**CPP Roadmap**

**1. Introduction to C++**

* Introduction to C++, Installing VS Code, g++ & more
* Basic Structure of a C++ Program

**2. Basic Concepts**

* Variables & Comments
* Variable Scope & Data Types
* C++ Basic Input/Output & More
* C++ Header files & Operators
* Constants, Manipulators & Operator Precedence

**3. Control Structures**

* C++ Control Structures, If Else and Switch-Case Statement
* For, While and do-while loops
* Break and Continue Statements

**4. Functions**

* Functions & Function Prototypes
* Call by Value & Call by Reference
* Inline Functions, Default Arguments & Constant Arguments
* Recursions & Recursive Functions
* Function Overloading with Examples

**5. Pointers and Arrays**

* Pointers in C++
* Arrays & Pointers Arithmetic

**6. Structures and Enums**

* Structures, Unions & Enums

**7. Object-Oriented Programming (OOP)**

* Object Oriented Programming
* Classes, Public and Private access modifiers
* OOPs Recap & Nesting of Member Functions
* C++ Objects Memory Allocation & using Arrays in Classes
* Static Data Members & Methods in C++ OOPS
* Array of Objects & Passing Objects as Function Arguments
* Friend Functions in C++
* Friend Classes & Member Friend Functions
* More on C++ Friend Functions (Examples & Explanation)

**8. Constructors and Destructors**

* Constructors In C++
* Parameterized and Default Constructors In C++
* Constructor Overloading In C++
* Constructors With Default Arguments In C++
* Dynamic Initialization of Objects Using Constructors
* Copy Constructor in C++
* Destructor in C++ in Hindi

**9. Inheritance**

* Inheritance & Its Different Types with Examples
* Inheritance Syntax & Visibility Mode
* Single Inheritance Deep Dive: Examples + Code
* Protected Access Modifier in
* Multilevel Inheritance Deep Dive with Code Example
* Multiple Inheritance Deep Dive with Code Example
* Exercise on C++ Inheritance
* Ambiguity Resolution in Inheritance
* Virtual Base Class in C++
* Code Example Demonstrating Virtual Base Class
* Constructors in Derived Class in C++
* Solution to Exercise on Cpp Inheritance
* Code Example: Constructors in Derived Class

**10. Polymorphism**

* Polymorphism in C++
* Virtual Functions in C++
* Virtual Functions Example + Creation Rules in C++
* Abstract Base Class & Pure Virtual Functions in C++

**11. Pointers and Dynamic Memory**

* Revisiting Pointers: new and delete Keywords
* Pointers to Objects and Arrow Operator
* Array of Objects Using Pointers
* This Pointer in C++
* Pointers to Derived Classes in C++

**12. File Input/Output (I/O)**

* File I/O in C++: Working with Files
* File I/O in C++: Reading and Writing Files
* File I/O in C++: Read/Write in the Same Program & Closing Files
* File I/O in C++: open() and eof() functions

**13. Templates**

* C++ Templates: Must for Competitive Programming
* Writing our First C++ Template in VS Code
* C++ Templates: Templates with Multiple Parameters
* C++ Templates: Class Templates with Default Parameters
* C++ Function Templates & Function Templates with Parameters
* Member Function Templates & Overloading Template Functions

**14. Standard Template Library (STL)**

* The C++ Standard Template Library (STL)
* Containers in C++ STL
* Vector In C++ STL
* List In C++ STL
* Map In C++ STL
* Function Objects (Functors) In C++ STL.

**For Node Js and Backend**

**1. Introduction and Basics**

* Onwards to Backend NodeJs Tutorial
* NodeJs Modules
* NodeJs Blocking Vs Non Blocking Calls
* NodeJs Serving HTML Files

**2. Backend Development with Node.js**

* NodeJs Creating a Custom Backend
* NodeJs Creating External Modules
* NodeJs What is NPM & its Usage!
* NodeJs Instaling Express & Postman

**3. Express.js**

* NodeJs Creatin our first Express website
* NodeJs Instaliing Pub Template Engine
* NodeJs Executing Raw HTML in Pub

**4. Project: Gym Website**

* NodeJs Gym Website Wrap Up & More

**5. Project: Dance Website**

* NodeJs Dance Website using Pug
* NodeJs Designing Cards Using Pug
* NodeJs Continuing Dance Website
* NodeJs Adding Sponsers to Dance Websites
* NodeJs Adding Contact Form Using Pug+CSS

**6. MongoDB**

* Introduction to MongoDB
* MongoDB CRUD Inserting Data
* MongoDB CRUD Searching Query Data
* MongoDB CRUD Deleting Data
* MongoDB CRUD Updating Data
* MongoDB Compass Tutorial
* Working with Mongoose
* Saving Data to Database + NodeJs

**7. Projects and Data Visualization**

* Plotting CoronaVirus Cases on World Map Dasboard

**8. Hosting and Deployment**

* Hosting Tutorials: Where to Host your Website?
* Hosting Creating our First VPS Cloud Server
* Hosting Installing Putty Basic + Linux Commands
* Hosting Installing Apache2 Web server on VPS
* Hosting CoronaVirus Information Website
* Hosting Using Filezilla & WinSCP to upload Files
* Hosting Linking Domain to the Web Hosting Server
* Host Mutiple websites On One Single Hosting Server
* Deploying NodeJs Apps in Production
* Installing MongoDB & Hosting Dance Website
* Free https SSL Certaficate For Your Domain On Ubuntu Vps

**9. Version Control and Git**

* Git Tutorial How To Upload your Projects

**10. Frontend Development**

* Transparent Login Form using HTML & CSS
* Realtime Chat Application Using NodeJs and SocketIO
* Creating Responsive Website Using HTML, CSS & JS