(s1, s2);** Concatenates string s2 onto the end of string s1.

3 **strlen(s1);** Returns the length of string s1.

4 **strcmp(s1, s2);** Returns 0 if s1 and s2 are the same; less than 0 if s13.

5 **strchr(s1, ch**); Returns a pointer to the first occurrence of character ch in string s1.

6 **strstr(s1, s2);** Returns a pointer to the first occurrence of string s2 in string s1.

Program:

```
#include<stdio.h>
 #include <string.h>
int main ()
 {
        char str1[12] = "Hello";
         char str2[12] = "World";
        char str3[12];
```

```
int len ;
strcpy(str3, str1);
printf("strcpy( str3, str1) : %s\n", str3 );
strcat( str1, str2);
printf("strcat( str1, str2): %s\n", str1 );
len = strlen(str1);
 printf("strlen(str1) : %d\n", len );
return 0;
 }
```

Output :

strcpy(str3, str1) : Hello

strcat(str1, str2) : HelloWorld

strlen(str1) : 10

3.Differentiate between structure and union?

Answer:

	STRUCTURE	UNION
Keyword	The keyword **struct** is used to define a structure	The keyword **union** is used to define a union.
Size	When a variable is associated with a structure, the compiler allocates the memory for each member. The size of structure is **greater than or equal to the sum of sizes of its members.**	when a variable is associated with a union, the compiler allocates the memory by considering the size of the largest memory. So, size of **union is equal to the size of largest member.**
Memory	Each member within a structure is assigned unique storage area of location.	Memory allocated is shared by individual members of union.
Value Altering	Altering the value of a member will not affect other members of the structure.	Altering the value of any of the member will alter other member values.
Accessing members	Individual member can be accessed at a time.	Only one member can be accessed at a time.
Initialization of Members	Several members of a structure can initialize at once.	Only the first member of a union can be initialized.

Syntax	struct tagname
	{
	member 1;
	member 2;
	... member m;
	};
	struct tagname variable1,
	variable2..... ;
		union tagname
		{
		member 1;
		member 2;
		... member m;
		} ;
		struct tagname variable1,
		variable2..... ;

4. Define a structure for Student with Sno, Sname, marks of three subjects ,avg.

Write a C program to read 4 students information calculate average and display 4 students information.

Answer:

PROGRAM:

```
#include<stdio.h>
struct student
{
        int sno;
        char sname[20];
        int mark[3];
         float avg;
};
int main()
{
        struct student  s[4];
         int i , j, sum=0;
        for(i=0;i<4;i++)
        {
                sum=0;
                printf(" enter  student %d details\n",i+1);
                printf("sno,  sname\n");
                scanf("%d%s", &s[i].sno, s[i].sname);
                printf("enter 3 subject marks\n");
                for(j=0;j<3;j++)
                {
                    scanf ("%d",&s[i].mark[j];
                    sum=sum+ s[i].mark[j];
                }
                s[i].avg=sum/3.0;
        }
        Printf("Student details are");
        for(i=0;i<4;i++)
        {
                printf("%d student : ",i+1);
                printf("%d student sno: %d\n",s[i].sno);
                printf("%d student name: %s\n",s[i].sname);
                printf("%d student pecentage: %f\n",s[i].avg);

        }
return 0;
}
```

5. what is pointer ? explain pointer arithmetic.

Answer:

Pointers in C language is a variable that stores/points the address of another variable.

A Pointer in C is used to allocate memory dynamically i.e. at run time.

The pointer variable might be belonging to any of the data type such as int, float, char, double, short etc.

Pointer is a derived data type.

Syntax:

Datatype *pointername;

Example : int *p; char *p;

pointer arithmetic: Operation perform on the pointers are

int * ptr, * p, a=20 , b=10;

p= &a;

ptr= &b;

1 poninter increment & decrement. (p++, ptr--, --p, ++ptr)

2 substraction of two pointer. (ptr – p)

3 poniter can be added or subtracted with constant integer value. (ptr + 3, p-4)

4 Relational operator : two pointer variable can be compared. (ptr< p, ptr==p)

5 Assignment operator: one pointer value can be assign to another pointer.(p= ptr)

UNIT 3:

1. Explain different preprocessor directives in C?

Answer:

Sr.No.	Directive & Description
1	**#define:** Substitutes a pre-processors macro. Example: #define max 7
2	**#include:** Inserts a particular header from another file.
3	**#undef :** Undefines a pre-processor macro.
4	**#ifdef:** Returns true if this macro is defined.
5	**#ifndef :** Returns true if this macro is not defined.
6	**#if:** Tests if a compile time condition is true.
7	**#else :** The alternative for #if.
8	**#elif :** #else and #if in one statement.
9	**#endif :** Ends preprocessor conditional.

