CS201- Data Structures
Week 02

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Agenda

- Object Oriented Programing
- Abstraction
- Encapsulation
- Inheritance
- Polymorphism
- Classes
- Objects
- Constructor
- Destructor

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- Copy Constructor
- Assignment Operator
- Named- Constructor Idiom

Object Oriented Programming

- Object-oriented programming core idea is to create an object, in code, that has certain properties and methods.
- This object resemblance with a real object in the world and its interaction with other objects.
- OOP emphasis on easy, reusable and extendable coding for complex real world problem solving.

Abstraction

- The concept of Abstraction makes OOP easy to use and apply.
- It provide essential interface for the objects to the real world. Its hide the details of the actual working of the objects.
- Internal details about data and behaviors are hidden due to the concept of abstraction.

Encapsulation

- Encapsulation is the phenomena of blending the data and functions together.
- The data and functions are tightly knitted to provide encapsulation.
- Objective of encapsulation is to provide a simple artificial objects from the real world.
- Preventing unauthorized access to some piece of information or functionality.
- safety (information hiding) and usability (multiple instances)

Inheritance

- Inheritance is a way to reuse and extend code in object oriented programming.
- Inheritance is used to form new classes from the existing classes with limited data and functionality.
- It helps in reducing the code and utilizing the code.
- Base Class and Derived Class relationship and to create extended objects is very important.

Polymorphism

- Objects of the same type may have different data and behavior, similarly objects of different types may have similar data and functions.
- Polymorphism is the phenomena that is used in OOP to give object – different meaning to same function or data and same meaning to different function or data.
- Polymorphism – gives many forms to function and operators.

Classes

- Objects are define through classes, it will give a blueprint of objects
- Class define data and behaviors of objects that they create.
- A class define a type- a type consists of a set of state and set of operations
- C++ Class definition

Objects

- Objects are the basic unit for OOP.
- Objects connect both Data and Methods into a single bundle.
- Object life cycle is an important concept.
- In, OOP solution comprises of many objects and their interactions.
- A region of storage with associated semantics.

Constructor

- A class constructor is a special function in a class that is called when a new object of the class is created.
- The main reason of a constructor is to initialize all data members of the objects so that a desirable object is created.
- There are many types of constructors
  - Default Constructor
  - Parametric Constructor
  - Copy Constructor

Destructor

- A destructor is also a special function which is called when created object is deleted.
- The main reason of a destructor is to wipe of all the data members initialize by a constructor and the object life cycle.

Copy Constructor

- The copy constructor is a constructor which creates an object by initializing it with an object of the same class, which has been created previously.

Assignment Operator (=)

- An assignment operator is used to replace the data of a previously initialized object with some other object's data.
- Obj1 = Obj2 where Objs are of the same/different type

Named- Constructor Idiom

- Some time we have two or distinct types of constructors for the semantically different objects. This phenomena is important
- Point class with polar or rectangular coordinates while both are taken as float.