**Q1. Write an essay covering the history and evolution of c programming. Explain its importance and why it is still used today.**

**Ans : History of C programming language :**

* C language is a procedural programming language(POP).
* C is one type of programming language.
* It was developed by Dennis.M.Ritchie in the year 1972 in USA.
* It was developed at “AT & T’s Bell Laboratories”.
* Dennis.M.Ritchie was the founder of father of C language.
* **Importance note of c programming :**
* C is a case sensitive language.
* C is an extension of c language file.
* C language supports 32 keywords.
* C language is a middle level language.
* **Importance of c programming language :**
* C language is a open source programming language.
* C language is easy to learn and understand.
* C language is portable (user easily run same code in any different windows).
* Easy debugging in c language.
* **Why it is still used today :**
* C language is a oldest , fastest , famous and important programming language . C language is use to games , Browser development and software application.
* C language is a very flexible , portable , open source and middle level (part of high level language and low level langauge) so c language is very used in today generation.

**Q2 : Describe the Steps to install a C compiler in Dev C++.**

**Ans :**

Step 1 : go to your google and search download dev C++(version 5.11.0) or visual studio .

Step 2 : Download opera in your system and click to Download button for Dev C++.

Step 3 : After download you install Dev C++ in your windows , linux .

Step 4 : Dev C++ complete install in your system to set your fonts , theme and size etc.

Step 5 : after installation open Dev c++ and create a new file and write your code.

Step 6 : you save your file any place and save the extension in .cand run program.

**Q3 : Explain the basic structure of a C programming , including headers , main function , comments , data types , and variables . provide example.**

**Ans : Basic structure in c:**

#include<stdio.h>

Main()

{

Block of code

}

#include<stdio.h>

# : preprocessor

include : keyword by C

<stdio.h> : standard input output (header file)

main() : () function

execution of the program will be started from here.

{ } - block of code

< > - use to include any library

[ ] – use to store index number of string or character

( ) – use to function in any method to start a code

* **Comments :**

the non-executable part of the program is known as a comments.

comments is part of program but not display output.

Comment is use to show a hint to what perform your code and what you perform in this code you easily know.

**There are two types of comment :**

1. single line comment

2. multi line comment

Single line comment is start with // and use to notes about single specific line.

Multi line comment start with /\* and end with \*/ and use to multiple explanation and large block of code.

* **Data type:**

the data type of any variable tells that what kind of values will be stored inside the variable.

In simple words data type means store a data in variable.

**Data type is two type :**

1.primitive datatype.

2.nonprimitive datatype.

* **Primitive datatype :**

primitive datatype is provide ianguage.

Ex : int , float , char etc…

**Integer :** this data type is used to store a integer value and size of bytes is 2 bytes.

%d use to store the integer value in code.

**Float :**  this data type is used to store decimal value and size of bytes is 4 bytes.

%f is used to store the floating value in code.

**Char :** This data type is used to store a single character .

%c use to store the character in code and use to ‘’.

**Long integer :** declare %ld store the positive value high range.

**double :** declare %lf store the decimal value high range.

* **Non primitive datatype :**

nonprimitive datatype is provide developer.

Ex : string , array , structure etc…

String : string means collection of elements. Use to store multiple character .

%s use store the string value in code.

* **Variable :**

element(memory) to store the particule value .

Ex : a=10

a=123456789 , a=34.56 , a=345678.7656 , a=’g’ , a=”tops”

Example :

include<stdio.h>

Main()

{

Int a=30;

Float b=20.5;

Printf(“\n store the value: %d”,a);

Printf(“\n store the value: %f”,b);

}

**Q4 .Write notes explaining each type of operator in C:**

In c programming operator means to perform some operations on the data or values.

Many types of operator in c language :

1. arithmetic
2. relational
3. logical
4. assignment
5. increment/decrement
6. bitwise
7. conditional operators

**1. Arithmetic operator :** The arithmetic operator are used

perform the some operations on the value.

|  |  |
| --- | --- |
| **Operators** | **meaning** |
| + | Addition |
| - | substraction |
| \* | multiplication |
| / | division |
| % | moduls |

**2.Relational operator :** Relational operator is also known as a comparison operator.

|  |  |
| --- | --- |
| **Operators** | **meaning** |
| > | Greater than |
| < | Less than |
| >= | Greater than & Equal to |
| <= | Less than & Equal to |
| == | Equal to |
| != | Not equal to |

**3.logical operator :**

|  |  |
| --- | --- |
| **operator** | **meaning** |
| && | Logical AND |
| || | Logical OR |
| ! | Logical NOT |

&& - And (All the expressions must be true)

|| - Or (One of the any condition must be true)

! - Not (true expression will turn into false)

**4.Assignment operator :** The assignement operator is used to assign the value to the variable.

|  |  |  |
| --- | --- | --- |
| += | a=a+b | a+=b |
| -= | a=a-b | a-=b |
| \*= | a=a\*b | a+=b |
| /= | a=a/b | a+=b |
| %= | a=a%b | a+=b |

