Object-Oriented Programming Concepts

Session: 9

Polymorphic Variable
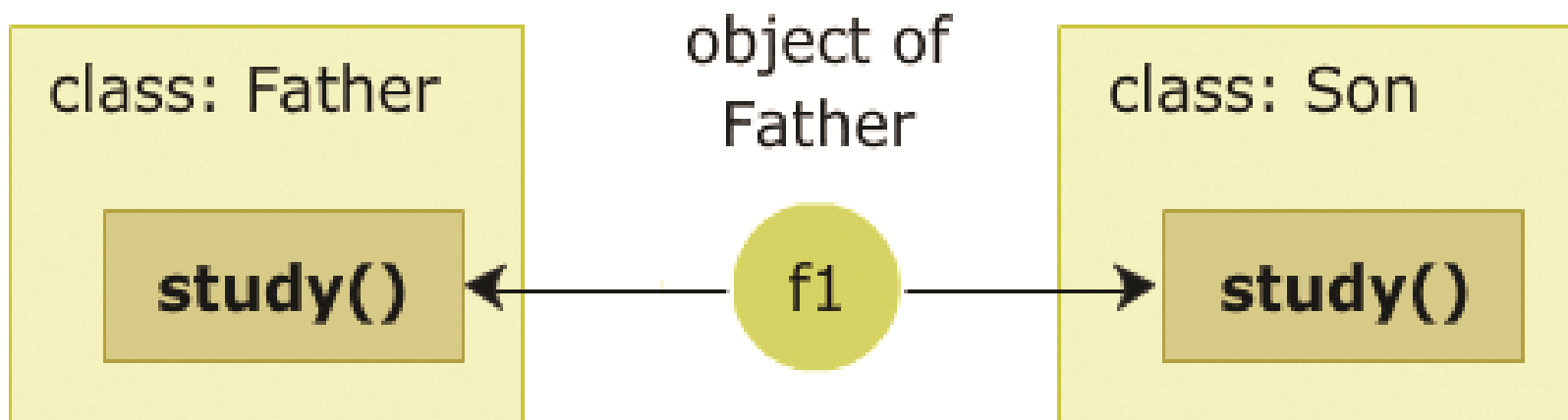
- Explain polymorphic variable

- List types of polymorphic variables

- Explain simple polymorphic variable

- Explain pseudo-variable

- Explain reverse polymorphism

A variable that can hold reference of more than one type of object

◆ The figure show an object f\ of class Father which is used to access both parent as well as child class study() methods.

Polymorphic Variables

Simple Polymorphic Variable

Pseudo-variable

◆ The C# code shows the creation of polymorphic variable.

Code Snippet

```
class Emp
{
public virtual void display()
{
Console.WriteLine("Class Emp");
}
}


// class FullTimeEmp inherits class Emp
class FullTimeEmp : Emp
```

```
{
// overridden method
public override void display()
{
Console.WriteLine("Class FullTimeEmp");
}
}
// class PartTimeEmp inherits class Emp
class PartTimeEmp  : Emp
{
// overridden method
public override void display()
```

```
{

Console.WriteLine("Class PartTimeEmp");

}

static void Main()

{

Emp e1 = new FullTimeEmp(); // polymorphic
variable e1

e1.display(); // line3

}

}// end of class
```

Output:

```
Class FullTimeEmp
```

Invisible receiver that works inside of a method and is normally not declared like a normal variable

Eliminates the need to give different names to the method parameters from that of the actual parameters

◆ Reverse polymorphism is a process of undoing a polymorphic assignment.

◆ The C# code shows reverse polymorphism by assigning the object e1 again to a variable of type child class.
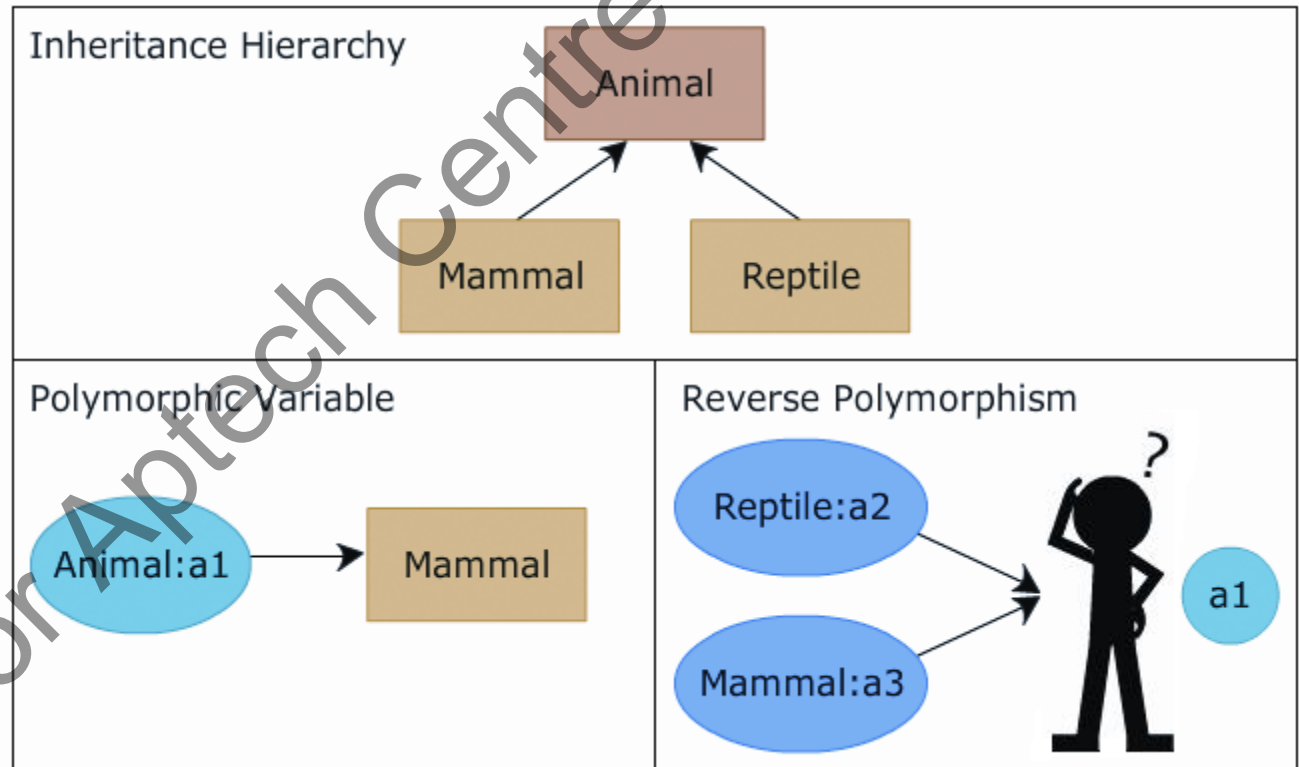
Code Snippet

```
Emp e1 = new FullTimeEmp(); // assign child
class reference to parent class

FullTimeEmp e2 = (FullTimeEmp)e1; // cast the
parent object back to child type
```

◆ Problems that can arise

Problem of identification   Problem of assignment

◆ The figure shows the identification and assignment problem.

- A polymorphic variable is one that can hold reference of more than one type of object.

- A pseudo-variable is an invisible receiver that works inside of a method and is normally not declared like a normal variable.

- The pseudo-variable is called 'this' in C++, C# and Java, 'self' in Small talk, and 'current' in Eiffel.

- The pseudo-variable eliminates the need to give different names to the method parameters from that of the actual parameters to resolve name ambiguity.

- Reverse polymorphism is a process of undoing a polymorphic assignment.