# Encapsulation and Abstraction

Sensitivity: Internal & Restricted

# Agenda

1 Encapsulation and Abstraction

# Objectives

At the end of this module, you will be able to:

- Understand the relevance of Object Oriented Programming techniques
- Implement Encapsulation and Abstraction

# Encapsulation And Abstraction

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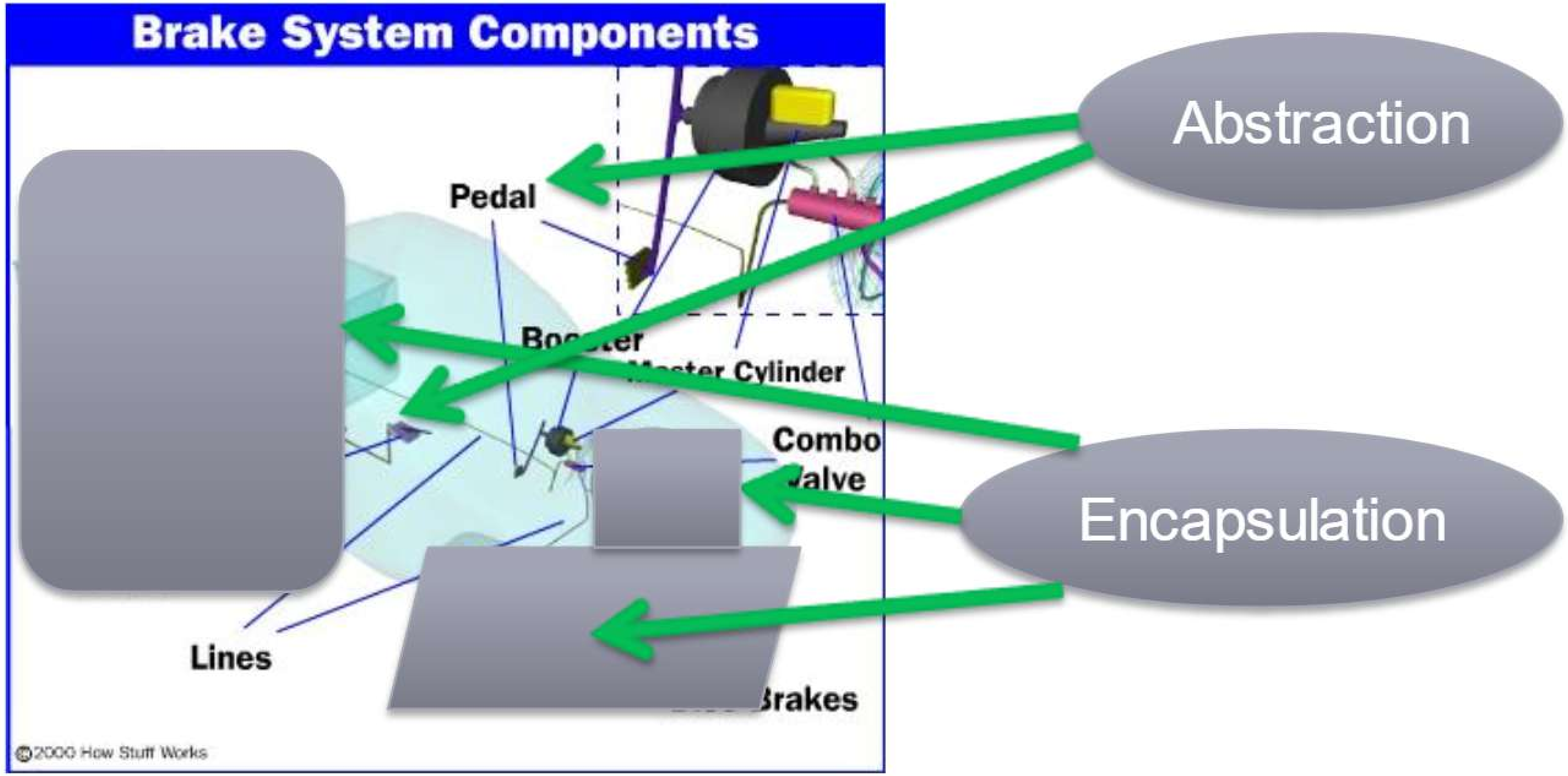
# Introduction to Object Oriented Programming

- Object Oriented Programming is a programming paradigm which uses "Objects" consisting of data fields and methods together with their interactions

- It is used to design applications and computer programs

- Programming technique may include features like encapsulation, abstraction, polymorphism and inheritance

# Encapsulation and Abstraction



Encapsulation is hiding the implementation level details

Abstraction is exposing only the interface

# Defining a Sample point Class

```
class Point {
    int x;    int y;
    void setX( int x){
    x = (x > 79 ? 79 : (x < 0 ? 0 :x)); }
  void setY (int y){
    y = (y > 24 ? 24 : (y < 0 ? 0 : y)); }
  int getX( ){ return x; }
  int getY( ){ return y;}
}
```

# Access Specifiers

- Java provides access specifiers to control access to class members
- Access specifiers help implement:
  - Encapsulation by hiding implementation-level details in a class
  - Abstraction by exposing only the interface of the class to the external world

- The **private** access specifier is generally used to encapsulate or hide the member data in the class

- The **public** access specifier is used to expose the member functions as interfaces to the outside world

# Class Declaration for Point

```
class Point{
  private int x;
  private int y;
  public void setX( int x){
    x= (x > 79 ? 79 : (x < 0 ? 0 :x));
  }
  public void setY (int y){
    y= (y > 24 ? 24 : (y < 0 ? 0 : y));
  }
  public int getX( ){
    return x;
  }
public int getY( ){
    return y;
  }
}
```

# Class Declaration for Point (Contd.).

```
class PointDemo {
  public static void main(String args[ ] ){
    int a, b;
    Point p1 = new Point( );
    p1.setX(22);
    p1.setY(44);
    a = p1.getX( );
    System.out.println("The value of a is "+a);
    b = p1.getY( );
    System.out.println("The value of b is "+b)
  }
}
```

**Expected Output :**

```
The value of a is 22
The value of b is 24
```

**Actual Output :**

```
The value of a is 0
The value of b is 0
```

**?**

# Class Declaration for Point - modified

```
class Point{
  private int x;
  private int y;
  public void setX( int x){
    this.x= (x > 79 ? 79 : (x < 0 ? 0 :x));
  }
  public void setY (int y){
    this.y= (y > 24 ? 24 : (y < 0 ? 0 : y));
  }
  public int getX( ){
    return x;
  }
public int getY( ){
    return y;
  }
}
```

# Class Declaration for Point - modified (Contd.).

```
class PointDemo {
  public static void main(String args[ ] ){
    int a, b;
    Point p1 = new Point( );
    p1.setX(22);
    p1.setY(44);
    a = p1.getX( );
    System.out.println("The value of a is "+a);
    b = p1.getY( );
    System.out.println("The value of b is "+b);
  }
}
```

**Output** :

```
The value of a is 22
The value of b is 24
```

# Summary

In this module, we were able to:

- Understand the relevance of Object Oriented Programming techniques
- Implement Encapsulation and Abstraction

# Thank You

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