CSE 11
Accelerated Intro to Programming
Lecture 10

Greg Miranda, Spring 2021

This lecture is being recorded

Announcements

- Quiz 10 due Wednesday @ 8am

- PA3 due Wednesday @ 11:59pm

- Survey 4 due ~~tonight~~ Friday @ 11:59pm

WeeklyPay Examples

- weeklyPay: takes a number of hours worked and an hourly rate, and returns the pay with overtime (over 40 hours) counting as double the rate

```
class CircleRegion {                    class SquareRegion {
    …                                       …
→   boolean contains(Point p)           ⤳   boolean contains(Point p)
    { … }                                   { … }
}                                       }
```

Both classes have a <u>method</u> with the **<u>same header</u>**

We can write an **interface** with the shared method

```
interface Region {
    boolean contains(Point p);
}
```

```
class CircleRegion
    implements Region {
    …
    public boolean contains(Point p)
    { … }
}
```

```
class SquareRegion
    implements Region {
    …
    public boolean contains(Point p)
    { … }
}
```

Both classes have a method with the **same header**

We can write an **interface** with the shared method

```
interface Region {
    boolean contains(Point p);
}
```

```
class CircleRegion
  implements Region {

  …
  public boolean contains(Point p)
  { … }
}
```

```
class SquareRegion
  implements Region {

  …
  public boolean contains(Point p)
  { … }
}
```

Both classes have a method with the **same header**

```
interface Region {
  boolean contains(Point p);
}
```

```
class CircleRegion                    class SquareRegion
  implements Region {                   implements Region {

  …                                     …
  public boolean contains(Point p)      public boolean contains(Point p)
  { … }                                 { … }
}                                     }
```

```
class ExamplesRegion {
  Region circ = new CircleRegion(new Point(10, 5), 4));
  Region square = new SquareRegion(new Point(5, 6), 8));
}
```

We can use the same
interface type
for references of classes that implement it

```
interface Region {
    boolean contains(Point p);
}
```

```
class CircleRegion
  implements Region {
  Point center;
  double int radius;
  public boolean contains(Point p)
  { … }
}
```

```
class SquareRegion
  implements Region {
  Point center;
  int sideLength;
  public boolean contains(Point p)
  { … }
}
```

```
class ExamplesRegion {
    Region circ = new CircleRegion(new Point(10, 5), 4));
    Region square = new SquareRegion(new Point(5, 6), 8));
    double int num = circ.radius;
}
```

What is stored in
the num field?

1 A: 10   1 C: 5

1 B: 8   (3 D:) it's an error

12 E: something else

Using an interface, we can
only use methods on the interface.

```
interface Region {
    boolean contains(Point p);
}
```

```
class CircleRegion
    implements Region {
    Point center;
    int radius
    public boolean contains(Point p)
    { … }
}
```

```
class SquareRegion
    implements Region {
    Point center;
    int sideLength;
    public boolean contains(Point p)
    { … }
}
```

```
class ExamplesRegion {
    Region circ = new CircleRegion(new Point(10, 5), 4);
    Region square = new SquareRegion(new Point(5, 6), 8);
    boolean contains1 = circ.contains(new Point(7, 6));
}
```

What is stored in
the contains1 field?

15 (A) true   20: error

6 B: false

```java
interface Region {
    boolean contains(Point p);
}

class CircleRegion                    class SquareRegion
  implements Region {                   implements Region {

  …                                     …
  public boolean contains(Point p)      public boolean contains(Point p)
  { … }                                 { … }
}                                     }



class UnionRegion {
  Region r1, r2;
  UnionRegion(Region r1, Region r2) { … }
  public boolean contains(Point p) {
    return this.r1.contains(p) ||
           this.r2.contains(p);
  }
}
```

```
interface Region {
  boolean contains(Point p);
}
```

```
class CircleRegion
  implements Region {

  …
  public boolean contains(Point p)
  { … }
}
```

```
class SquareRegion
  implements Region {

  …
  public boolean contains(Point p)
  { … }
}
```

What is the value of
the b1 field?

```
class UnionRegion {
  Region r1, r2;
  UnionRegion(Region r1, Region r2) { … }
  public boolean contains(Point p) {
    return this.r1.contains(p) ||
           this.r2.contains(p);
  }
}
class ExamplesRegion {
  Region circ = new CircleRegion(new Point(10, 5), 4);
  Region square = new SquareRegion(new Point(5, 6), 8);
  UnionRegion ur = new UnionRegion(this.square, this.circ);
  boolean b1 = this.ur.contains(new Point(13, 5));
}
```

20 (A:)true   1 C: error

4 B: false