CHAPTER NO 1
(INTRODUCTION TO PROGRAMMING)
SHORTS QUESTIONS/ANSWERS

1. **Define programmer?**
   The person who know how to write a program correctly is called programmer.

2. **Define computer programming?**
   The process of feeding or storing this instruction in the computer is known as computer programming.

3. **Define programming languages?**
   They have their own special languages, designed by computer programmers. Programmer writes computer programs in these special languages called programming languages. Such as: - C, C++, Python, COBOL etc.

4. **Who was developed by C-level Language and developed by this year?**
   C language was developed by the Dennis Ritchie between 1969 and 1973 at Bell Labs

5. **Define programming environment?**
   In order to correctly perform any task's, we need to have proper tool.

6. **Define IDE and how many IDE'S?**
   A software that provide a programing environment to facilitate the programmer in writing and executing computer program is known as Integrated Development Environment. There are many IDE'S to write a programming codes are as follow: -
   1. Visual studio
   2. Dev C++
   3. Code::blocks
   4. Xcode
   5. C_{xx} droid
   6. C coding / C++ coding

7. **Differentiate between text editor and compiler?**

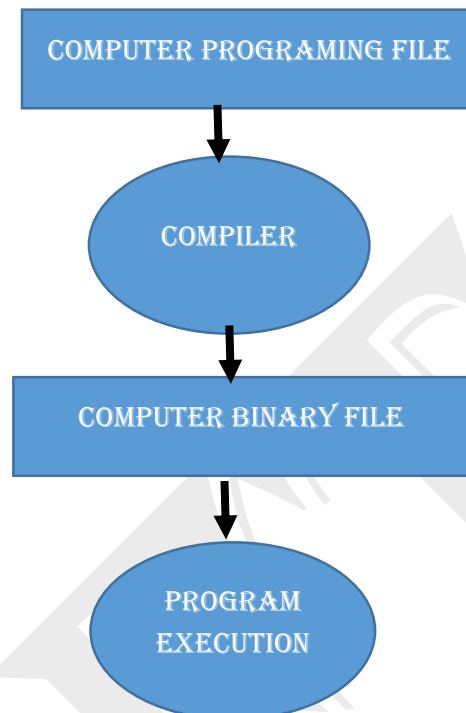| Text Editor	Compiler
A text editor is a software that allows the programmer to write or edit the computer program.	Compiler only understand and work in the machine language consisting of 0 and 1. A compiler is a software that is responsible for conversion a computer program written in some high level programing language to machine language code.

8. Define and draw the structure of compiler?

Compiler only understand and work in the machine language consisting of 0 and 1. A compiler is a software that is responsible for conversion a computer program written in some high level programing language to machine language code.

Structure: -

```
┌─────────────────────────────────┐
│  COMPUTER PROGRAMING FILE        │
└─────────────────────────────────┘
               │
               ▼
          ╭─────────╮
          │ COMPILER │
          ╰─────────╯
               │
               ▼
┌─────────────────────────────────┐
│  COMPUTER BINARY FILE            │
└─────────────────────────────────┘
               │
               ▼
          ╭─────────╮
          │ PROGRAM │
          │EXECUTION│
          ╰─────────╯
```

9. Differentiate between syntax & syntax error?

Syntax	Syntax error
Each programming language has some primitive building blocks and provide some rules in order to write an accurate program. The set of rules is also known syntax of the language.	If proper syntax or rules of the programming languages are not followed, the programmer does not get compiled in the case the computer generate the error. This process is also known as syntax error

10. Define reserve words and who is other name?

Each programming language has a list of words that are predefined. Each word has its specific meaning already known as the compiler? This word is also known as reserve words and the other name is key word. Many reserve word are classified as: -

"if, goto, switch, case, break, while, double, long, auto"

11. Define header file and main section?

Header file: -

We need to includes the files where these function have defined. These files are called header files. We include these files in our by written the including statement at the top of the program.

For example: - #include<header_file_name>

Main section: -

It consists a main function. Every C programming that contain a main ( ) function and it is the starting point of execution.

12. Write down the syntax of writing C language program?

```
#include<stdio.h>
using namespace std;
int main(){
    printf("Hello World");
}
```

13. Define comments and how many types of comments?

Comments are the statement in a programmed that are ignored by the compiler and do not get executed. There are two types of comments in C language: -
1. Single line Comments
2. Multi line Comments

14. Write down the purpose of comments?

i.   It facilitates programmer to understand our code
ii.   It helps us to understand our code even after year of writing it

15. Differentiate between single line and multi-line comments?

Single line Comments	Multi line Comments
Single line comments start with //. Anything after // on the same line is considered a comment.	Multi line comments start with /* and end at */. Anything between /*this is a single line comment*/

16. Differentiate between constant and variable?

Constant	Variable
Each language has a basic sets of alphabets (character set) that are combined in allowable manner to from words and these word can be used to from sentence.	It is actually a name given to a memory location as the data is physically stored inside the computer memory. These value of a variable can be change in a program.

