Event (1A)

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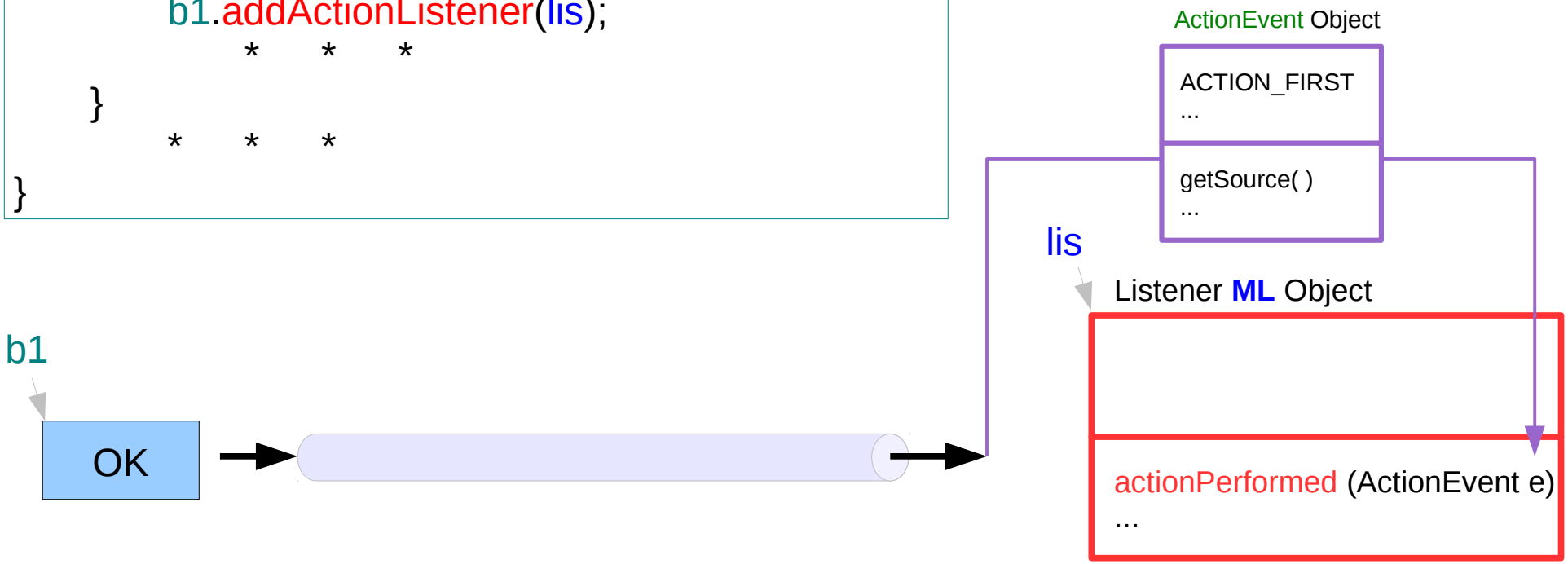
Action Event

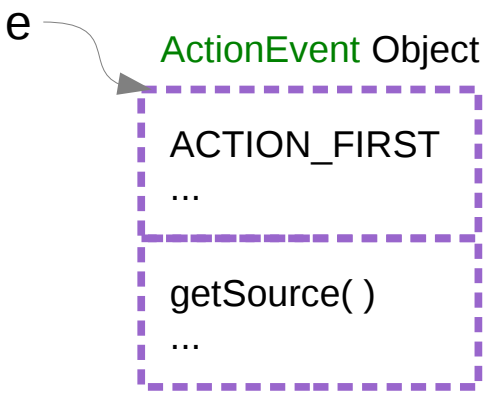
```
class MF extends JFrame {

      MF( ) {
            Jbutton b1   = new JButton();
            ML      lis  = new ML();

            b1.addActionListener(lis);
                  *     *     *
      }
            *     *     *
}
```



Listener Class

```
class ML implements ActionListener {

    public void actionPerformed( ActionEvent e ) {
        // this method will be invoked
        // when an action occurs
        // so, write here what we want to do
    }

}
```

