Object-Oriented Programming Concepts

Session: 8

Overriding

Objectives

- Explain Overriding
- Explain Abstract method and Pure virtual methods
- Explain Replacement and Refinement
- Differentiate between Overriding and Shadowing
- Differentiate between Overriding and Overloading

Overriding 1-2

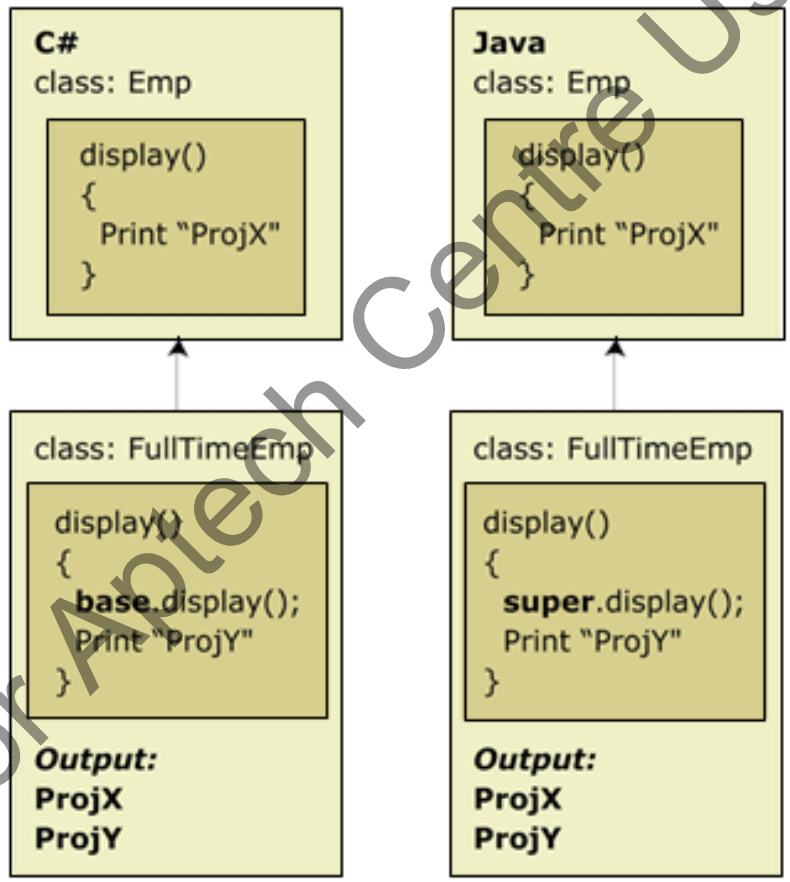
A child class can override the method of a parent class

Child class use methods inherited from the parent class as per its own requirement

Child class cannot change the signature (the name and parameters of the parent class method)

Overriding 2-2

- The figure shows calling parent class method from child class overridden method



Replacement and Refinement

Replacement - When the child class completely overrides the parent class method implementation

Refinement - When the child class includes the functionality of the parent class version of the overridden method within its own version