17. How many types of constant?

There are three types of constant: -
1. Integer Constant
2. Real Constant
3. Character Constant

18. Differentiate between integers and character constant?

Integer Constant	Character Constant
These values without a decimal point's such as: - 45325,25,7586	Any single small case letter, upper case letter, digit, punctuation marks and special symbols such as: - 'A', 'a', '5', '~

19. Write down the names of main parts of structure of a C program?

1. Header section or link section
2. Main section
3. Body of a program

20. Differentiate between real and character constant?

Real Constant	Character Constant
These values with a decimal point's such as: - 45.325,2.5,75.86	Any single small case letter, upper case letter, digit, punctuation marks and special symbols such as: - 'A', 'a', '5'

21. Define identifier?

Each variable has a unique name is called identifier

22. Define variable?

It is actually a name given to a memory location as the data is physically stored inside the computer memory. These value of a variable can be change in a program.

23. How many data types of variable?
There are three types of constant: -
1. *Integer*
   It can be divided into categories: -
   - *signed int*
   - *unsigned int*
2. *Real*
3. *Character*

24. What is the purpose of character data type?
To declare character types variable in C we use the keyword char. It takes up just 1 bytes of memory of a storage. A variable of character type can store one character only.

25. Differentiate between signed int & unsigned int?

Singed int	Unsinged int
A signed int can be stored both values i.e. positive or negative ranging from -47582 to 47582	An unsigned int can be stored positive ranging from 0 to 47582

26. How many types of data types and each data types that can be store the bytes of data in computer memory?
There are three types of constant: -
1. *Integer: - (It takes up just 4 bytes of memory of a storage)*
   It can be divided into categories: -
   - *signed int*
   - *unsigned int*
2. *Real: - (It takes up just 4 bytes of memory of a storage)*
3. *Character: - (It takes up just 1 bytes of memory of a storage)*

27. Rules of naming variable?
1. *A variable name can only contain alphabets (Upper & Lower case), digit and underscore sign*
2. *Variable name must be beginning with a letter or underscore*
3. *It cannot use the reserve words*
4. *There is no restrict on how long a variable name*

28. Differentiate between variable initialization & declaration?

Variable Declaration	Variable Initialization
Declaring variable include specifying its data type and give it a valid name.	Assigning value to a variable to the first time is called variable initialization
Syntax: - *data_type variable_name;*	**Syntax: -** *data_type variable_name=value;*

29. Write down the syntax of variable declaration & initialization?

Variable Declaration	Variable Initialization
Syntax: - *data_type variable_name;*	**Syntax: -** *data_type variable_name=value;*

LONG QUESTIONS/ANSWERS

1. Write down the concept of computer programming language?

A computer programming language is a formal set of instructions that can be used to communicate with a computer to perform specific tasks. These languages translate human logic into a syntax that machines can interpret and execute. Examples include C, Java, Python, and JavaScript. Programming languages have syntax, semantics, and rules that allow programmers to write code for various applications such as web development, system software, and games.

2. Write a note on Structure of C-language?

The structure of a basic C program is as follows:

1. **Preprocessor Directives**: *Includes headers like #include<stdio.h> for libraries.*
   *Preprocessor directives in C are instructions that are executed before the actual compilation of the code. They begin with a # symbol and are used to include libraries, define constants, or conditionally compile sections of code. These directives are handled by the **preprocessor** and are not part of the compiled program*
   Types of Preprocessor Directives: -
   1. *File Inclusion*
   2. *Macro definition*
   3. *Conditional Compilation*

2. **Global Declarations**: *Define global variables or functions outside the `main()` function.*

3. **Main Function**: *The starting point of execution, written as int main().*
   *The **main function** is the entry point of any C program. It is the first function that gets executed when the program runs. The main function defines the logic or flow of the program and directs the compiler to perform specific tasks.*

   Syntax
   ```
   #include <stdio.h>
   int main() {
      // Code or statements
      return 0; // Return statement indicating successful execution
   }
   ```
   Key Features of the Main Function

1. **Execution Start Point**:
   - *The operating system looks for the `main()` function to begin program execution.*

2. **Return Type**:
   - *The main function usually has a return type of `int`, where returning `0` indicates successful execution to the operating system.*
   - *The syntax for returning other values is: `return some_integer;`.*

3. **Arguments (Optional)**:
   - *`main()` can accept arguments to take input from the command line:*
     ```
     Copy code
     int main(int argc, char *argv[]) {
         // argc: Argument count
         // argv: Argument vector (array of strings)
     }
     ```

