Agenda

- Limitations of C
- History of CPP
- OOP
- Hello world
- Flow of Execution
- Data types in CPP
- Structure in C and CPP
- ~~Access Specifiers in structure in cpp~~

Introduction

- 8 days - 2 hrs per day
- 16 hrs -> learn CPP with OOP

Limitations of C

- C is a POP Language
- procedure oriented programming language.
- resuabity of functions is very limited.
- As the code size increase the complexity of the program increases
- Their is no any data security
- every limititation is overcomed using an oop language

OOP

- Object oriented programming Concepts
- It is a methodology
- OOP has defined 2 pillars

1. Major pillar
    - Abstraction
    - Encapsulation
    - Modularity
    - Hirerrachy
2. Minor Pillar
    - typing/polymorphism
    - concurrency
    - persistance

- Any programming language that follows all the major pillars of oop is called as an Object oriented programming language
- Following the minor pillars of oop for any OOP language is completly optional
- C++, Java, Python,etc... are all oop languages

Abstraction

- Hiding the unnecessary data and getting to know only the required/essential things
- abstraction defines outer behaviour of an object
- calling a function is called as an abstraction

Encapsulation

- Implemention of abstraction is called as encapuslation
- Binding the data and code together is called as encapsulation
- Defining a function is an example of encapuslation

Modularity

- Dividing the code into smaller modules/functions/files

Hirerachy

- It is ordering of abstraction
- is-a (inheritance), has-a(association) realtionship

Typing/Polymorphism

- Poly -> many morphism -> forms
- It means an entity taking multiple forms
- their are two types of polymorphism

1. compile time

- eg -> function overloading

2. runtime

- eg-> function overriding

Concurrency

- Concurrent execution
- one resouce cannot be accessed by the multiple processes at a single times.
- to provoide access of this resource we need concurrency

Persistance

- to persist the data
- to save the state of an object

History of cpp

- inventer of cpp is Bjarne Stroustrup
- it was invented in 1979 on unix operating system
- Its initial name was c with classes
- ANSI standaradized it and it was later renamed to C++
- C++ is derived from 2 languages.

- 1st one is C and the 2nd one is simula

Hello world (demo01)

- create a .cpp file
- write the program
- to compile
    - g++ demo01.cpp
- to execute
    - a.exe

Flow of Execution

1. Preprocesssing
2. Compilation
3. Linking
4. Execution

Data types in CPP

- Datatypes define 3 things

1. nature
    - What type of data i can store inside it
2. memory
    - How much memory is required to store that data
3. operations
    - What type of operations i can have on that data.

- Their are two types of datatypes

1. Fundamental Datatype

- void,char,int,float,double,bool,wchar_t

2. Derived Datatype

- array,pointer, union,structure,class

bool (demo02)

- It stores only 2 values
- It can be true(1) or false(0)
- It takes 1 byte in the storage
- any non zero value stored inside this bool datatype will be considered as true.

wchar_t (demo03)

- it stands for wide characters
- it should not be used as the implementation is compiler specific
- it can be of either 2 or 4 bytes in the memory

- it is used to support unicode character set
- char supports ASCII charcter set wher it can support 255 differnt charcters
- wchar_t suports unicode character set where it can support 65355 differnt characters
- we have to prefix `L` before the character to tell the compiler that it is a wide character

Structure in C (demo04.c)

Structure in CPP (demo04.cpp)