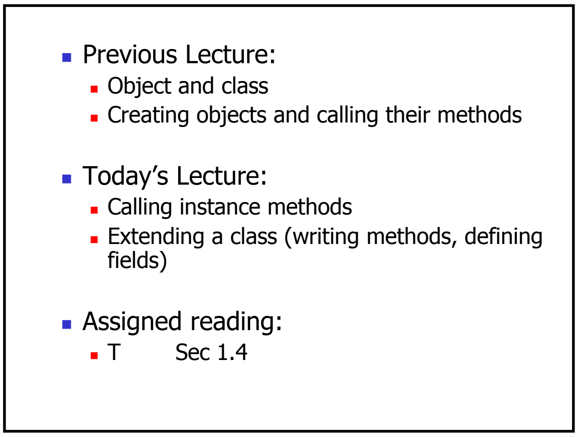
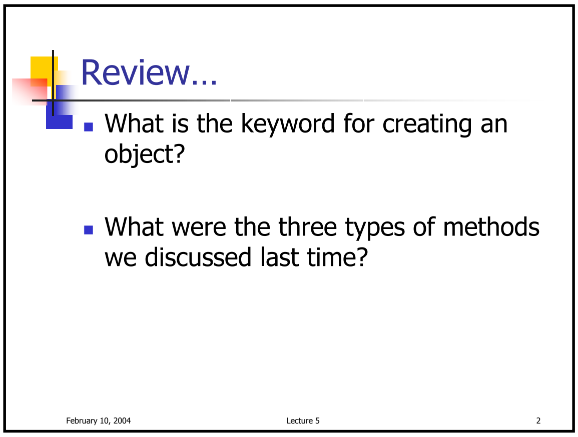
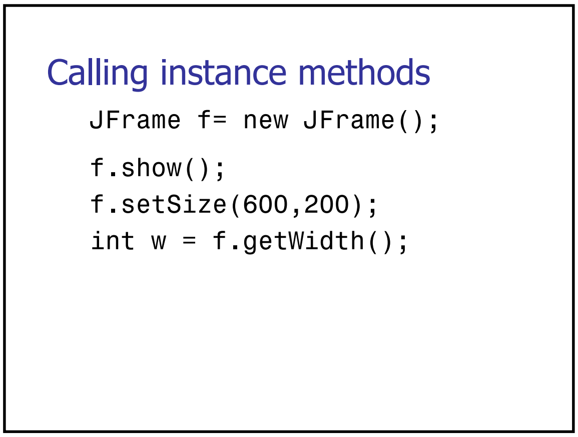


- Previous Lecture:
  - Object and class
  - Creating objects and calling their methods
- Today's Lecture:
  - Calling instance methods
  - Extending a class (writing methods, defining fields)
- Assigned reading:
  - T Sec 1.4



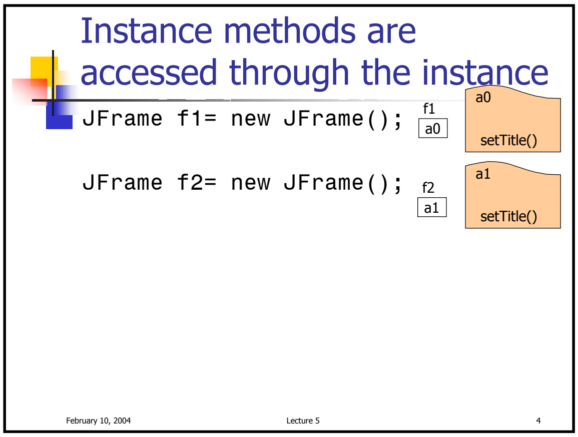
Review…

- What is the keyword for creating an object?
- What were the three types of methods we discussed last time?



Calling instance methods

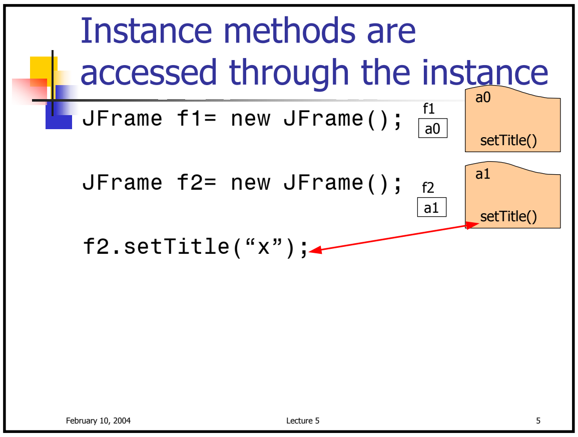
```
JFrame f= new JFrame();
f.show();
f.setSize(600,200);
int w = f.getWidth();
```



Instance methods are accessed through the instance

```
JFrame f1= new JFrame();

JFrame f2= new JFrame();
```