4. **Statements**:
   - *Contains the logic and instructions for the program.*

4. **Local Declarations**: *Variables declared inside the `main()` or other functions.*

5. **Statements and Expressions**: *Instructions that execute logic.*

6. **Functions**: *Optional, modular sections of code to perform specific tasks.*

7. ***Programing Body***: *The **programming body** refers to the part of a program where the actual logic, computations, and instructions are written. It resides within the main function or other user-defined functions and includes the sequence of statements that define the program's behavior and actions.*
   Components of Programing Body: -
   1. *Variable Declaration*
   2. *Logic/Statement*
   3. *I/O operation*
   4. *Control Statement*
   5. *Function Call*
   6. *Return Statement*

3. *Write a note on Comments?*
Comments are the statement in a programmed that are ignored by the compiler and do not get executed. There are two types of comments in C language: -
3. *Single line Comments*
4. *Multi line Comments*
Purpose: -
iii. *It facilitates programmer to understand our code*
iv. *It helps us to understand our code even after year of writing it*
Types: -
There are two types of comments: -
1) ***Single line comments: -***
   Single line comments start with //. Anything after // on the same line is considered a comment.
2) ***Multi line comments: -***
   Multi line comments start with / and end at */. Anything between /*this is a single line comment*/*

4. *Differentiate between variable & constant?*

Aspect	Variable	constant
Definition	*A named memory location to store changeable data. It is actually a name given to a memory location as the data is physically stored inside the computer memory. These value of a variable can be change in a program.*	*A fixed value that cannot be modified during execution. Each language has a basic sets of alphabets (character set) that are combined in allowable manner to from words and these word can be used to from sentence*
Value	*Can change during program execution.*	*Remains the same throughout execution.*
Declaration	*int x = 10;*	*const int x = 10;*
Usage	*Used for dynamic data.*	*Used for fixed data like Pi or tax rates.*
Data Types	*Int(signed int, unsigned int), float, char*	*Int, float, char*

5. *Write a note on Data types of variable?*
A named memory location to store changeable data. It is actually a name given to a memory location as the data is physically stored inside the computer memory. These value of a variable can be change in a program.
Types: -
There are three types of constant: -
1. *Integer*

Integer data types in programming are used to store whole numbers (positive, negative, or zero) without any fractional or decimal component. They are fundamental to most programming languages, including C, and are defined within a specific range based on memory allocation. -(It takes up just 4 bytes of memory of a storage)

Data Type	Size	Range (Signed)	Range (Unsigned)
`int`	4 bytes	-2,147,483,648 to 2,147,483,647	0 to 4,294,967,295
`short int`	2 bytes	-32,768 to 32,767	0 to 65,535
`long int`	4 or 8 bytes	-2,147,483,648 to 2,147,483,647 (4 bytes)	0 to 4,294,967,295
`long long int`	8 bytes	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807	0 to 18,446,744,073,709,551,615
`unsigned int`	4 bytes	N/A	0 to 4,294,967,295

It can be divided into categories: -
signed int
  i. A signed int can be stored both values i.e. positive or negative ranging from -47582 to 47582
unsigned int
  ii. An unsigned int can be stored positive ranging from 0 to 47582

2. **Real/Float**

The **float data type** in programming is used to store numbers that contain fractional or decimal values. It is part of the family of floating-point types, which are designed for handling real numbers with precision. (It takes up just 4 bytes of memory of a storage)

Comparison with Other Data Types

Aspect	int	float
Stores	Whole numbers	Numbers with fractions
Size	4 bytes (typically)	4 bytes (typically)
Precision	Exact values	Approx. 6-7 decimal places
Example Values	`10` , `-50`	`3.14` , `-2.718`

3. *Character*

The **char data type** *in programming is used to store single characters. It is one of the basic data types and is primarily used to represent letters, symbols, or numbers as characters, such as 'A', 'z', '1', or '$'. (It takes up just 1 bytes of memory of a storage)*

Comparison with Other Data Types

Aspect	char	int	float
Size	1 byte	4 bytes	4 bytes
Stores	Single characters	Whole numbers	Decimal numbers
Example Values	`'A'` , `'9'`	`123` , `-56`	`3.14` , `-2.718`

6. Write down the rules of naming variables?

1) **Valid Characters:**

Use letters (a-z, A-Z), digits (0-9), and underscore _.

2) **Start with a Letter or Underscore:**

A variable must not start with a digit.

3) **No Special Characters or Spaces:**

Avoid symbols like @, $, %, or spaces.

4) **Case Sensitivity:**

Variable names are case-sensitive (e.g., `Age` and `age` are different).

5) **Avoid Keywords:**

Do not use reserved keywords like `int`, `return`.