Listener Class : ML

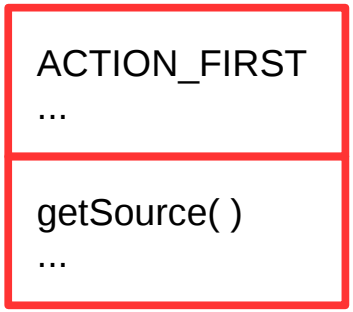



```
public interface ActionListener {
    public void actionPerformed( ActionEvent e ) ;
    // abstract method to be implemented
}
```

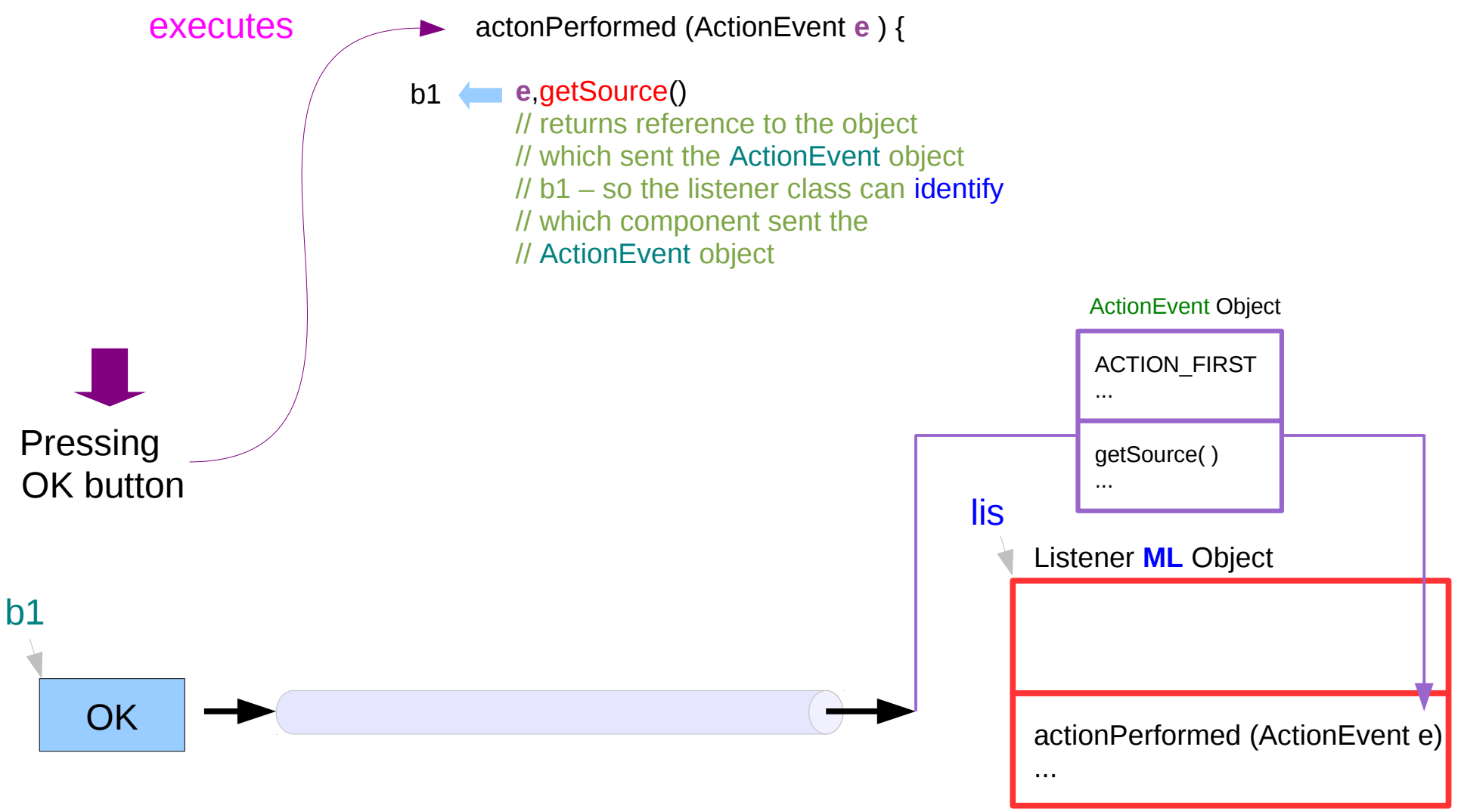
Interface
with abstract method

ActionEvent Class

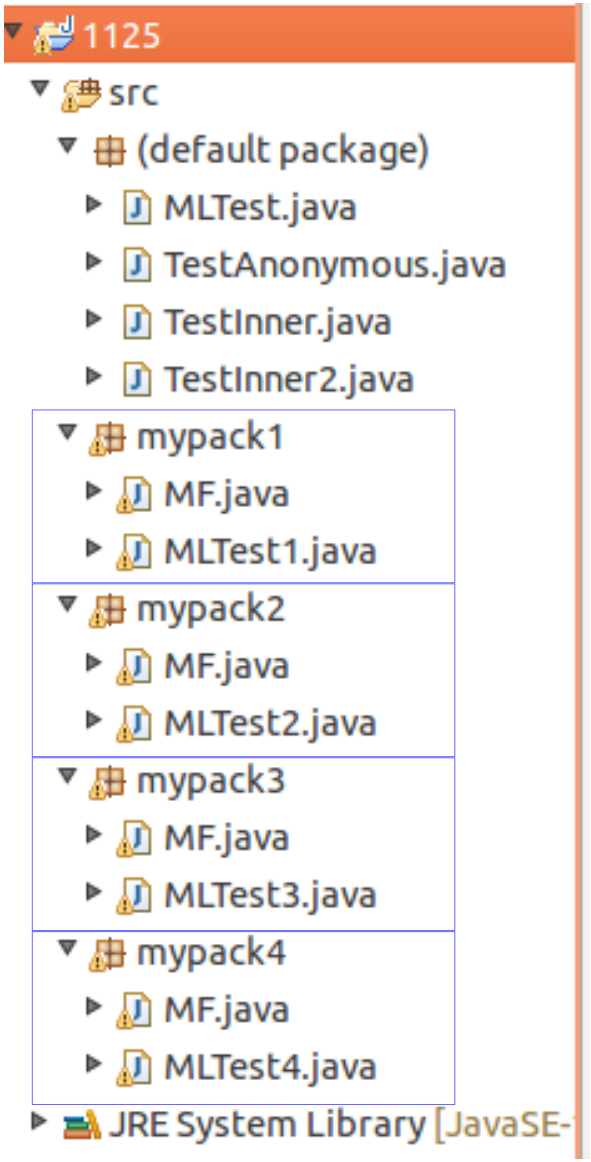
```
public class ActionEvent … {

      static int ACTION_FIRST …  // fields
      ActionEvent( … )           // constructors
                                 // methods
      public Object getSource( ) {
            // returns the object
            // on which the Event initially occurred.
      }

}
```



getSource()


executes
actonPerformed (ActionEvent e) {
b1
e,getSource()
// returns reference to the object
// which sent the ActionEvent object
// b1 – so the listener class can identify
// which component sent the
// ActionEvent object
ActionEvent Object
ACTION_FIRST
...
getSource( )
...
Pressing
OK button
lis
Listener ML Object
b1
OK
actionPerformed (ActionEvent e)
...

Packages


1125
src
(default package)
MLTest.java
TestAnonymous.java
TestInner.java
TestInner2.java
mypack1
MF.java
MLTest1.java
mypack2
MF.java
MLTest2.java
mypack3
MF.java
MLTest3.java
mypack4
MF.java
MLTest4.java
JRE System Library [JavaSE-

I. Using separate classes (1)

mypack1

```
package mypack1;

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

class ML implements ActionListener {
    JButton bb;
    int a = 0;
    public void actionPerformed (ActionEvent e){

        bb = (JButton) e.getSource();
        a++;
        System.out.println("a="+a);
        if ((a % 2) == 1) bb.setText("BBB");
        else              bb.setText("AAA");
    }
}
```

System.out.print(“mypack1: “);

