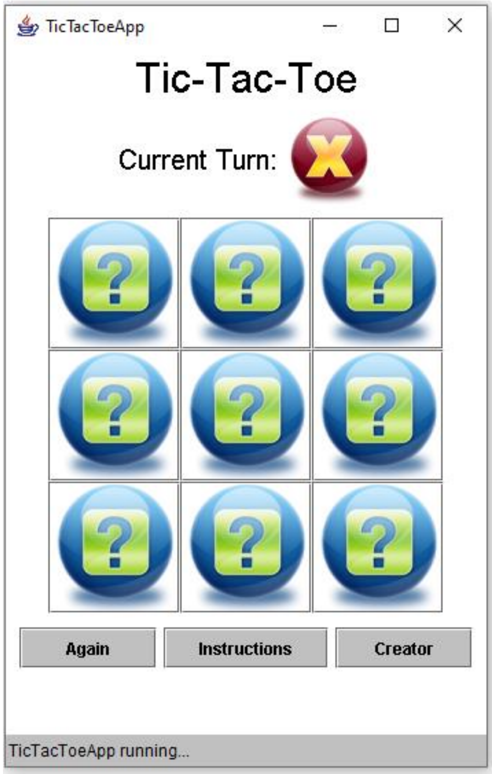
Tic Tac Toe App



This app didn't break up its code using methods. Your job is to fix it.

Look at the actionPerformed method. Create code for:

```
public void flipTurn ()
{
}

public void win()
{
}
```

Then, also looking at the actionPerformed, create this method. It will call the other two methods.

```
public void upDateSquare (int x, int y, JButton square)
{
}
```

Note that it has parameters to help you customize the code for each button.

Also create a reset method to shorten the actionPerformed.

Once done, the actionPerformed will be reduce to this:

```
if (e.getActionCommand ().equals ("reset"))
    reset ();
else if (e.getActionCommand ().equals ("settings")){
    JOptionPane.showMessageDialog (null, "Created by Ms. Gorski in 2023", "Creator", JOptionPane.INFORMATION_MESSAGE);
}
else if (e.getActionCommand ().equals ("instruct")){
    JOptionPane.showMessageDialog (null, "Check whose turn it is at the top.\nPlace your piece by clicking on a square.\n"
            + "Try to get three of your pieces in a row.\nAlso, try to prevent your opponent from \ngetting 3 in a row!",
            "How to Play", JOptionPane.INFORMATION_MESSAGE);
}
else{
    if (e.getActionCommand ().equals ("a"))
        upDateSquare (0, 0, a);
    else if (e.getActionCommand ().equals ("b"))
        upDateSquare (0, 1, b);
    else if (e.getActionCommand ().equals ("c"))
        upDateSquare (0, 2, c);
    else if (e.getActionCommand ().equals ("d"))
        upDateSquare (1, 0, d);
    else if (e.getActionCommand ().equals ("ee"))
        upDateSquare (1, 1, ee);
    else if (e.getActionCommand ().equals ("f"))
        upDateSquare (1, 2, f);
    else if (e.getActionCommand ().equals ("g"))
        upDateSquare (2, 0, g);
    else if (e.getActionCommand ().equals ("h"))
        upDateSquare (2, 1, h);
    else if (e.getActionCommand ().equals ("i"))
        upDateSquare (2, 2, i);
}
```

