Unit - III

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Polymorphism

- The word polymorphism means having many forms.
- We can define polymorphism as the ability of a message to be displayed in more than one form.

→ Compile - Time polymorphism

- whenever an object is bound with its functionality at the compile time this is known as compile-time polymorphism.
- The call is resolved by the compiler.
- It is also known as static binding, Early binding, overloading
- It is achieved by function and operator overloading.
- It is less flexible
- Inheritance is not involved.

→ Run - Time polymorphism

- whenever an object is bound with the functionality at run time, this is known as runtime polymorphism.
- The call is not resolved by the compiler

- It is also known as dynamic binding, late binding, and overriding
- It is achieved by virtual function and pointer
- It is more flexible
- Inheritance is involved

(#) Difference between function overloading and operator overloading

→ function Overloading

- function overloading allow us to call it in multiple ways
- You can overload the function with the same name but with different parameter.
- function overloading means using a single name and giving more functionality to it.
- When a function is overloaded, the same function name has different interpretation depending on it's signature.
- function overloading is a feature of Object - Oriented programming
- Example of polymorphism in c++.

Rules of function overloading

- The function must have the same name
- The function must have different types of parameters
- The function must have different set of parameters
- The function must have different sequence of parameters

→ Operator Overloading

- Operator overloading allow operator to have their extending meaning.
- You can overload operator such as '+', '-', '*', '( )', '[ ]'
- Operator overloading means adding extra functionality for a certain operator.
- When an operator is overloaded, the operator has different meaning.
- Operator overloading is a compile - time polymorphism

Rules of Operator Overloading

- Only built - in operator can be overloaded
- Arity of operator cannot be changed
- Precedence and associativity of operator cannot be changed

→ Types of Operator Overloading

- Unary Operator
  Unary operator operate on only one operand.
  In this no argument should be passed. It works only with one class object
  Ex - increment (++) and decrement (--) operator

- Binary Operator
  In Binary operator one argument should be passed It is the overloading of an operator operating on two operand.

Ex - Result = num + 9
here + is binary operator that works on operand num and 9

(#) Virtual Function

- A virtual function is a member function that is declared within the base class and is re-defined by derived class.
- It is also known as virtual method
- Virtual function ensures that correct function is called for an object or not.
- Mainly achieved by Runtime polymorphism
- function are declared with virtual keyword.

Rules for Virtual Function

- Virtual function cannot be static
- A virtual function can be friend function of another class
- A class may have virtual destructor but it cannot have virtual constructor.
- They are always defined in base class

(##) Pure Virtual Function

- A pure virtual function is a virtual function for which we don't have an implementation. we only declare it
- A pure virtual function is declared by assigning 0 in the declaration
- It is concept of Run-time polymorphism
- It is also known as abstract function