Jurusan Teknik Komputer dan Informatika

Politeknik Negeri Bandung

Pertemuan 8 Polymorphism

D3 Kelas 2A/2B

Dosen Pengampu :

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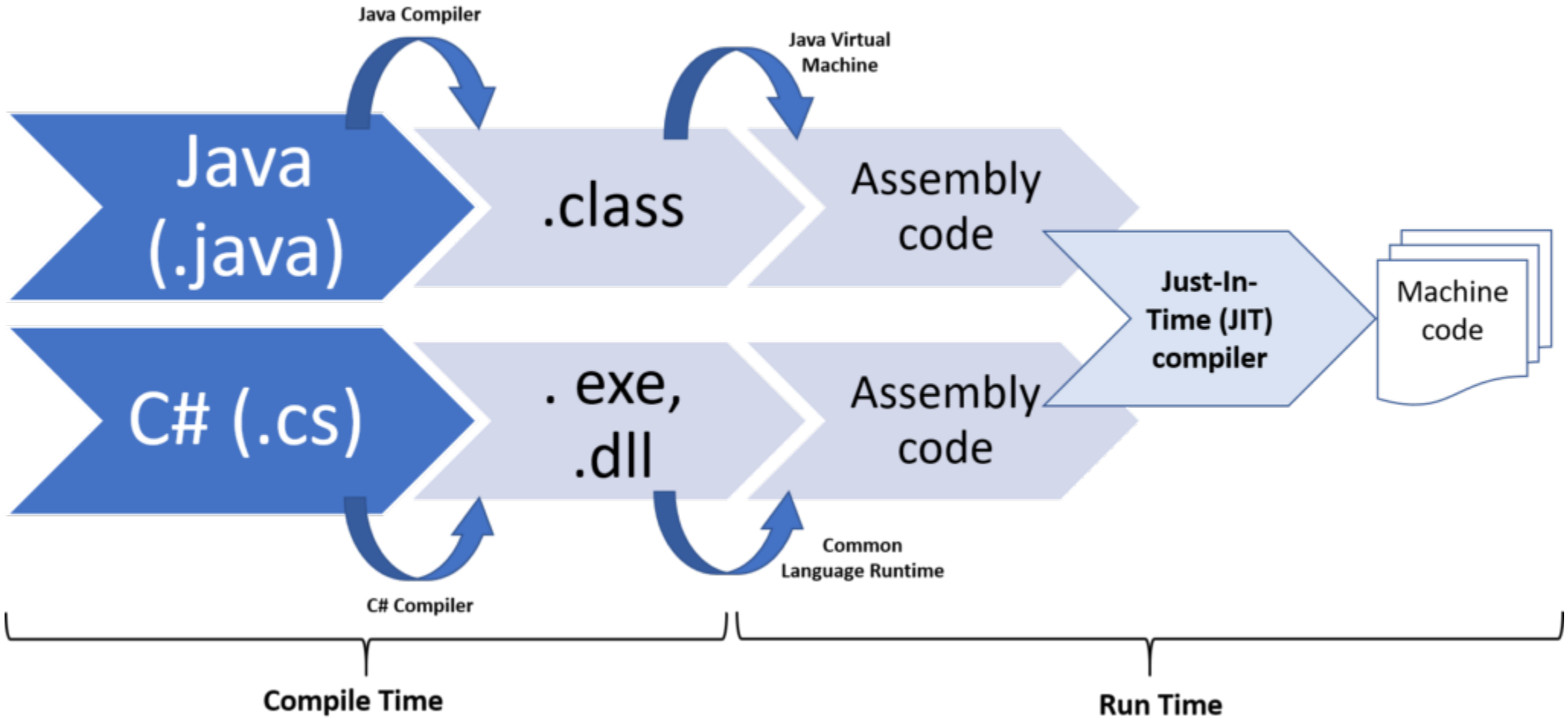
Introduction

