

CSCI 1200 Introduction to Computing Recitation 4, Java Applets

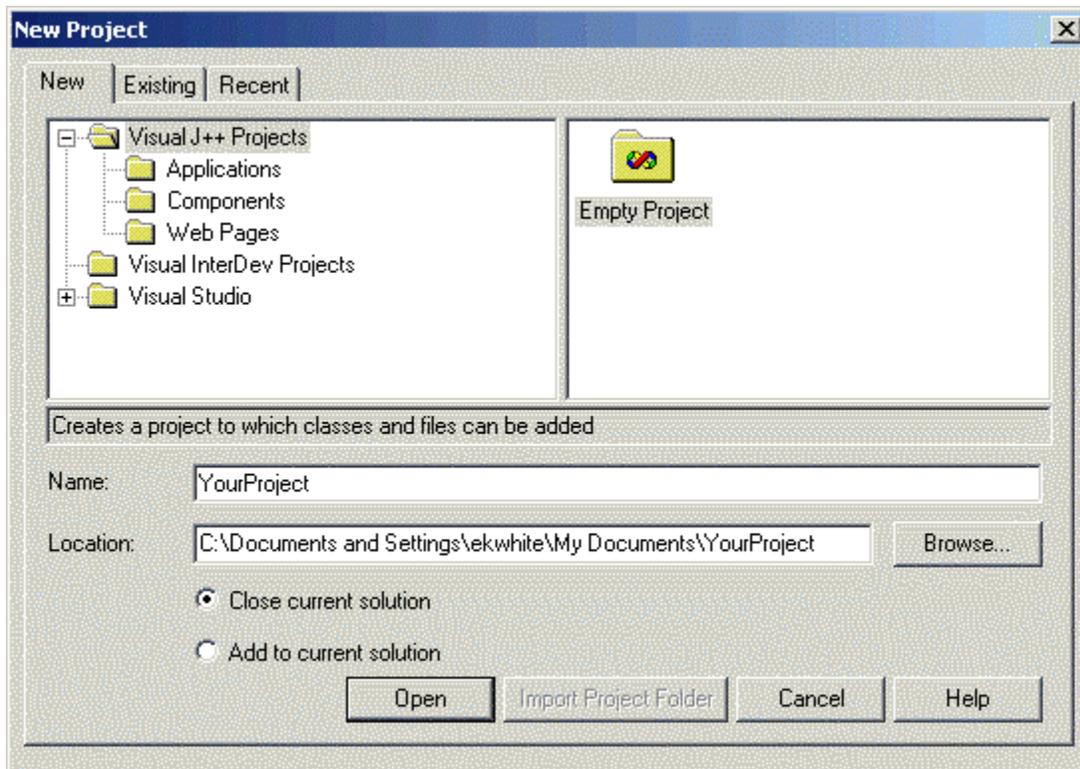
Applets are a unique kind of Java program, because they run in a Web page, instead of that black window we saw for HelloWorld. For homework2, due this Friday, you will build a Web page applet. The book's discussion of graphics and applets is not exactly the same as the stuff we do here, but the basic ideas will still hold.

A bit about computer graphics

- In Java, you define a graphics page, which is like a sheet of graph paper. You draw figures (lines, rectangles, ellipses, etc.) on the a grid defined by the graph paper squares. It's generally helpful to plan out your page on a grid (see back sheet).
- Curiously, Java has chosen not to follow standard graph techniques, and so the coordinate 0,0 is at the top left of your grid. Generally, you specify lines by starting coordinates and ending coordinates (4 numbers) and you specify shapes by the top left corner's coordinate, followed by a length and a width (4 numbers).
- You can only draw shapes with sizes that fit your grid. You are free to draw shapes on top of other shapes; the new shape will cover the old one.

Step 1 (Create a new project)

- Start up **Microsoft Visual J++**.
- In the left pane select **Visual J++ Projects**.
- You should get a window similar to this:

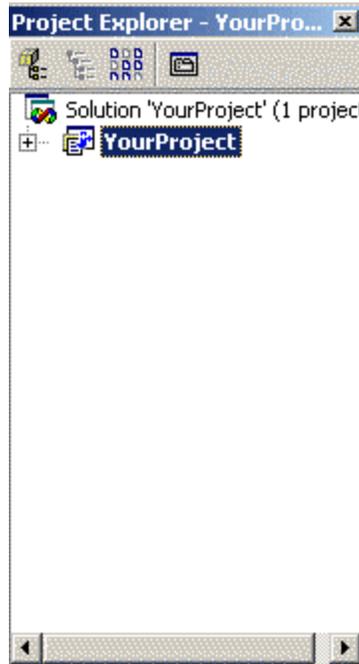


- Give your project a name in the **Name** field (in this example, it's YourProject).

