1. Programming:

- What is programming?
- POP vs OOP programming.
- OOP's Concepts.
  - Class & objects.
  - Abstraction.
  - Encapsulation.
  - Inheritance.
  - Polymorphism.
- C++ programming and it's Features

2. Basics of C++

- Basic structure of C++ programming
- Tokens in programming language.
- Types of Token:
  - Keywords
    - What is keywords and list of keywords in c++
  - Identifiers
    - what is identifier and rules to define identifiers.
    - Variables.
  - Constants
    - Define constants in C++
    - constant vs Variable.
  - Strings
    - char [] vs string class
  - special symbols
    - All printable characters and symbols
  - Operators
    - Expression with Operator and its Types.

- Data Types
  - Build-in Data Type : [int, char, float, double, void, bool]
  - User defined Data Type : [struct, union, class, enum]
  - derived data type : [array, function, pointer]

3. Input/output in C++

- Header files
- input/output objects [cout,cin]
- error msg [cerr and clog]
- Type casting
  - Implicit type casting
  - explicit type casting

4. Operators and control statements

- Operators and operands
  - Types of operators
    1. Arithmetic operators
    2. Relational operators
    3. Logical operators
    4. Bitwise operators
    5. Assignment Operators
  - precedence and associativity
- Conditional statements
  - if statement
  - if-else statement
  - else if ladder statement
  - nested if statement
  - switch statement
  - range switch
  - nested switch statement
  - Turnary Operator(?:)

- Iteration Statements
  - for loop
  - while loop
  - do while
  - nested loops
- Flow control statement
  - Break
  - continue
  - return
  - exit
  - goto

5. Array : the collection of data

- What is array
- Types of Array
  - One dimension array
  - multi-dimension array
  - character array
- Sorting and searching elements

6. OOP's Concepts

- Class and Object
- Constructor
  - default constructor
  - parameterized constructor
  - copy constructor
- destructor
- Abstraction
- Encapsulation
- Inheritance
  - Single inheritance
  - multilevel inheritance
  - multiple inheritance
  - hierarchical inheritance
  - hybrid inheritance
  - diamond problem

- Polymorphism
  - compile time polymorphism
  - run time polymorphism

7. Functions The group of statements

- Function prototype
- type of functions
  - Without return value, without arguments
  - Without return value, with arguments
  - With return value, without arguments
  - With return value, with arguments
- Function calls
  - call by value
  - call by reference
  - call by Pointer
- recursion

8. Structure & Unions

- Structure
  - structure variable [object of structure]
  - nested structure
  - structure array
  - function with structure
- Union
- structure vs Union

9. Pointers

- Pointers
- pointer arithmetic
- pointer with array
- array of pointer
- pointer to pointer

10. File management

- File classes
- File Modes
- File operation
  - file open/close
  - write/read file
  - appending content in file
- file flags

11. String the class

- Char array as string [null terminated string]
- NULL terminated string functions
  - strlen()
  - strcpy()
  - strlwr()
  - strupr()
  - strcmp()
  - strchr()
  - strstr()
  - strrev()
  - strset()
- String class method
  - append()
  - assign()
  - at()
  - begin()
  - capacity()
  - compare()
  - empty()
  - end()
  - erase()
  - find()
  - length()
  - swap()
- String operations

12. Templates

- Template
  - template with functions
  - template with class
- Types of Template
  - Type template
  - Non-type template
  - Template Template
- Template specialization

13. Exception Handling

- Types of error
  - Compile time Error
  - Run time Error
- Exceptions
  - try-catch block
  - multi-catch block
  - nested try catch block

14. Pre-processor directives

- Pre processor directives
- #include
- #define & #undef
- #ifdef & #ifndef
- #if, #else, #elseif, #endif