Program:

```
#include <stdio.h>
#define PI 3.1415
#define circleArea(r) (PI*r*r)
int main()
{
   float radius, area,area1;
   printf("Enter the radius: ");
   scanf("%f", &radius);
   area = PI*radius*radius;
   printf("Area=%.2f",area);
   area1 = circleArea(radius);
   printf("Area = %.2f", area1);
    printf("Current time: %s",--TIME--);
   return 0;
}
```

OUTPUT:

```
Enter the radius: 5
Area=78.54
Area1 = 78.54
Current time: 07:19:33
```

2. define file? What are the types of file ?

Answer:

In C programming, file is a place on computer disk where information is stored permanently. Which represents a sequence of bytes ending with an end-of-file marker(EOF) .

Types of Files

1. Text files
2. Binary files

1. Text files

Text files are the normal .txt files that you can easily create using Notepad or any simple text editors.

When you open those files, you'll see all the contents within the file as plain text. You can easily edit or delete the contents.

They take minimum effort to maintain, are easily readable, and provide least security and takes bigger storage space.

2. Binary files

Binary files are mostly the .bin files in your computer.

Instead of storing data in plain text, they store it in the binary form (0's and 1's).

They can hold higher amount of data, are not readable easily and provides a better security than text files.

3. Define file pointer? Explain how to create,open, and read a file?

Answer:

Declaration for file Pointer:

When working with files, you need to declare a pointer of type file. This declaration is needed for communication between the file and program.

Syntax:

FILE *file_pointer_name;

Example: FILE *fp;

Opening a File or Creating a File:

The fopen() function is used to create a new file or to open an existing file. this function available in stdio.h file

Syntax:

fp= fopen("filename", "mode");

filename is the name of the file to be opened and **mode** specifies the purpose of opening the file. Mode can be of following types,

Example:

fp= fopen("sample.txt", "w");

fp= fopen("sample.txt", "r");

Reading and writing to a text file:

For reading and writing to a text file, we use the functions

Function	Description
getc()	reads a character from a file
putc()	writes a character to a file
fscanf()	reads a set of data from a file
fprintf()	writes a set of data to a file
getw()	reads a integer from a file
putw()	writes a integer to a file

4. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Answer:

```
#include <stdio.h>
#include <stdlib.h>
 int main()
{
   FILE *fs1, *fs2, *ft;
    char ch;

    fs1 = fopen(“file1.txt”,"r");
   fs2 = fopen(“file2.txt”,"r");
    ft = fopen(“file3.txt”,"w");
    if( fs1 == NULL || fs2 == NULL || ft == NULL )
   {
      printf("Press any key to exit...\n");
      exit(0);
   }

    while( ( ch = fgetc(fs1) ) != EOF )
              fputc(ch,ft);
    while( ( ch = fgetc(fs2) ) != EOF )
               fputc(ch,ft);
    printf("Two files were merged into third file successfully.\n");
    fclose(fs1);
   fclose(fs2);
   fclose(ft);
    return 0;
}
```

INPUT:

Source file : file1.txt : ABC

file2.txt : XYZPQR

file3.txt : ABC XYZPQR

OUTPUT: Two files were merged into third file successfully

5. what are different file positioning function available in c. (fseek, rwind ftell)

Answer:

There is no need to read each record sequentially, if we want to access a particular record. C supports these functions for random access file processing.

1. fseek()
2. ftell()
3. rewind()

fseek():
This function is used for seeking the pointer position in the file at the specified byte.
Syntax: fseek(file_pointer, displacement, pointer position);

OR

int fseek (FILE *fp, long num_bytes, int origin) ;

Where
file_pointer ---- It is the pointer which points to the file.

displacement ---- It is positive or negative.

This is the number of bytes which are skipped backward (if negative) or forward (if positive) from the current position.

Pointer position:

This sets the pointer position in the file.

Value	pointer position
0	Beginning of file.
1	Current position
2	End of file

Example:

1) **fseek(p,10L,0)**

0 means pointer position is on beginning of the file, from this statement pointer position is skipped 10 bytes from the beginning of the file.

2) fseek(p,5L,1)

1 means current position of the pointer position. From this statement pointer position is skipped 5 bytes forward from the current position.

3)fseek(p,-5L,1)

From this statement pointer position is skipped 5 bytes backward from the current position.

ftell():

This function returns the value of the current pointer position in the file. The value is count from the beginning of the file.

Syntax: ftell(fptr);

Where fptr is a file pointer.

rewind():

This function is used to move the file pointer to the beginning of the given file. **Syntax:** rewind(fptr);

Where fptr is a file pointer.