Abstract Methods 1-2

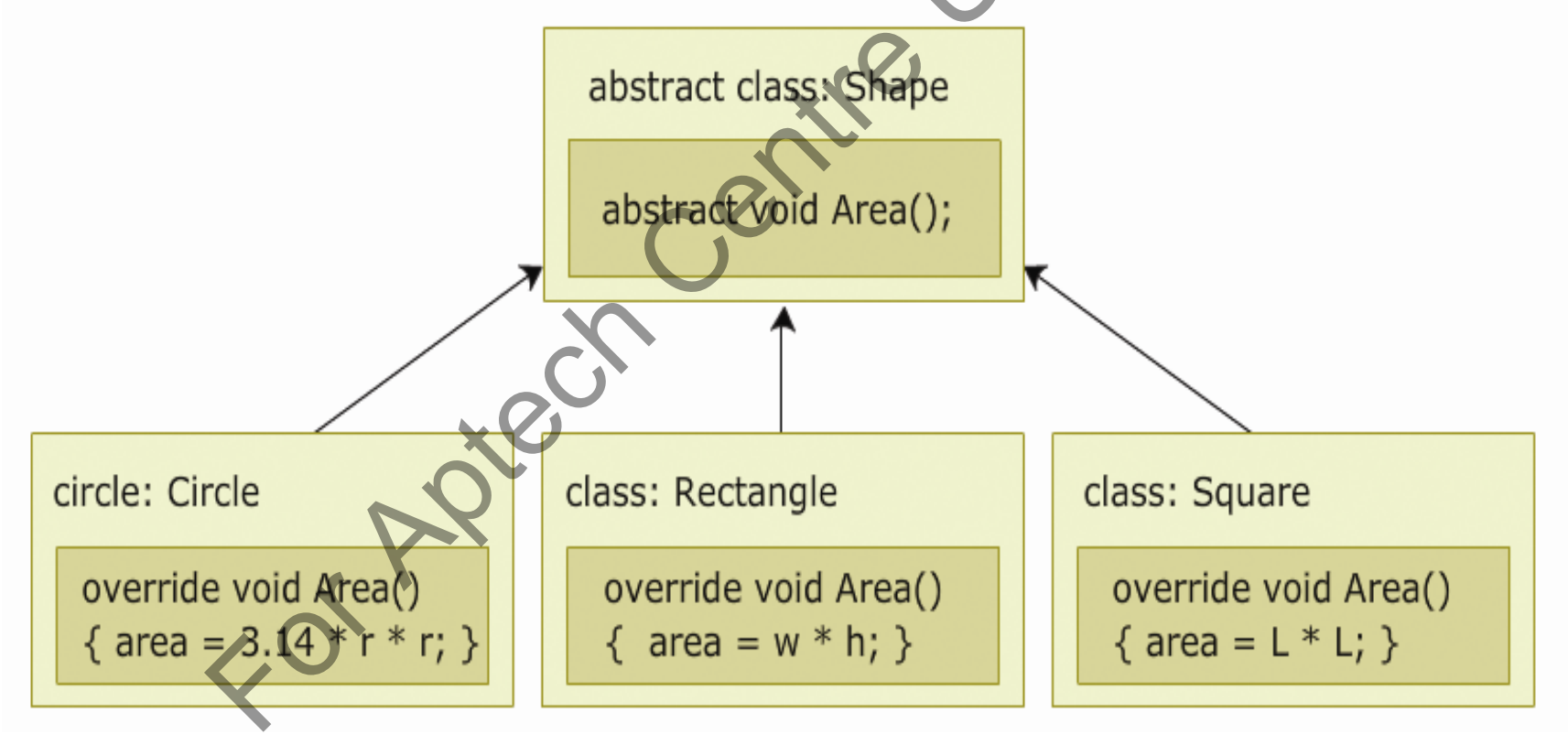
An abstract method is one which is declared inside parent class but not implemented there.

The characteristics of abstract methods are as follows:

- An abstract method is considered implicitly virtual.
- Abstract methods are allowed only in abstract classes in C# and Java.
- An abstract method declaration provides no actual implementation and the method declaration simply ends with a semicolon.

Abstract Methods 2-2

- The figure shows an abstract class with an abstract method.



Operator Overloading

- The table shows syntax of writing an abstract method.

C#	Java	C++
abstract public void draw();	**abstract** public void draw();	**virtual** void draw() = 0;

- The table lists the differences between the abstract class and interface.

Abstract Class	Interface
Can contain methods with a body	Cannot contain methods with a body
Cannot simulate multiple inheritance	Can simulate multiple inheritance
Child class should be a type of parent	Child class may not be a type of interface
Abstract class can have private members	All members of interface are implicitly public
Enable strong naming on precompiled assemblies	Specifies if assemblies have strong names

Pure Virtual Functions

- The deferred methods of C# and Java are referred to as pure virtual functions in C++.
- In C++, including a pure virtual function in a class is the only way to inform the compiler that the class is abstract.

Code Snippet

```
class Shape
{
public:
virtual void Area() = 0;
}
```

Overriding versus Overloading

- Table shows the difference between overriding and overloading.

Method Overriding	Method Overloading
Classes in which overridden methods are used must have a parent-child relationship	Parent-child relationship is not required for overloading
For overriding, the method signature cannot be changed	For overloading, the method signature must be changed
Overridden methods can be combined to perform the actions of both parent and child class together	Overloaded methods are always executed separately
Overriding is resolved at run-time	Overloading is resolved at compile time

Summary 1-2

- Method overriding is a technique in which a child class can override the method of a parent class and change the implementation of the method to suit its own requirement.
- Replacement is a condition in which the child class completely overrides the parent class method implementation.
- Refinement is a condition in which the child class includes the functionality of the parent class version of the overridden method within its own version.

Summary 2-2

- An abstract method is one which is declared inside parent class but implemented in the child class.
- An abstract class is intended only to be a base class of other classes and cannot be instantiated.
- Shadowing is a technique in which a variable or method declared in one scope hides a variable or method with the same name in another scope.
- Redefinition is a technique in which the name of the methods remains the same but signature of the child class method differs from that of the parent class.