6) **Descriptive Names:**

Use meaningful names like `employeeSalary` instead of `x`.

7) **Restriction:**

There is no restrict on how long a variable name

Example of Valid Variable Names:
- `student_age`
- `_counter`
- `totalMarks`

Invalid Variable Names:
- `2count` *(starts with a digit)*
- `total-marks` *(contains a hyphen)*
- `float` *(reserved keyword)*

MCQ'S (MULTIPLE CHOICE QUESTIONS)

Sr. No	Question	A	B	C	D
1	A software that facilitates programmers in writing computer programs is known as:	A compiler	An editor	An IDE	A debugger
2	____is a software that is responsible for the conversion of program files to machine understandable and executable code.	Complier	Editor	IDE	Debugger
3	Every programming language has some primitive building blocks and follows some grammar rules known as it's ____	Programming rules	Syntax	Building blocks	Semantic rules
4	A list of words that are predefined and must not be used by the programmer to name his own variables are known as____.	Auto words	Reserved words	Restricted words	Predefined words
5	include statements are written in ____ section.	header	Main	Comments	Print
6	____ are added in the source code to further explain the techniques and algorithms used by the programmer.	Messages	Hints	Comments	Explanation
7	____ are the values that do not change during the whole execution of program.	Variables	Constants	Strings	Comments
8	A float uses____ bytes of memory.	3	4	5	6
9	For initializing a variable, we use ____ operator.	➜	=	@	?
10	____ can be thought of as a container to store constants.	Box	Jar	Variable	Collection
11	All IDEs have their own specific:	Compiler	IDE	Text editors	Identity

12	Computers only understand and work in machine language consisting of:	Alphabet	0s and 1s	only 1s	Only 0s
13	A ....is a software that is responsible for conversion of a computer program written in some high level programming language to machine language code.	Compiler	Interpreter	Machine	Printer
14	Each programming language has some primitive building blocks and provides same rules in order to write an accurate program. This set of rules is known as ......of the language.	Software	Instruction	Error	Syntax
15	While programming, if proper syntax or rules of the programming language are not followed, the program does not get compiled. In this case, the compiler generates an error. This kind of errors is called........	Syntax errors	Logical error	Programming error	Machine error
16	Which one from the following is not a reserved word?	Auto	int	case	print
17	The main parts of structure of C program are:	2	3	4	5
18	General structure of an include statement is as:	#include<header_file_name>	#include<head_file_name>	#include(header_file_name>	#include<header_file_name
19	Every C program must contain a .... function and it is the starting point of execution.	main()	header files	Body	all of these
20	The body of main() is enclosed in:	<>	[]	{}	()

No.	Question	a	b	c	d
21	.... are the statements in a program that are ignored by the compiler and do not get executed.	Syntax	Comments	Reserve word	Header
22	The type of comments:	Single-line Comments	Multi-line Comments	Both a and b	None of these
23	Single-line comments start with:		/	//	;
24	Multi line comments start with:	^	/*	??	//
25	Multi line comments end at:	{	//	/*	*/
26	Which one from the following is not special symbol?	*	6		?
27	The alphabets, digits and special symbols when combined in an allowable manner form:	Constants	Variables	Keywords	All of these
28	............are the values that cannot be changed by a program.	Character Constants	Integer Constants	Constants	Real constants
29	The types of Constants are:	Integer Constants	Real constants	Character Constants	All of these
30	The values without a decimal point:	Integer Constants	Real constants	Character Constants	Variables
31	Which one of the following is a real constant?	-7941.2345	79412345	-792345a	-7941.23457
32	A ....is actually a name given to a memory location, as the data is physically stored inside the computer's memory.	Constants	Variable	Reserved words	Comments
33	The value of a .... can be changed in a program.	Variable	Constants	Comments	None of these

34	Data type of a variables are:	3	4	5	1
35	Integer data type is used to store:	Float value	Signed int value	Integer values	Real value
36	Integer takes up .... bytes of memory.	2	4	6	8
37	A signed int can store:	Positive value	Negative value	Both a and b	None of these
38	By default, type int is Considered as a:	Char integer	Unsigned integer	Signed integer	Float
39	The ranges of Unsigned int is form:	0 to +4,294,967,295	0 to 2.1122222	0 to ±4,294,967,295	0 to -4,294,967,295
40	..........type is used to store a real number (number with floating point) up to six digits of precision.	Real data	Float data	Int data	Char data
41	The value ranges of floating data point is form:	4.4×10^{38} to 3.4×10^{38}	3.4×10^{37} to 3.4×10^{37}	4.4×10^{38} to 4.4×10^{38}	3.4×10^{38} to 3.4×10^{38}
42	Some examples of valid variable declarations are:	unsigned int age;	float height;	int salary;	All of these