**5.Increment / Decrement operator** :

|  |  |
| --- | --- |
| **operator** | **meaning** |
| ++a | Prefix increment |
| a++ | Postfix increment |
| --a | Prefix increment |
| a-- | Postfix increment |

Prefix : ++i, --i

Postfix : i++, i—

unary op. - a++, b-- (1 operand, 1 operator)

binary op. - a+b (2 operands, 1 operator)

**Q6 :Explain decision-making statements in C (if, else, nested if-else, switch). Provide examples of each.**

**1. If stetment :** The condition is true code to be executed.

**Syntax :**

if(condition)

{

//code to b execute

}

**2.if\_else stetment :** IF statement condition is false so else statement condition is true.

**Syntax :**

if(condition)

{

//code to be execute

}

Else

{

// code to be execute

}

**3.nested if stetment :** check if condition within if condition (if into if)

**Syntax :**

if(condition)

{

If(condition)

{

//stetment

}

else

{

//stetment

}

Else

{

//stetment

}

}

**4.switch stetment :** multiple choice value and one choice use switch stetment.

Not use relation operator , switch use int , charcter datatype , switch use keyword switch , break , case , default.

Syntax :

switch(choice)

{

Case 1: // stetment

Break;

Case 2 : //stetment

Break;

Default : //stetment

Break;

}

**Q6.Compare and contrast while loops, for loops, and do-while loops. Explain the scenarios in which each loop is most appropriate**.

**ANS :** in c language loops is repeat the same code a number of times.

in c language two types of loops :

**1)entry loop**

**2)exit loop**

**1)entry loop :** 1)while loop

2)for loop

**2)exit loop :** 1)do..while loop

**1)while loop :**  A while loop is the an entry controlled loop. in while loop given condition is true then the loop is executed.and given condition false the loop is not executed.

**Syntax of while loop :**

intialization

While(condition)

{

//block of code

Increment / decrement

}

**Example :**

i = 1;

While(i<=10)

{

printf (“%d”, i);

I++;

}

**2) for loop :** for loop is easier to compare than while loop. A for loop is the an entry controlled loop. in for loop given condition is true then the loop is executed and given condition false the loop is not executed.

**Syntax :**

For(initialization ; condition ; increment/decrement)

{

//block of code;

}

**Example:**

For(i=1;i<=10;i++)

{

Printf(“ %d”,i);

}

**3)do-while loop :** do-while loop is a exit control loop . in do – while loop given condition is true d0-while loop first time execute and after loop is repeat given condition is false loop is not execute.

**Syntax :**

initialization

do

{

//block of code

Increment/decrement

}while(condition)

**Q7. Explain the use of break, continue, and goto statements in C. Provide examples of each.**

**ANS :**  **The break statement :**

* The break statement is mainly used in the switch statements .it is also useful for immediately stopping a loop.
* IN simple words break statement is used to break the code and rest of the code will not be executed.

**Example of break statement:**

#include<stdio.h>

main()

{

int i;

for(i=5;i>0;i--)

{

if(i==3)

break;

printf("%d\n",i);

}

}

O/P : 5 4

**2) The continue statement :**

* When you skip the current iteration but remain in the loop you should use the continue statement .
* IN simple words you skip the current iteration and rest of the code will not be executed then.

Example of Continue statement :

#include<stdio.h>

main()

{

int i;

for(i=5;i>0;i--)

{

if(i==3)

continue;

printf("%d\n",i);

}

}

O/P : 5 4 2 1

**3)The go to statement :**

* The go to statement used to create a label and this label to go the statement and continue the code will be executed.

**Example of goto statement :**

#include<stdio.h>

main()

{

int i;

i=1;

label:

printf("%d\n",i);

i++;

if(i<=5)

goto label;

}

O/P : 1 2 3 4 5

**Q8. What are functions in C? Explain function declaration, definition, and how to call a function. Provide examples.**

**ANS :** A function is a set of statements or group of block of code that performs a specific task.

* Every c Program has at least one function , which is main().
* In function you have not return any value from the Function to use void () function.

IN c language Two types of function :

**1) In built function**

**2) User Defined Function**

**1) In built function :** In built function is provided by system means already all rules and function defined by in c compiler.