Program for File position function

Answer:

```
#include
void main(){
  FILE *fp;
  int i;
  fp = fopen("file1.txt","r");
  for (i=1;i<5;i++){
     printf("%c : %d\n",getc(fp),ftell(fp));
     fseek(fp,ftell(fp),0);
     if (i == 5)
     rewind(fp);
  }
  fclose(fp);
}
```

UNIT 5:

1.Build Linear Search on list of elements 20, 12, 17, 28, 70, 80 and key element is 70.

Write the algorithm, draw the flowchart along with the program.

Answer:

Algorithm:

1. variables needed: array[100], key, i, n, found=0

2. read n value

3. enter n elements into array

4. read the value for search key.

5. for (i = 0 ;i < n ; i++)
   {
   if (a[i] == key)
   {
   found=1; break;
   }
   }

6. if found = = 1,

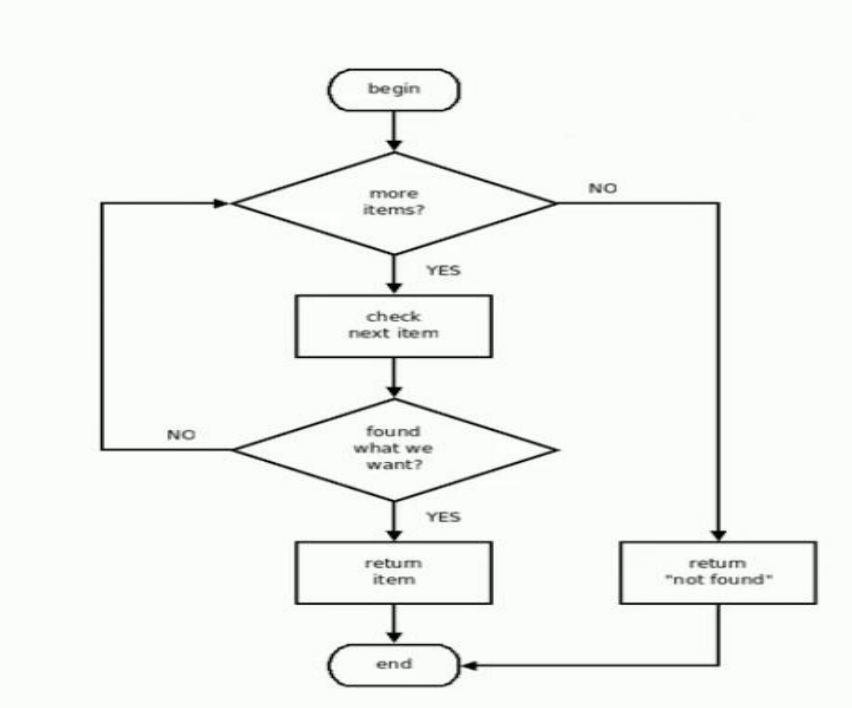
   6.1 Display message “Search is successful and item is found at location: loc”

7. else

7.1 Display the message “Search Unsuccessful” and exit.

8. stop

Flowchart:



Program:

```
#include <stdio.h>

int main()
{
  int array[100], key, i, n, found=0;

  printf("Input number of elements in array\n");
  scanf("%d", &n);

  printf("Input %d numbers\n", n);

  for (i = 0; i < n; i++)
    scanf("%d", &array[i]);

  printf("Input a number to search\n");
  scanf("%d", &key);

  for (i = 0 ;i < n ; i++ )
 {
    if (a[i] == key)
          {
           found=1; break;
          }
```

```
 }
   if (found==0)
      printf("%d isn't present in the array.\n", key);
   else
      printf("%d is present at location %d.\n", key, i+1);

   return 0;
}
```

Output:

```
Enter the number of elements in array
5
Enter 5 numbers
2
6
18
25
1
Enter the number to search
25
25 is present at location 4.
```

2. write a program for bubble sort.

Answer:

Program:

```
#include<stdio.h>
void main()
{
 int a[50],n,i,j,temp;
 printf("Enter the size of array: ");
 scanf("%d",&n);
 printf("Enter the array elements: ");
  for(i=0;i<n;++i)
  scanf("%d",&a[i]);
  for(i=1;i<n;++i)
          for(j=0;j<(n-i);++j)
          if(a[j]>a[j+1])
```

```
        {
                temp=a[j];
                a[j]=a[j+1];
                a[j+1]=temp;
        }
  printf("Array after sorting: ");
 for(i=0;i<n;++i)
  printf("%d ",a[i]);

}
```

OUTPUT:

Enter total elements: 5
Enter 5 elements: 45 67 32 68 20

The array after sorting is: 20 32 45 67 68.