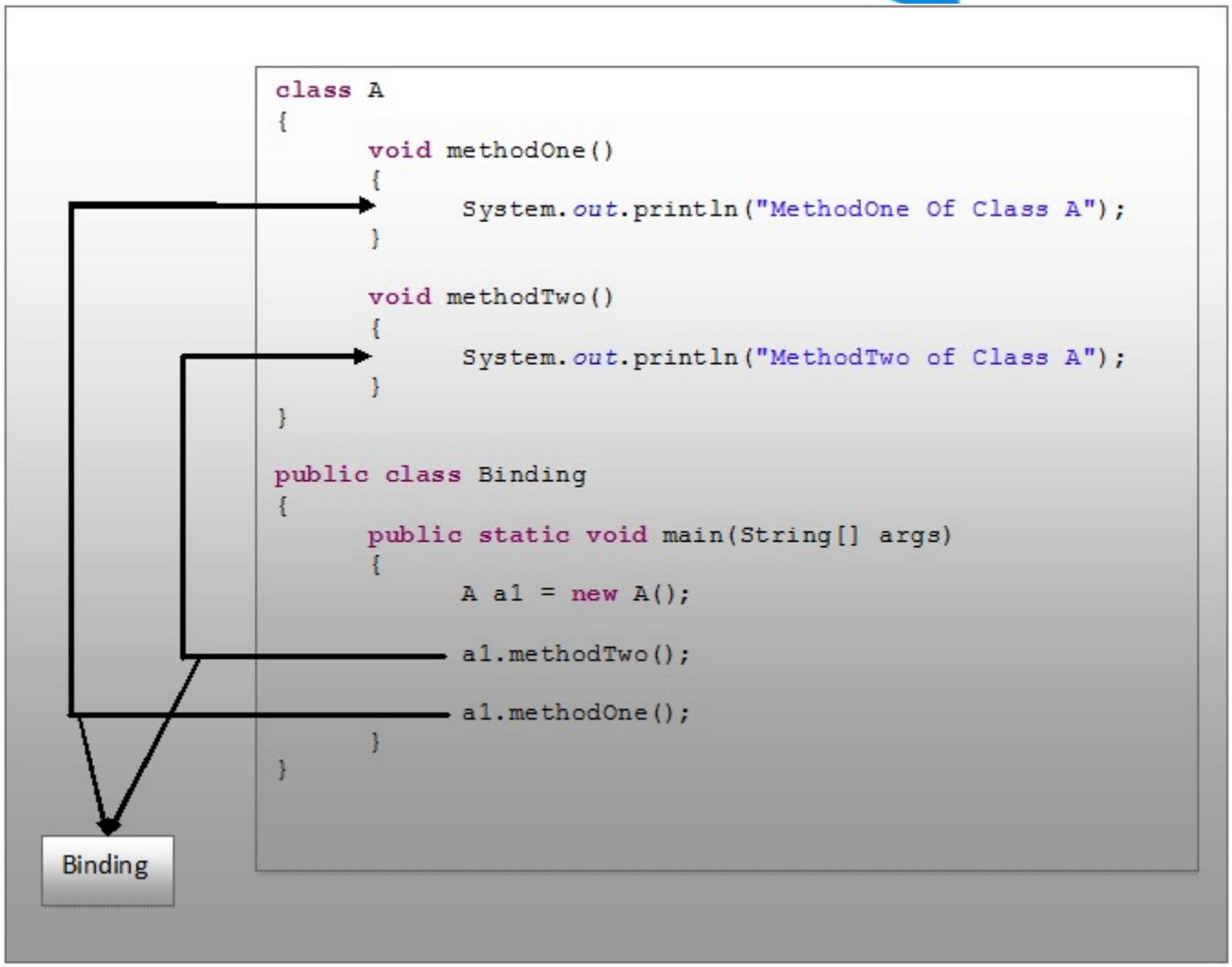
- In greek, Poly means many and morph means shapes or forms. So. Polymorphism refers to any entity which takes many form.
- Polymorphism in java refers to any entity whether it is an operator or a constructor or any method which takes many forms or can be used for multiple tasks either while compiling or while running a java program.
- There are two types of polymorphism in Java.
  - Static Polymorphism, **static binding or Early Binding**.
  - Dynamic Polymorphism, Dynamic binding or Late Binding

Compile time vs Run time

- 

Binding in Java

- The process by which references are bound to specific classes.
- **Binding** refers to the link between method call and method definition. This picture clearly shows what is binding.
- "a1.methodOne()" call is binding to corresponding methodOne() definition "a1.methodTwo()" call is binding to corresponding methodTwo() definition.



Static Polymorphism

- it is called **static binding or Early Binding**.
- Any entity which shows polymorphism during compile time is called static polymorphism.
- Constructor Overloading and method overloading are best examples of static polymorphism. Because, they show polymorphism during compilation.

```
class SimpleCalculator
{
    int add(int a, int b)
    {
         return a+b;
    }
    int  add(int a, int b, int c)
    {
         return a+b+c;
    }
}
public class Demo
{
   public static void main(String args[])
   {
           SimpleCalculator obj = new SimpleCalculator();
       System.out.println(obj.add(10, 20));
       System.out.println(obj.add(10, 20, 30));
   }
}
```

Output:

```
30
60
```

Dynamic Polymorphism

- Any entity which shows polymorphism during run time is called dynamic polymorphism. Method Overriding is the best example of dynamic polymorphism
- In Dynamic binding compiler doesn't decide the method to be called. Overriding is a perfect example of dynamic binding. In overriding both parent and child classes have same method

```
public class NewClass {
    public static class superclass {
        void print()
        {
            System.out.println("print in superclass.");
        }
    }

    public static class subclass extends superclass {
        @Override
        void print()
        {
            System.out.println("print in subclass.");
        }
    }

    public static void main(String[] args)
    {
        superclass A = new superclass();
        superclass B = new subclass();
        A.print();
        B.print();
    }
}
```

Output:

```
print in superclass.
print in subclass.
```

Lat 7.1 Dynamic Polymorphism (Run time)

```
public class Animal{
   public void sound(){
      System.out.println("Animal is making a sound");
   }
}
```

```
class Horse extends Animal{
    @Override
    public void sound(){
        System.out.println("Neigh");
    }
    public static void main(String args[]){
        Animal obj = new Horse();
        obj.sound();
    }
}
```

Output:

```
Neigh
```

```
public class Cat extends Animal{
    @Override
    public void sound(){
        System.out.println("Meow");
    }
    public static void main(String args[]){
        Animal obj = new Cat();
        obj.sound();
    }
}
```

Output:

```
Meow
```

Lat 7.2 Static Polymorphism (Compile Time)

```
class Overload
{
    void demo (int a)
    {
       System.out.println ("a: " + a);
    }
    void demo (int a, int b)
    {
       System.out.println ("a and b: " + a + "," + b);
    }
    double demo(double a) {
       System.out.println("double a: " + a);
       return a*a;
    }
}
```

```
class MethodOverloading
{
    public static void main (String args [])
    {
        Overload Obj = new Overload();
        double result;
        Obj .demo(10);
        Obj .demo(10, 20);
        result = Obj .demo(5.5);
        System.out.println("O/P : " + result);
    }
}
```

Lat 7.3 Another Type of Employee

- file terlampir