The code to be fixed (it’s long):

```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import java.applet.Applet;
public class TicTacToeApp extends Applet implements ActionListener
{

    //Game screen
    JLabel turnPic;
    JButton a, b, c, d, ee, f, g, h, i;
    char board[] [] = {{'b', 'b', 'b'}, {'b', 'b', 'b'}, {'b', 'b', 'b'}};
    char turn = 'x';
    JTextField choice, name, first;

    //Formatting
    Color backgroundColour = Color.white;
    Color buttonColour = Color.lightGray;
    Color buttonText = new Color (0, 0, 0);
    Color titleColour = Color.black;
    Font titleFont = new Font ("Arial", Font.PLAIN, 30);
    Font promptFont = new Font ("Arial", Font.PLAIN, 20);
    Dimension boardSquare = new Dimension (96, 96);

    public void init ()
    {
        setBackground (backgroundColour);
        resize (350, 500);
        JLabel title = new JLabel ("Tic-Tac-Toe");
        title.setFont (titleFont);
        title.setForeground (titleColour);

        Panel p = new Panel ();
        JLabel curturn = new JLabel ("Current Turn:");
        curturn.setFont (promptFont);
        turnPic = new JLabel (createImageIcon ("xturn.png"));
        p.add (curturn);
        p.add (turnPic);

        //TO DO: Fill this comment in
        Panel p2 = new Panel (new GridLayout (3, 3));
        p2.setBackground (backgroundColour);
        a = new JButton (createImageIcon ("b.png"));
        a.setActionCommand ("a");
        a.setBackground (backgroundColour);
        a.setPreferredSize (boardSquare);
        a.addActionListener (this);
        p2.add (a);
        b = new JButton (createImageIcon ("b.png"));
        b.setActionCommand ("b");
        b.setBackground (backgroundColour);
        b.setPreferredSize (boardSquare);
        b.addActionListener (this);
        p2.add (b);
        c = new JButton (createImageIcon ("b.png"));
        c.setActionCommand ("c");
        c.setBackground (backgroundColour);
        c.setPreferredSize (boardSquare);
        c.addActionListener (this);
        p2.add (c);
        d = new JButton (createImageIcon ("b.png"));
        d.setActionCommand ("d");
        d.setBackground (backgroundColour);
        d.setPreferredSize (boardSquare);
        d.addActionListener (this);
        p2.add (d);
        ee = new JButton (createImageIcon ("b.png"));
        ee.setActionCommand ("ee");
        ee.setBackground (backgroundColour);
        ee.setPreferredSize (boardSquare);
        ee.addActionListener (this);
        p2.add (ee);
        f = new JButton (createImageIcon ("b.png"));
        f.setActionCommand ("f");
        f.setBackground (backgroundColour);
        f.setPreferredSize (boardSquare);
        f.addActionListener (this);
        p2.add (f);
        g = new JButton (createImageIcon ("b.png"));
        g.setActionCommand ("g");
        g.setBackground (backgroundColour);
        g.setPreferredSize (boardSquare);
        g.addActionListener (this);
        p2.add (g);
        h = new JButton (createImageIcon ("b.png"));
        h.setActionCommand ("h");
        h.setBackground (backgroundColour);
        h.setPreferredSize (boardSquare);
        h.addActionListener (this);
        p2.add (h);
        i = new JButton (createImageIcon ("b.png"));
        i.setActionCommand ("i");
        i.setBackground (backgroundColour);
        i.setPreferredSize (boardSquare);
        i.addActionListener (this);
        p2.add (i);

        //TO DO: Fill this comment in
        Panel p3 = new Panel ();
        JButton reset = new JButton ("Again");
        reset.addActionListener (this);
        reset.setActionCommand ("reset");
        reset.setPreferredSize (new Dimension (100, 30));
        reset.setBackground (buttonColour);
        reset.setForeground (buttonText);
        p3.add (reset);
        JButton instruct = new JButton ("Instructions");
        instruct.addActionListener (this);
        instruct.setActionCommand ("instruct");
        instruct.setPreferredSize (new Dimension (120, 30));
        instruct.setBackground (buttonColour);
        instruct.setForeground (buttonText);
        p3.add (instruct);
        JButton creator = new JButton ("Creator");
        creator.addActionListener (this);
        creator.setActionCommand ("creator");
        creator.setPreferredSize (new Dimension (100, 30));
        creator.setBackground (buttonColour);
        creator.setForeground (buttonText);
        p3.add (creator);

        add (title);
        add (p);
        add (p2);
        add (p3);

    }


    public void actionPerformed (ActionEvent e)
    {
        if (e.getActionCommand ().equals ("reset"))
        {
            board [0] [0] = 'b';
            a.setIcon (createImageIcon ("b.png"));