**2) User Defined Function :** User Defined function is used to Reusability of the code.

* User defined functions , the user give any name to the functions except the name of key words.
* **Types of User Defined Function :**

1) function without argument without return value

2) Function with argument without return value

3) function without argument with return value

4) function with argument with return value

* **User defined functions mainly three parts follows :**

1) function Declaration (After Header file)

2) Function calling (in main function)

3) Function Definition (After main Function or Function body)

**Example of Function :**

#include<stdio.h>

void num(); //function declaration

main()

{

num(); //function calling

}

void num() //function definiton

{

int i;

for(i=0;i<=10;i++)

{

printf("%d\n",i);

}

}

**Q9. Explain the concept of arrays in C. Differentiate between one-dimensional and multi-dimensional arrays with examples.**

**ANS :** An array is a Collection of elements or values with similar data types.

* syntax : data\_type array\_name[size of array];
* Each elements refers to the identification number called index number.
* Always array index will be started from "0".
* The array is the simplest data structure where each data element can be randomly accessed by using its index number.
* Mainly three Types of Arrays :

1) One Dimentional Array e.g int arr[5];

2) Two Dimentional Array e.g int arr[3][3];

3) Multi Dimentional Array e. g int arr[4][3][3];

**Differentiate between one-dimensional and multi-dimensional arrays:**

**One dimensional :**it has only one dimensional. Array store single line multiple element. One dimensional array isexecuteseries type.

**Multi dimensional**: it has three or multiple dimensional. Multi dimensional array store row and column multiple element. And multi dimensional array is execute table or matrix.

**Example:**

int array[50],i,n;

printf("enter user value");

scanf("%d",&n);

for(i=0;i<n;i++)

{

printf("enter the value: [%d]",i);

scanf("\n%d",&array[i]);

}

for(i=0;i<n;i++)

{

printf("\n array[%d] %d",i,array[i]); }

**Q10. Explain what pointers are in C and how they are declared and initialized. Why are pointers important in C?**

**ANS :**

* In c programming Pointer variable can store the address of the variable.
* Pointer used to point the actual value.
* Pointer is a variable that stores the memory address of an other variable.

**How pointer declared and initialized :**

In c language pointer declared to (\*)asterisk symbol.

**Syntax :**

Data\_type \*ponter\_name;

int num = 10;

int \*ptr = &num;

printf(“%d”,\*ptr);

pointers are important in c because they allow the programmer to directly manipulate the computer’s memory , which can improve performance and reduce code. And follow this purpose :

1) memory management

2) pass by reference

3) working with array and string

4) store the address in variable

**Q11. Explain string handling functions like strlen(), strcpy(), strcat(), strcmp(), and strchr(). Provide examples of when these functions are useful.**

**ANS :**

* **Strlen () :** strlen() function is a built-in function that returns the length of the string and it doesn’t count the null character.
* **Strcpy() :** strcpy() function is a built-in function that copies a string from one location to another Or copies the contents from source string to destination string.
* **Strcat() :** strcat() function is concats or joined first string with second string.
* **Strcmp() :** strcmp() is a built-in functions that is used to compare two strings and both strings are equal it returns 0.
* **Strchr() :**

**All String handling function example in one code :**

#include<stdio.h>

main()

{

char str1[20] , str2[20] , str3[40];

printf("\n\n\t Enter a string1 = ");

gets(str1);

printf("\n\n\t Enter a string2 = ");

gets(str2);

if(**stricmp**(str1 , str2)==0)

{

printf("\n\n\t strings are same.");

}

else

{

printf("Strings are not same.");

}

strcpy(str3,**strcat**(str1,str2));

printf("\n\n\t concat of string3 = %s",str3);

printf("\n\n\t string2 %s",**strcpy**(str3,str1));

printf("\n\n\t Lenghth of the string = %d",**strlen**(str3));

}

**Q12 . Explain the concept of structures in C. Describe how to declare, initialize, and access structure members.**

**ANS :** Structure is a template or blueprint which is a collection of elements with different types of data.

Structure is user defined data type in c programming language.

In c programming use to structute for define struct keyword.

In Structure you create a nested structure .

**Declaration of structure :**

Struct structure\_name { //Structure name

Datatype Member1\_name;

Datatype Member2\_name; //structure member name

}s;

**Initialize of structure :**

Struct Student\_info{

Int rollno;

Char name[20];

}s;

**Access Structure members:**

{

s.rollno;

s.name;

}

**Q13.Explain the importance of file handling in C. Discuss how to perform file operations like opening, closing, reading, and writing files.**

**ANS :**

**File handling :** file handling in c is the process in which we create , open , read , write , and close operation on a file.

* C language provides different function such as fopen() , fgets() , fputs().
* **Fopen() =** to open the file in memory by different different modes.
* **Fputs() =**  to write data into file.
* **Fgets() =** to read the data from the file.
* **Fclose()=** close a file.
* **Modes in file handling :**

1) ‘r’ : the file is open un read mode.

2)’w’ : creats a text file in write mode.

3)’a’ :open a file append mode.

**1) opening a file :**

* The fopen() function Is used to create a file or open an existing file.
* Fptr=fopen(“example.txr”,”w”);

**2) reading a file:**

* The “r” mode is used to read a file.
* To use to fgets() function to read a data in display.
* Fptr=fopen(“example.txt”,”r”);

**3) writing file :**

* The “w” mode is used to write a file.
* To use to fputs() function to write data in file.
* fptr=fopen("File1.txt","w");

**4)close file :**

* Used to close a file.
* Fclose(fptr);