

Inheritance

- **Inheritance**: a mechanism for creating a new class from an existing one.
- **Motivation**:
 - Can **reuse** existing classes
 - Faster than writing them from scratch

```
public class Square extends Rectangle {  
    private double diagonal;  
    public Square(int side) {  
        super(side, side); // superclass constructor  
        diagonal = (double)side * 1.4142;  
    }  
    public int getSide( ) {  
        return getWidth( );  
    }  
    public String toString( ) {  
        return "Square: Side(" + getSide( ) + ")";  
    }  
}
```

Casting

/* A class that models a rectangle *

```
public class Rectangle {  
    private int length;  
    private int width;  
  
    public Rectangle(int len, int w) {  
        length = len;  
        width = w;  
    }  
    public int getLength( ) {  
        return length;  
    }  
    public int getWidth( ) {  
        return width;  
    }  
  
    public int area( ) {  
        return length*width;  
    }  
  
    public String toString( ) {  
        return "Rectangle: Length(" + length + "), Width(" + width + ")";  
    }  
}
```

```

public class Rectangle {
    protected int length;
    protected int width;

    public Rectangle(int len,
                     int w) {
        length = len;
        width = w;
    }

    public String toString() {
        return "Rectangle:
        Length(" + length +
        "), Width(" + width
        + ")";
    }
}

```

```

public class Square extends Rectangle {
    private double diagonal;

    public Square(int side) {
        super(side, side);
        diagonal = (double)side * 1.4142;
    }

    public String toStringAsRectangle() {
        return toString();
    }

    public String toString() {
        return "Square: Side(" + getSide()
        + ")";
    }
}

```

overriding

Square

```

diagonal:
Square()
toStringAsRectangle()
toString()

```

```

length:
width:
Rectangle()
toString()
getWidth()
getLength()
area()

```

Inheritance

Class A methods
and instance
variables

Class A

Parent or base class

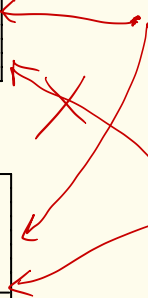
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Class B methods
and instance
variables

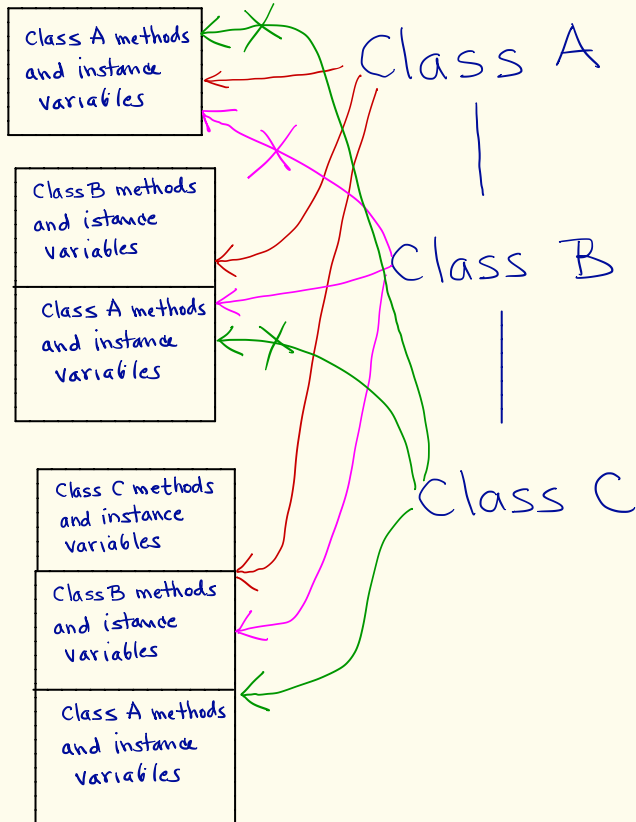
Class B

child class or subclass

Class A methods
and instance
variables



Inheritance



Parent or base class

child class or subclass