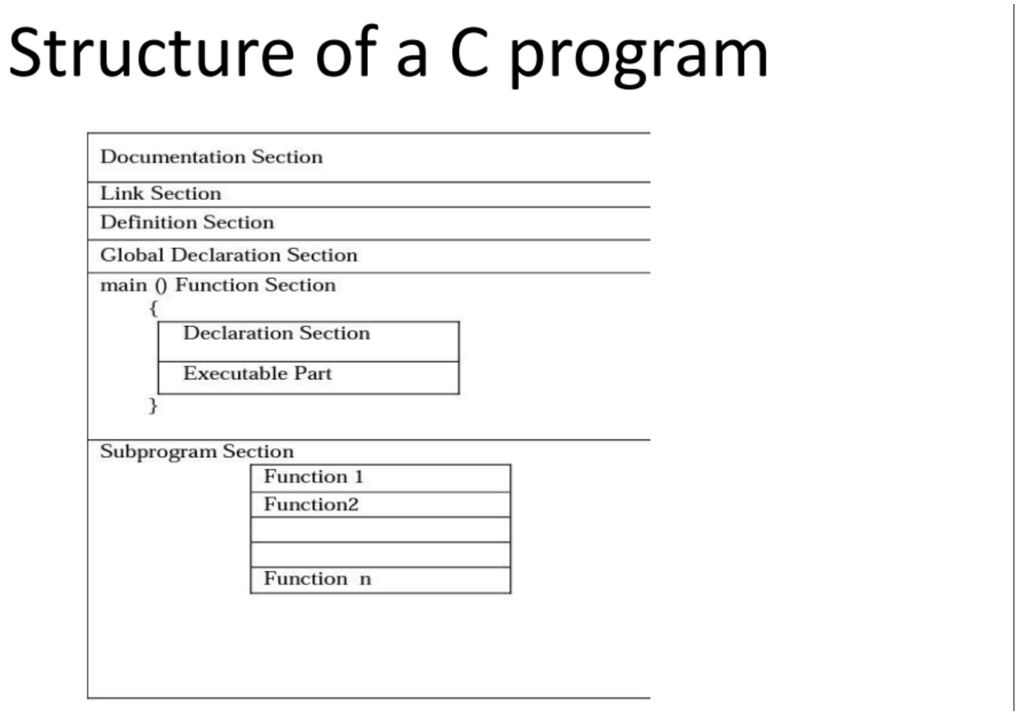
Training Reflexive Journal

C LANGUAGE

How to compile? • In Linux/Unix you can compile your code using – gcc [filename].c • GCC stands for GNU c compiler • If code contains errors, those are listed with line numbers • Else an executable file named a.out is created in working directory which contains machine dependent instructions to run code.



Structure of a C program

Documentation Section

Link Section

Definition Section

Global Declaration Section

main () Function Section

{

Declaration Section

Executable Part

}

Subprogram Section

Function 1

Function2

Function n

Keyword has fixed meanings which can't be changed ex. Print, if, scan etc

A fixed value that do not change during the execution of a program

A variable is a data name that may be used to store a data value

C allows identifier to represent an existing data type which can be used then to declare a variable.

ARRAY

An array is a collection of elements of the same type that are referenced by a common name.

This absolutely has simplified our declaration of the variables .We can use index or subscript to identify each element or location in the memory.

STRING

A String is a one-dimensional array of characters terminated by a null('\0').

There is no need to use address of (&) operator in scanf to store a string. As string name is an array of characters and the name of the array, i.e., name indicates the base address of the string (character array). scanf() terminates its input on the first whitespace(space, tab, newline etc.) encoun2ter.

gets(): Reads characters from the standard input and stores them as a string.

puts(): Prints characters from the standard.

scanf(): Reads input until it encounters whitespace, newline or End Of File(EOF) whereas gets() reads input until it encounters newline or End Of File(EOF).

gets(): Does not stop reading input when it encounters whitespace instead it takes whitespace as a st2ring.

FUNCTION

A function is a group of statements that perform a specific task. It divides a large program into smaller parts. A function is something like hiring a person to do a specific job for you. Every C program can be thought of as a collection of these functions. Program execution in C language starts from the main function.

A function Prototype also know as function declaration. A function declaration tells the compiler about a function name and how to call the function. It defines the function before it is being used or called. A function prototype needs to be written at the beginning of the prog2ramm.

Using function we can avoid rewriting the same logic or code again and again in a program. We can track or understand large program easily when it is divide into functions. It provides reusability. It help in testing and debugging because it can be tested for errors individually in the easiest way. Reduction in size of program due to code of a function can be used again and again, by calli2ng it.

POINTERS

A normal variable is used to store value. A pointer is a variable that store address / reference of another variable. Pointer is derived data type in C language. A pointer contains the memory address of that variable as their value. Pointers are also called address variables because they contain the addresses of other variables.

Pointer holds the address of another variable of same type. When a pointer holds the address of another pointer then such type of pointer is known as pointer-to-pointer or double pointer. The first pointer contains the address of the second pointer, which points to the location that contains the actual value.

Relation between Array & Pointer :-

When we declare an array, compiler allocates continuous blocks of memory so that all the elements of an array can be stored in that memory. The address of first allocated byte or the address of first element is assigned to an array name. Thus array name works as pointer variable. The address of first element is also known as base address.3

Pointer to Function

Every function has reference or address, and if we know the reference or address of function, we can access the function using its reference or address. This is the way of accessing function using pointer. return-type: Type of value function will return.