            board [0] [1] = 'b';
            b.setIcon (createImageIcon ("b.png"));
            board [0] [2] = 'b';
            c.setIcon (createImageIcon ("b.png"));
            board [1] [0] = 'b';
            d.setIcon (createImageIcon ("b.png"));
            board [1] [1] = 'b';
            ee.setIcon (createImageIcon ("b.png"));
            board [1] [2] = 'b';
            f.setIcon (createImageIcon ("b.png"));
            board [2] [0] = 'b';
            g.setIcon (createImageIcon ("b.png"));
            board [2] [1] = 'b';
            h.setIcon (createImageIcon ("b.png"));
            board [2] [2] = 'b';
            i.setIcon (createImageIcon ("b.png"));

        }
        else if (e.getActionCommand ().equals ("settings"))
        {
            JOptionPane.showMessageDialog (null, "Created by Ms. Gorski in 2023", "Creator", JOptionPane.INFORMATION_MESSAGE);
        }
        else if (e.getActionCommand ().equals ("instruct"))
        {
            JOptionPane.showMessageDialog (null, "Check whose turn it is at the top.\nPlace your piece by clicking on a square.\n"
                    + "Try to get three of your pieces in a row.\nAlso, try to prevent your opponent from \ngetting 3 in a row!",
                    "How to Play", JOptionPane.INFORMATION_MESSAGE);
        }

        else
        {
            if (e.getActionCommand ().equals ("a")) //------------------------------------------------------------------------
            {
                if (board [0] [0] == 'b')
                {
                    board [0] [0] = turn;
                    a.setIcon (createImageIcon (turn + ".png"));
                    if (turn == 'x')
                    {
                        turn = 'o';
                        turnPic.setIcon (createImageIcon ("oturn.png"));
                    }
                    else
                    {
```

```
         turn = 'x';
         turnPic.setIcon (createImageIcon ("xturn.png"));
      }
      if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
   }
   else
   {
      JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
   }
}
else if (e.getActionCommand ().equals ("b")) //----------------------------------------------------------------------
{
   if (board [0] [1] == 'b')
   {
      board [0] [1] = turn;
      b.setIcon (createImageIcon (turn + ".png"));
      if (turn == 'x')
      {
         turn = 'o';
         turnPic.setIcon (createImageIcon ("oturn.png"));
      }
      else
      {
         turn = 'x';
         turnPic.setIcon (createImageIcon ("xturn.png"));
      }
      if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
   }
   else
   {
      JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
   }
}
else if (e.getActionCommand ().equals ("c")) //----------------------------------------------------------------------
{
   if (board [0] [2] == 'b')
   {
      board [0] [2] = turn;
      c.setIcon (createImageIcon (turn + ".png"));
      if (turn == 'x')
      {
         turn = 'o';
         turnPic.setIcon (createImageIcon ("oturn.png"));
      }
      else
      {
         turn = 'x';
         turnPic.setIcon (createImageIcon ("xturn.png"));
      }
      if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
   }
   else
   {
      JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
   }
}
else if (e.getActionCommand ().equals ("d")) //--------------------------------------------------------------------------
{
   if (board [1] [0] == 'b')
   {
      board [1] [0] = turn;
      d.setIcon (createImageIcon (turn + ".png"));
      if (turn == 'x')
      {
         turn = 'o';
         turnPic.setIcon (createImageIcon ("oturn.png"));
      }
      else
      {
         turn = 'x';
         turnPic.setIcon (createImageIcon ("xturn.png"));
      }
      if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
   }
   else
   {
      JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
   }
}
else if (e.getActionCommand ().equals ("ee")) //--------------------------------------------------------------------------
{
   if (board [1] [1] == 'b')
   {
      board [1] [1] = turn;
      ee.setIcon (createImageIcon (turn + ".png"));
      if (turn == 'x')
      {
         turn = 'o';
         turnPic.setIcon (createImageIcon ("oturn.png"));
      }
      else
      {
         turn = 'x';
         turnPic.setIcon (createImageIcon ("xturn.png"));
      }
      if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
   }
   else
   {
      JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
   }
}
else if (e.getActionCommand ().equals ("f")) //------------------------------------------------------------------------
{
   if (board [1] [2] == 'b')
   {
      board [1] [2] = turn;
