

4. a) Difference between pass by value and pass by reference:

Pass by value

- i. mechanism of copying the function parameters value to the another variable.
- ii. Makes a copy of the actual parameters.
- iii. Requires more memory.
- iv. Requires more time as it involves copying values.
- v. code

Pass by reference

- i. Mechanism of passing the actual parameters to the function.
- ii. Address of the actual parameters passes to the function.
- iii. Requires less memory.
- iv. Requires a less amount of time as there is no copying.
- v. code

• Break:

In any loop 'break' is used to jump out of loop skipping the code below it without caring about the test condition. It interrupts the flow of the program by breaking the loop and continues the execution of code which is outside the loop. The common use of break statement is in switch case where it is used to skip remaining part of the code.

• Continue:

It is used with if condition inside the loop to alter the flow of control. When used in while, for and do-while loop, it skips the remaining statements in the body of that loop and performs the next iteration of the loop.

It does not terminate the loop rather interrupts a particular iteration.

c) Identifier :

An identifier is a name that identifies either a unique object or a unique class of objects, where the "object" or "class" maybe an idea, physical countable object, or physical noncountable substance. The abbreviation ID often refers to identity, identification or an identifier.

Rules to be followed :-

- i) It can start only with a letter of the alphabet or underscore (_), but not a number.
- ii) It can be a combination of numbers, letters, connectors, Unicode escape sequence etc.
- iii) It cannot be a C# keyword.
- iv) It should not contain white space.
- v) It cannot have more than 511 character.

structure

- i. Structure is the container defined in C to store data type variables of different type and also supports for the user defined variables storage.

ii. struct. struct-name

```
    type element 1;  
    type element 2;  
    { variable 1, variable 2,  
      ... ; }
```

iii. In structure multi-ple members can be initializing at same time.

union

- i. On other hand union is also similar kind of container of C which can also holds the different type of variables along with the user defined variables.

ii. union ul-name{

```
    type element 1;  
    type element 2;
```

```
    ...  
    } variable 1, variable 2...;
```

iii. On other hand in case of union only the first ele member can get initialized at a time.

Answer of number - 3.

a) i) Difference between character array and string

Character array	String
character array is a collection of variables of character data type.	String is class and variables of string are the object of class string.
char array-name [size];	string string-name;
A character array does not define a datatype.	A string defines defines a datatype in C++ .
Array boundaries are easily overrun.	Boundaries are not overrun.
Fast accessing.	Slow accessing.

ii) Difference between signed and unsigned int :-

Signed	Unsigned
Signed integers range from -128 to 127 in chars.	unsigned integers range from 0 to 255 in chars.



```
while ( number != 0.0 );
printf ("Sum = %.2f ", sum);
return 0;
}
```

Output :

```
Enter a number : 1.5
"           : 2.4
"           : -3.4
"           : 4.2
"           : 0
```

Sum = 4.70

Distinguish between local and global variable →

Local	Global
It is declared inside a function.	It is declared outside the function.
If it is not initialized, a garbage value is stored.	If it is not initialized, zero is stored as default.
It is stored on the stack unless specified.	It is stored on a fixed location decided by the compiler.
It is created when the function starts execution and lost when the function terminates.	It is created before the program's global execution starts and lost when the program terminates.
Data share is not possible.	Data share is possible.

memory allocations for the array elements to be stored in the array.

char name [5] [10] = {

 "tree",

 "bowl",

 "hat",

 "mice",

 "toon" } ;

d) number of occurrence in a string.

e) concatenate 2 strings.

6. a) what is an array? Why array is important than variable?

Array : An array is a collection of similar data elements stored at contiguous memory locations. It is the simplest data structure where each data element can be accessed directly by only using its index number.



1 : transkota stop ()
 5 int sum = 0; di transkota stop saat
 lama alih-alih dan prasifres menganggur selama
 set, sum = sum + i ; setelah set, set
 ot free if (i == 5) {
 jadi menganggur setelah set, set
 lama alih-alih dan prasifres menganggur selama
 set, sum = sum + i ; setelah set, set
 } goto addition ;
 } .

2 :
 addition :
 printf ("%d", sum); setelah set
 lama alih-alih dan prasifres menganggur selama
 set, sum = sum + i ; setelah set, set
 return 0; .

output : : output
 : sum added stop

We know array is a collection of similar data type. Here the word collection means that it helps storing multiple values which are under the same variable.

On the hand a single variable can contain only one data. This is why array is more efficient and important than array.

b) Define composite data structure, differ between structure and union.

In computer science, a composite data type which can be constructed in a program using its programming language's primitive data types and other composite types.

The act of constructing a composition type is known as composition.

Differ between structure and union.



