

CS 213 : Software Methodology

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Inheritance/Static & Dynamic Types

Static and Dynamic Types

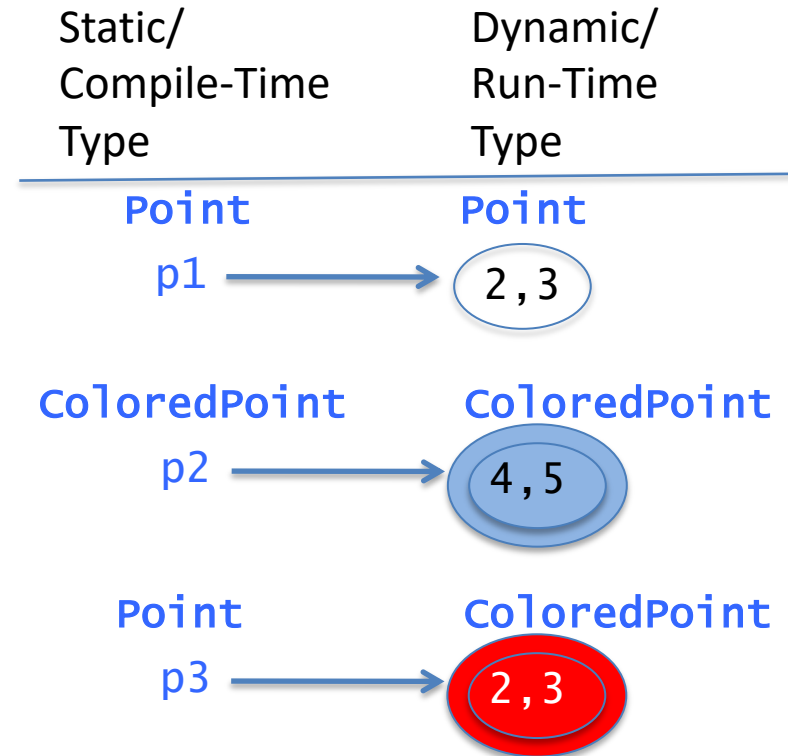
```
public class PointApp {  
    public static void  
    main(String[] args) {
```

```
        Point p1 = new Point(2,3);
```

```
        ColoredPoint p2 =  
            new ColoredPoint(4,5,"blue");
```

```
        Point p3 =  
            new ColoredPoint(2,3,"red");
```

```
    }
```



Every ColoredPoint is a Point (just like every Student is a Person) – so any ColoredPoint instance (dynamic type) can be referred to by a Point variable (static type)

Dynamic Binding

```
public class PointApp {  
    public static void  
    main(String[] args) {  
        Point p1 = new Point(2,3);  
        ColoredPoint p2 = new ColoredPoint(4,5,"blue");  
        System.out.println(p2.getColor()); // ? "blue"  
        Point p3 = new ColoredPoint(2,3,"red");  
        System.out.println(p3.getX()); // ? 2  
        System.out.println("p3 = " + p3); // ? "p3 = 2,3,red"  
    }  
}
```

Dynamic Binding

Static type of p3 is `Point`,
but dynamic type (type of
instance it points to) is
`ColoredPoint`.



So, the `p3.toString()`
static call is bound to the
dynamic type,
`ColoredPoint`.



This results in the
overriding version
of `toString()` being
executed.

Static and Dynamic Types

```
public class PointApp {  
    public static void  
    main(String[] args) {
```

```
        ColoredPoint p4 = new Point(5,6); // ?
```

```
    }  
}
```

WILL NOT COMPILE

Every `Point` (RHS) is

NOT a `ColoredPoint`

(LHS), so a `Point` instance

cannot be referenced

by a `ColoredPoint` variable

Static and Dynamic Types

```
public class PointApp {  
    public static void  
    main(String[] args)
```

```
        Point p5 = new ColoredPoint(1,2,green);  
        System.out.println(p5.getColor()); // ?
```

```
}
```

WILL NOT COMPILE

Because the static type of
p5 is Point, ONLY members of
Point class can be syntactically
referenced by p5. Since
getColor is not in the Point
class, compiler flags error