      f.setIcon (createImageIcon (turn + ".png"));
      if (turn == 'x')
      {
         turn = 'o';
         turnPic.setIcon (createImageIcon ("oturn.png"));
      }
      else
      {
         turn = 'x';
         turnPic.setIcon (createImageIcon ("xturn.png"));
      }
      if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
   }
   else
   {
      JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
   }
}
else if (e.getActionCommand ().equals ("g")) //------------------------------------------------------------------------
{
   if (board [2] [0] == 'b')
   {
      board [2] [0] = turn;
      g.setIcon (createImageIcon (turn + ".png"));
      if (turn == 'x')
      {
         turn = 'o';
         turnPic.setIcon (createImageIcon ("oturn.png"));
      }
      else
      {
         turn = 'x';
         turnPic.setIcon (createImageIcon ("xturn.png"));
      }
      if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

      if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
      if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
         JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
   }
   else
   {
      JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
   }
}
else if (e.getActionCommand ().equals ("h")) //------------------------------------------------------------------------
{
   if (board [2] [1] == 'b')
   {
      board [2] [1] = turn;
      h.setIcon (createImageIcon (turn + ".png"));
      if (turn == 'x')
      {
         turn = 'o';
```

```
                    turnPic.setIcon (createImageIcon ("oturn.png"));
                }
                else
                {
                    turn = 'x';
                    turnPic.setIcon (createImageIcon ("xturn.png"));
                }
                if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

                if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

                if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
            }
            else
            {
                JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
            }
        }
        else if (e.getActionCommand ().equals ("i")) //------------------------------------------------------------------------
        {
            if (board [2] [2] == 'b')
            {
                board [2] [2] = turn;
                i.setIcon (createImageIcon (turn + ".png"));
                if (turn == 'x')
                {
                    turn = 'o';
                    turnPic.setIcon (createImageIcon ("oturn.png"));
                }
                else
                {
                    turn = 'x';
                    turnPic.setIcon (createImageIcon ("xturn.png"));
                }
                if (board [0] [0] == board [0] [1] && board [0] [1] == board [0] [2] && board [0] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [1] [0] == board [1] [1] && board [1] [1] == board [1] [2] && board [1] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [1] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [2] [0] == board [2] [1] && board [2] [1] == board [2] [2] && board [2] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [2] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

                if (board [0] [0] == board [1] [0] && board [0] [0] == board [2] [0] && board [0] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [0] [1] == board [1] [1] && board [0] [1] == board [2] [1] && board [0] [1] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [1] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [0] [2] == board [1] [2] && board [0] [2] == board [2] [2] && board [0] [2] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);

                if (board [0] [0] == board [1] [1] && board [0] [0] == board [2] [2] && board [0] [0] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [0] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
                if (board [0] [2] == board [1] [1] && board [0] [2] == board [2] [0] && board [0] [2] != 'b')
                    JOptionPane.showMessageDialog (null, board [0] [2] + " has won!! Hooray!", "Winner!", JOptionPane.QUESTION_MESSAGE);
            }
            else
            {
                JOptionPane.showMessageDialog (null, "Space is already full. Pick another.", "Can't go here!", JOptionPane.ERROR_MESSAGE);
            }
        }


    }
}




protected static ImageIcon createImageIcon (String path)
{
    java.net.URL imgURL = TicTacToeApp.class.getResource (path);
    if (imgURL != null)
    {
        return new ImageIcon (imgURL);
    }
    else
    {
        System.err.println ("Couldn't find file: " + path);
        return null;
    }
}
```

```
}
```