Actions of CPU

ii) Expanded source code is sent to compiler which compiles the code and converts it into assembly code.

iii) The assembly code is sent to assembler which assembles the code and converts it into object code. Now a simple .obj file is generated.

iv) The object code is sent to the linker, which links it to the library such as header files. Then it is converted into executable code. A simple .exe file is generated.

v) The executable code is sent to loader which loads it into memory and then it is executed. After execution, output is sent to console.



b) what do you mean by the terms of get char() and put char() ?

getchar() :

~~#include <stdio.h>~~
~~getchar(void)~~

getchar() function is used to get/redd a character from keyboard input. In a c program, we can use getchar function as below.

getchar(char);

where, char is a character variable/value.

putchar() :

putchar() function is used to write a character on standard output/screen. In a c program we can use putchar function as below

putchar(char);

where, char is a character variable/value.

Function prototype in C is a function declaration that provides information to the compiler about the return type of the function and the number, types and order of the parameters the called function expect to receive.

Example :

int area (int length, int breadth)

// function body

}

Now the corresponding prototype declaration of the above function is :

int area (int length, int breadth) :

It states that function "area" takes two arguments of type "int" and returns area of type "int".



& and *

- * operator is used as pointer to a variable
* a where * is pointer to the variable a.
- & operator is used to get the address of the variable. & a will give address of a.

e) The conditional operator is also known as ternary operator. The conditional statements are the decision making statements, which depends upon the output of the expression. It is represented by two symbols '?' and ':'.

An conditional operator works on three operands, so it is known as the ternary operator.

Do... while loop:

The do... while loop is similar to the while loop with one important difference.

The body of do... while loop is executed at least once. Only then the test expression is evaluated.

Syntax :

```
do {
```

// the body of the loop

```
}
```

```
while ( test Expression )
```

Example :

```
#include <stdio.h>
int main () {
    double number; sum = 0;
    do {
        printf ("Enter a number : ");
        scanf ("%f", &number);
        sum += number;
    }
```

c) what is 2D Array and initialization :-

String is nothing but an array of characters that ends with a '\0'.

2D character arrays are very similar to 2D integer array. We store the elements and perform other operations in a similar manner. A 2D character array is more like a string array. It allows us to store multiple strings under the same name.

Initialization :

char name [5] [10];

The order of the subscripts is important during declaration. The first subscript [5] represents the number of strings that we want our array to contain and the second subscript [10] represents the length of each string. This is static memory allocation. We are giving $5 * 10 = 50$

c) File pointer and modes of file to open or create in C.

File pointer is a pointer which is used to handle and keep track on the files being accessed. A new data type called "FILE" is used to declare file pointer. This data type is defined in stdio.h file. File pointer is declared as FILE *fp. Where fp is a file pointer.

Modes of file to open or create in C :

i. r - open a file in read mode.

ii. w - opens or create a text file in write mode.

iii. a - opens a file in append mode

iv. r+ - opens a file both read and write mode.

v. a+ - "

vi. w+ - "



8. b) Write about fgets() and fopen()?

fopen(): It is used to open a file to perform operations such as reading, writing etc. In a C program, we declare a file pointer and use fopen() as below;

```
FILE *fp;
```

```
fp = fopen("file name", "mode");
```

fgets(): It is used to read a file line by line. In a C program, we use fgets() function as below;

```
fgets(buffer, size, fp);
```

Declaration:

```
char * fgets(char * string, int n, FILE *fp)
```

example :

```
# include <stdio.h>
int main ()
{
    int age;
    printf("Enter age : ");
    scanf("%d", &age);
    if (age >= 18)
        printf("Eligible for voting");
    else
        printf("Not eligible for voting");
    return 0;
}
```

5. a) Define string and length of a string.

A string in C language is an array of characters that is terminated with a null character (\0).

The string length is the number of characters in a string. In the string length '\0' a character is not counted.

```
char str[] = "STRING";
```

In the example shown above, the length of the string str is 6.



c) goto statement :

The goto Statement is rarely used because it makes program confusing, less readable and complex. Also, when this is used, the control of the program won't be easy to trace, hence it makes testing and debugging difficult.

When a goto statement is encountered in a c program, the control jumps directly to the label mentioned in the goto statement.

Syntax :

goto Label-name ;

::

b. Label-name : c-statements

Example :

include <stdio.h>

int main ()



c) Comparison between Else-if ladder and Switch case :-

Else-if ladder

values are based on constraint.

Else-if ladder is used when there is multiple conditions are to be tested.

Else-if ladder statement works on the basis of true, false.

Either integer or character data type used in the expression of else-if ladder.

The use of break statement is not very essential.

Switch case

values are based on user choice.

Switch case is used when there is only one condition and multiple values of the same are to be tested.