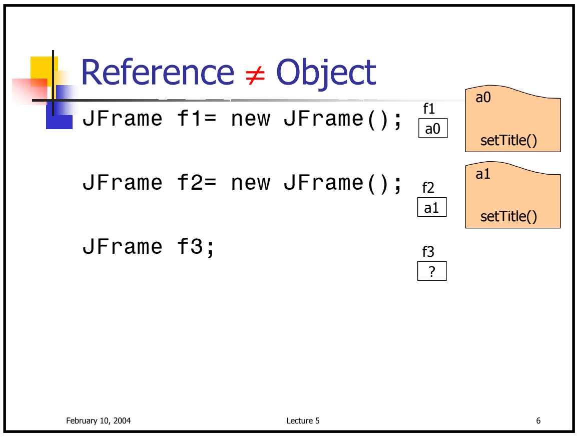


Instance methods are accessed through the instance

```
JFrame f1= new JFrame();

JFrame f2= new JFrame();

f2.setTitle(“x”);
```

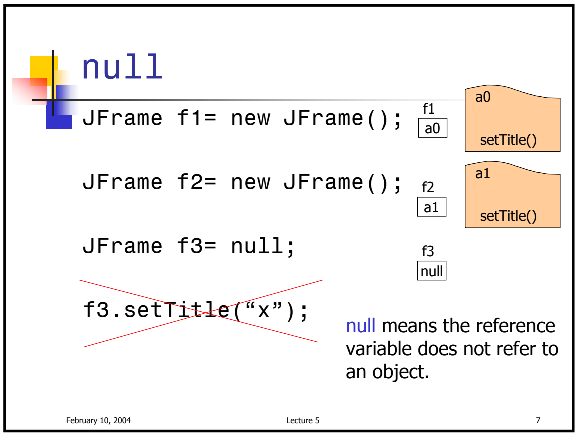


Reference ≠ Object

```
JFrame f1= new JFrame();

JFrame f2= new JFrame();

JFrame f3;
```



null

```
JFrame f1= new JFrame();

JFrame f2= new JFrame();

JFrame f3= null;
```

~~f3.setTitle(“x”);~~

f1 a0

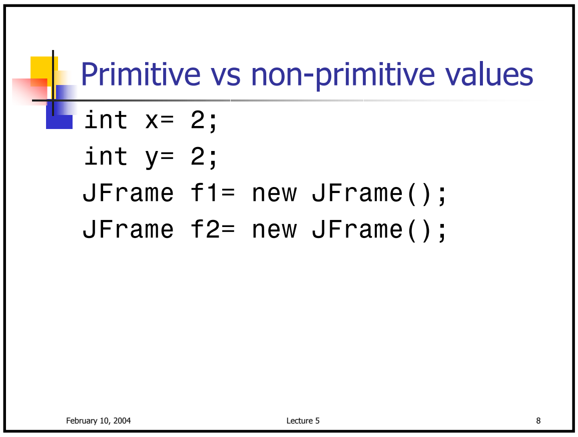
a0 setTitle()

f2 a1

a1 setTitle()

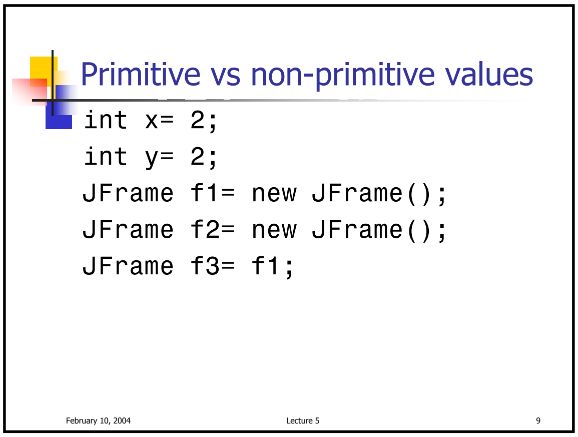
f3 null

null means the reference variable does not refer to an object.



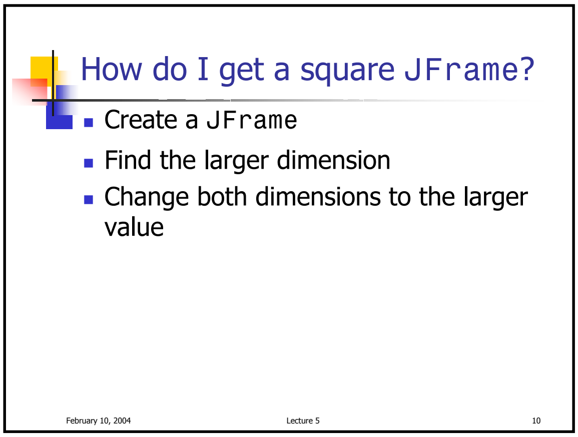
Primitive vs non-primitive values

```
int x= 2;
int y= 2;
JFrame f1= new JFrame();
JFrame f2= new JFrame();
```