I. Using separate classes (2)

mypack1

```
public class MF extends JFrame {
    JButton b;
    ML      lis;
    public MF() {
        lis = new ML();

        b = new JButton();
        b.setText("AAA");
        b.addActionListener(lis);

        // b.addActionListener( new ML() );


        setSize(500, 100);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setTitle("111 222 333");
        setLayout( new FlowLayout() );

        add(b);
        setVisible(true);
    }
}
```

I. Using separate classes (3)

mypack1

```
package mypack1;

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

public class MLTest1 {
    public static void main(String[] args) {
        new MF();
    }
}
```

II. Using an Inner class (1)

mypack2

```
package mypack2;

import java.awt.*;
import java.awt.event.*;
import javax.swing.*;

public class MF extends JFrame {
    JButton b;
    ML      lis;

    // Inner Class of MF
    class ML implements ActionListener {
        int a = 0;
        public void actionPerformed (ActionEvent e){
            a++;
            System.out.println("a="+a);
            if ((a % 2) == 1) b.setText("BBB");
            else              b.setText("AAA");
        }
    }
```

System.out.print("mypack2: ");

II. Using an Inner class (2)

mypack2

```
    public MF() {
        lis = new ML();

        b = new JButton();
        b.setText("AAA");
        b.addActionListener(lis);

        // b.addActionListener( new ML() );  !! unnecessary

        setSize(500, 100);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setTitle("111 222 333");
        setLayout( new FlowLayout() );

        add(b);
        setVisible(true);
    }

}
```

II. Using an Inner class (3)

mypack2

```
package mypack2;

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

public class MLTest2 {
    public static void main(String[] args) {
        new MF();
    }
}
```

III. Using an extending and implementing class (1)

mypack3

```
package mypack3;

import java.awt.*;
import java.awt.event.*;
import javax.swing.*;

public class MF extends JFrame implements ActionListener {
    JButton b;

    int a = 0;
    public void actionPerformed (ActionEvent e){
        a++;
        System.out.println("a="+a);
        if ((a % 2) == 1) b.setText("BBB");
        else              b.setText("AAA");
    }
```

System.out.print("mypack3: ");

III. Using an extending and implementing class (2)

mypack3

```
    public MF() {
        b = new JButton();
        b.setText("AAA");
        b.addActionListener(this);

        setSize(500, 100);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setTitle("111 222 333");
        setLayout( new FlowLayout() );

        add(b);
        setVisible(true);
    }


}
```

III. Using an extending and implementing class (3)

mypack3

```
package mypack3;

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

public class MLTest3 {
    public static void main(String[] args) {
        new MF();
    }
}
```

IV. Using an anonymous class (1)

mypack4

```
package mypack4;

import java.awt.*;
import java.awt.event.*;
import javax.swing.*;

public class MF extends JFrame {
    JButton         b;
    ActionListener  lis;
    public MF() {
        lis = new ActionListener()      {
            JButton bb;
            int a = 0;
            public void actionPerformed (ActionEvent e){

                bb = (JButton) e.getSource();
                a++;
                System.out.println("a="+a);
                if ((a % 2) == 1) bb.setText("BBB");
                else              bb.setText("AAA");
            }
        }       ;
```

unnecessary
use b instead

System.out.print("mypack4: ");

IV. Using an anonymous class (2)

mypack4

```
        b = new JButton();
        b.setText("AAA");
        b.addActionListener(lis);

        // b.addActionListener( new ML() );


        setSize(500, 100);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setTitle("111 222 333");
        setLayout( new FlowLayout() );

        add(b);
        setVisible(true);
    }
}
```

IV. Using an anonymous class (3)

mypack4

```
package mypack4;

import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

public class MLTest4 {
    public static void main(String[] args) {
        new MF();
    }
}
```

Test Class in the default package

Default
Package

```
//import mypack1.*;
//import mypack2.*;
//import mypack3.*;
import mypack4.*;

public class MLTest {
    public static void main(String[] args) {
        new MF();

    }

}
```

sustitute with mypack1, mypack2, mupack3, mypack4

References

[1] Java in a nutshell, 4th ed, David Flanagan
[2] An Introduction to Object-Oriented Programming with Java, C. Thomas, Wu
[3] Power Java, I. K. Chun (in Korean)