Switch case statement works on the basis of equality operator.

Integer is the only data type that can be in expression of switch.

The use of break statement is mandatory and very important.

- a) what is a scope rule? Distinguish between local and Global variable.
- c) compare else-if ladder and switch-case structure with examples.
- d) write about while and do while loop with its syntax and proper example.

Answers of Number - 2 .

a) Scope rules or scope of a variable means that from where the variable may directly be accessible after its declaration. The scope of a variable in C programming language can be declared in three places :-

Local variable → Inside a function or block.

Global variable → Outside of all function.

(can be accessed from anywhere)

Formal parameters → In the function parameters.

Signed data type/categories include both positive and negative integers.

Unsigned data categories include only zero and positive integers.

Signed data types use a flag sign before the negative numbers they represent.

Unsigned data types do not use a flag sign before.

The leftover bit is used by the signed data containers.

The leading bit of a value is used by the unsigned data containers.

b) Function prototype:

It is the important feature of c programming which was borrowed from c++. Early versions of c programming did not use function prototype.



vi) It has to be declared before it is referred.

vii) More than one identifier with the same name cannot be declared within a single scope.

d) Difference between while and do while loop-

Do - while loop	while - loop
Executes the statements first before evaluating the condition.	Evaluates the condition first and then execute the statements.
The condition isn't specified until after the body of the loop.	The condition is specified at the beginning of the loop.
The body is always executed at least once, regardless of whether the condition is met.	The body is executed only if a certain condition is met and it terminates when the condition is false.

Q 10 Batch

1. a) Explain the steps of executing a C program.
- b) Name and describe four basic data types of C.
- c) What is an identifier? What are the rules to be followed to form an identifier?
- d) What is the difference between while and do while loop?
- e) weight → pound } calculate BMI
height → inch }

$$1 \text{ p} = 0.4536 \text{ kg}$$

$$1 \text{ in} = 0.0254 \text{ m}$$

Answer of Number 1.

a) Steps of executing a C Program :

- i) C program (source code) is sent to preprocessor first. The preprocessor is responsible to convert preprocessor directives into their respective values. The preprocessor generates an expanded source code.



b) Four basic data types in C →

i) char :

The most basic data type in C. It stores a single character and requires a single byte of memory in almost all compilers.

ii) int :

As the name suggests, an int variable is used to store an integer.

iii) float :

It is used to store decimal numbers (numbers with floating point value) with single precision.

iv) double :

same as floating point, just double precision instead of single precision.

3. a) Difference between :
- i) A character array and a String
 - ii) Signed and unsigned integer
- b) what is a function prototype? Example.
- c) what does the goto statement do ?
- d) Fibonacci code.

1) '#' and '# #'

Stringizing operator : (#)

This operator causes the corresponding actual argument to be enclosed in double quotation marks. The # operator, which is generally called the stringize operator, turns the argument it precedes into a quoted string.

Token pasting operator (##) :

Allows tokens used as actual arguments to be concatenated to form other tokens. It is often useful to merge two tokens into one while expanding macros.

This is called token pasting or token concatenation.

d) About while loop and Do...while loop : →
while loop :

The while loop is used to repeat a section of code an unknown number of times until a specific condition is met.

Syntax :

while (testExpression) {

 // the body of the loop

}

Example :

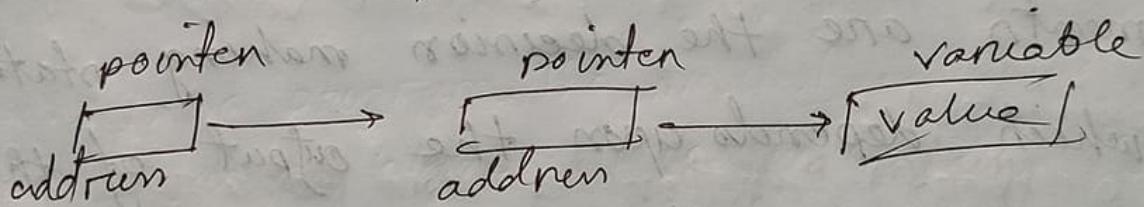
```
#include <stdio.h>
int main () {
    int i = 1;
    while (i <= 5) {
        printf ("%d\n", i);
        i++;
    }
    return 0;
}
```

Output :

1
2
3
4
5

c) Multiple indirection

A pointer to a pointer is a form of multiple indirection or a chain of pointers. Normally a pointer contains the address of a variable. When we define a pointer to a pointer, the first pointer contains the address of the second pointer, which points to the location that contains the actual value as shown below,



b) Pointer variable :

A pointer variable is basically the same as the other variables, which can store a piece of data. Unlike normal variable which stores a value, but a pointer stores a ~~no~~ memory address.