STRUCTURES

Structure is a collection of logically related data items of different datatypes grouped together under single name. Structure is a user defined datatype. Structure helps to build a complex datatype which is more meaningful than an array. But, an array holds similar datatype record, when structure holds different datatypes records. Two fundamental aspects of Structure: Declaration of Structure Variable Accessing of Structure3.

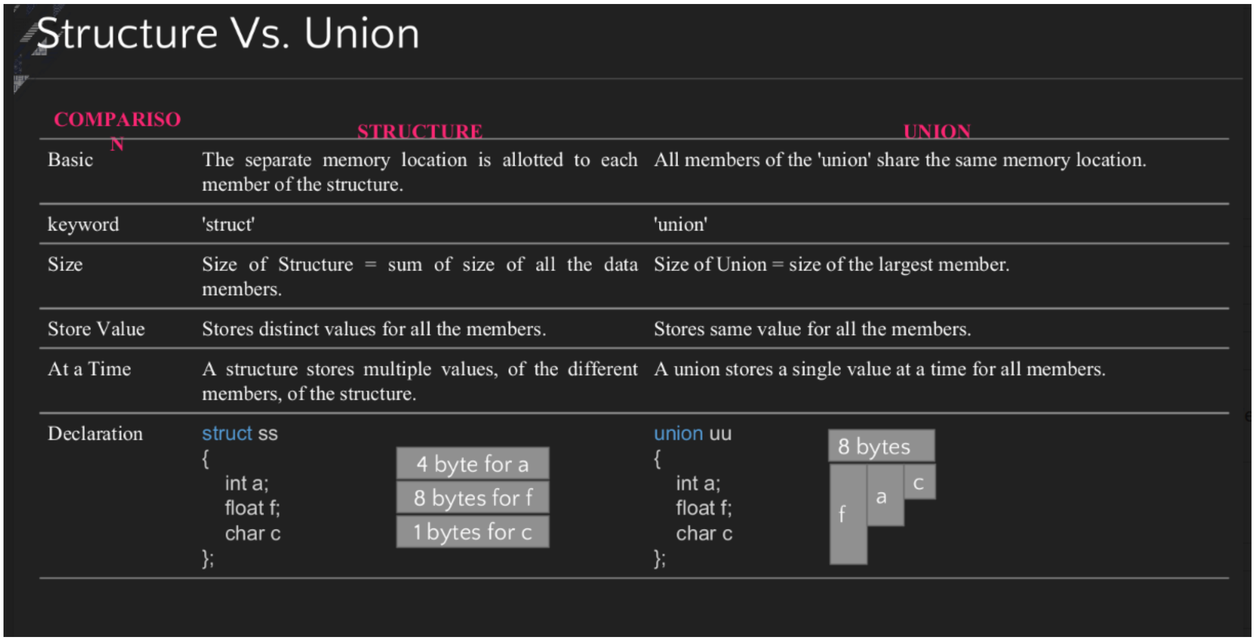
Structure is a complex data type, we cannot assign any value directly to it using assignment operator. We must assign data to individual structure members separately. C supports two operators to access structure members, using a structure variable. 1. Dot/period operator (.) 2. Arrow operator (3->).

It can be defined as the collection of multiple structure variables where each variable contains information about different entities. The array of structures in C are used to store information about multiple entities of different data type3.

When a structure contains another structure, it is called nested structure. For example, we have two structures named Address and Student. To make Address nested to Student, we have to define Address structure before and outside Student structure and create an object of Address structure inside Student structure.

UNION

Union is a user defined data type similar like Structure. It holds different data types in the same memory location. You can define a union with various members, but only one member can hold a value at any given time. Union provide an efficient way of using the same memory location for multiple-pur3pose.



Structure Vs. Union

COMPARISON	STRUCTURE	UNION
Basic	The separate memory location is allotted to each member of the structure.	All members of the 'union' share the same memory location.
keyword	'struct'	'union'
Size	Size of Structure = sum of size of all the data members.	Size of Union = size of the largest member.
Store Value	Stores distinct values for all the members.	Stores same value for all the members.
At a Time	A structure stores multiple values, of the different members, of the structure.	A union stores a single value at a time for all members.

Declaration	struct ss
	{
	int a;
	float f;
	char c
	};
	4 byte for a
	8 bytes for f
	1 bytes for c
		union uu
		{
		int a;
		float f;
		char c
		};
		8 bytes
		f a c

FILE MANAGEMENT

In real life, we want to store data permanently so that later we can retrieve it and reuse it. A file is a collection of characters stored on a secondary storage device like hard disk, or pen drive. There are two kinds of files that programmer deals with: Text Files are human readable and it is a stream of plain English characters Binary Files are computer readable, and it is a stream of processed characters and ASCII sy4stem.

DYNAMIC MEMORY ALLOCATION

If memory is allocated at runtime (during execution of program) then it is called dynamic memory. It allocates memory from heap (heap: it is an empty area in memory) Memory can be accessed only through a pointer.

When DMA is needed?

It is used when number of variables are not known in advance or large in size. Memory can be allocated at any time and can be released at any time during ru4ntime.

malloc () is used to allocate a fixed amount of memory during the execution of a program.

calloc() is used to allocate a block of memory during the execution of a program.

realloc() changes the size of the object pointed to by pointer fp to specified size.