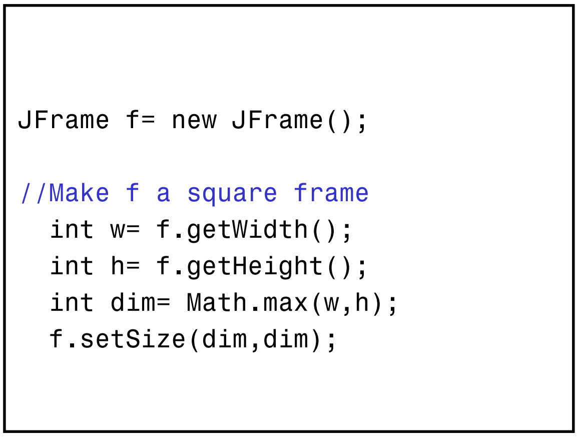
Primitive vs non-primitive values

```
int x= 2;
int y= 2;
JFrame f1= new JFrame();
JFrame f2= new JFrame();
JFrame f3= f1;
```



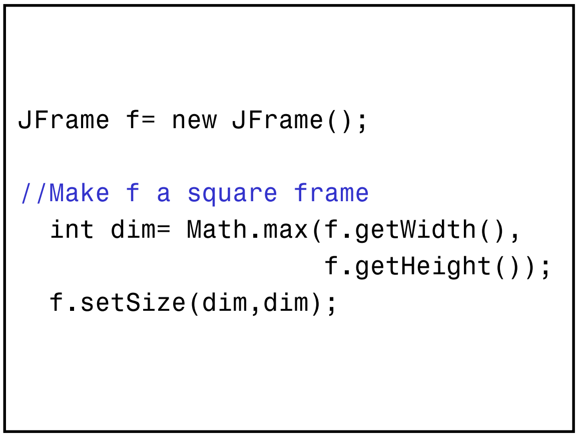
How do I get a square JFrame?

- Create a JFrame
- Find the larger dimension
- Change both dimensions to the larger value



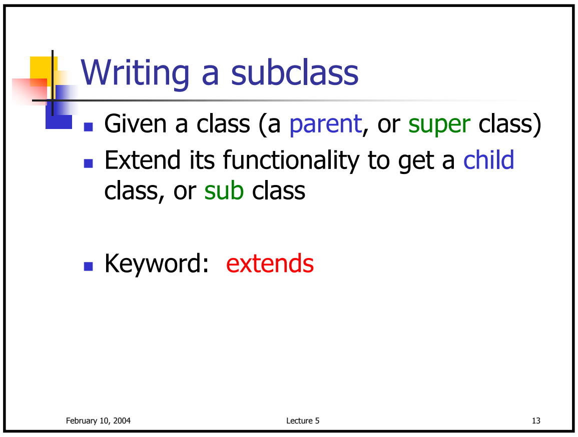
```
JFrame f= new JFrame();

//Make f a square frame
  int w= f.getWidth();
  int h= f.getHeight();
  int dim= Math.max(w,h);
  f.setSize(dim,dim);
```



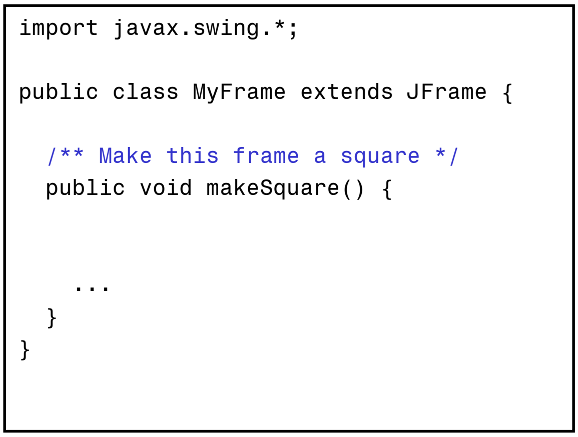
```
JFrame f= new JFrame();

//Make f a square frame
  int dim= Math.max(f.getWidth(),
                    f.getHeight());
  f.setSize(dim,dim);
```



Writing a subclass

- Given a class (a parent, or super class)
- Extend its functionality to get a child class, or sub class
- Keyword: extends



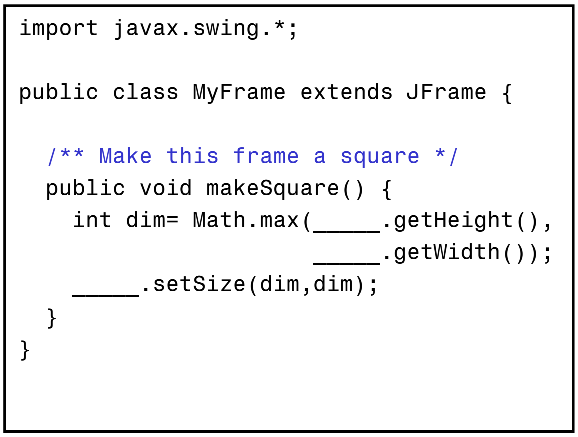
```
import javax.swing.*;

public class MyFrame extends JFrame {

  /** Make this frame a square */
  public void makeSquare() {



    ...
  }
}
```



```
import javax.swing.*;

public class MyFrame extends JFrame {

  /** Make this frame a square */
  public void makeSquare() {
    int dim= Math.max(_____.getHeight(),
                      _____.getWidth());
    _____.setSize(dim,dim);
  }
}
```