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**Explain Polymorphism**

# Meaning of Polymorphism

Polymorphism, from the Greek words meaning "many forms," is a fundamental concept in object-oriented programming. It allows objects of different classes to be treated as objects of a common parent class. This means you can use a single variable, function, or data structure to work with objects of various types, and the program will automatically execute the correct behavior for each object's specific type.

## Benefit of Polymorphism

The primary benefit of polymorphism is that it makes your code more flexible, reusable, and easier to maintain. It allows you to write generic, adaptable code that can operate on a variety of objects, even ones that didn't exist when the code was written

## Application of Polymorphism

A common and straightforward application of polymorphism is in creating a graphical user interface (GUI) or a drawing program where you need to handle different shapes.

Polymorphism allows you to treat objects of different classes as if they were objects of a common parent class. This simplifies your code by letting you perform the same action on different objects, with each object responding in its own unique way.

## Code Example of Polymorphism

Example 1:

class Shape:

def draw(self):

raise NotImplementedError

class Circle(Shape):

def draw(self):

print("Drawing a circle: ○")

class Square(Shape):

def draw(self):

print("Drawing a square: □")

class Triangle(Shape):

def draw(self):

print("Drawing a triangle: △")

shapes\_to\_draw = [Circle(), Square(), Triangle(), Circle()]

for shape in shapes\_to\_draw:

shape.draw() #

Example 2:

*static void Main(string[] args)*

*{*

*Console.WriteLine("Hello World! This is the Shapes Project.");*

*Console.WriteLine("");*

*List<Shape> shapes = new List<Shape>();*

*Square s1 = new Square("Red", 3);*

*shapes.Add(s1);*

*Rectangle s2 = new Rectangle("Blue", 4, 5);*

*shapes.Add(s2);*

*Circle s3 = new Circle("Green", 6);*

*shapes.Add(s3);*

*foreach (Shape s in shapes)*

*{*

*string color = s.GetColor();*

*double area = s.GetArea();*

*Console.WriteLine($"> The {color} shape has an area of {area}.");*

*}*

*Console.WriteLine("");*

*}*