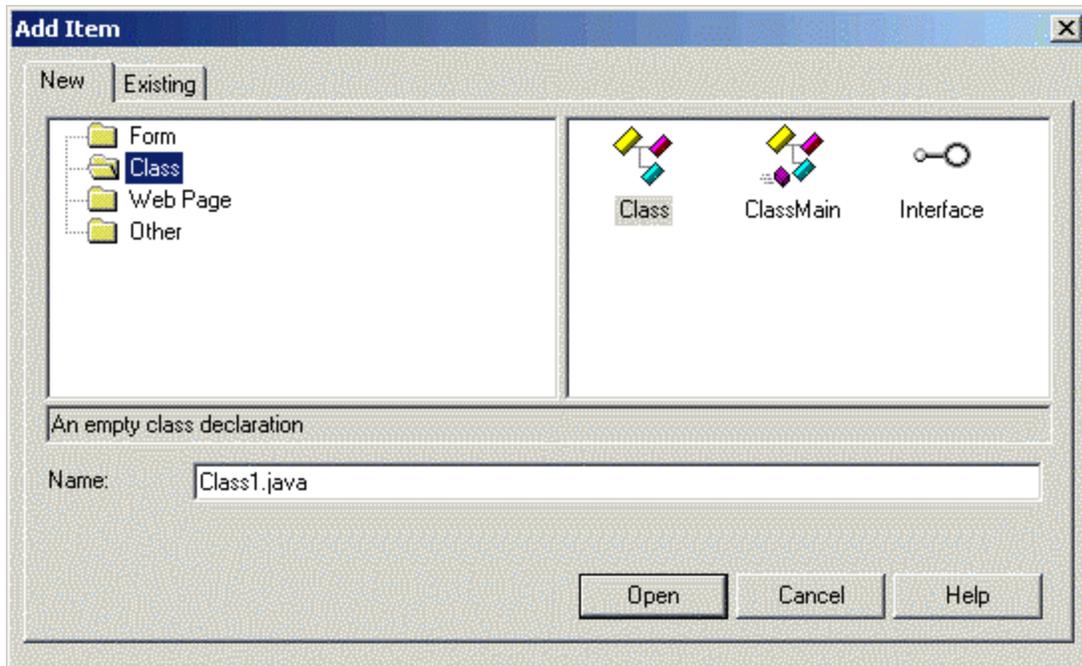
- Give a location for your project in the **Location** field, using your login.
- Click the **Open** button.

Step 2 (Add a class)

- You should see the following pane (Project Explorer) in the upper right-hand corner of your J++ window:



- Make sure the project YourProject (or whatever you named it) is selected, as above.
- From the menu bar select: **P**roject → **A**dd **C**lass...
- You should see the following window:



- Just as above, in the left pane select **Class**.
- In the right pane select **Class** (not ClassMain).
- Enter a name for your class in the **Name** field (make sure you keep the **.java** extension). In this handout the class is named “YourClass.class”.
- Select **Open**.

Step 3 (Start programming)

- Change your code so it looks like the following:

```

/* bring in the Java applet libraries */
import java.applet.*;
import java.awt.*;

```

```

/*

```

Your program piggybacks on Java’s applet code. Notice that the .java file in your Project Explorer window must have the same name as YourClass, plus the .java extension.

```

*/

```

```

public class YourClass extends Applet
{
    public void paint(Graphics page)
    {
        /*
            set the background color
            void setBackground(Color color);
        */
    }
}

```

```

set foreground color
void setColor(Color color);

you can change colors: check the text book, Page 147
for the color table
*/

/* this sets the background color to light blue */
setBackground(Color.cyan);

/*
draw a rectangle from upper left corner of (x,y) and dimension width
and height
void drawRect (int x, int y, int width, int height);

draw a oval: from upper left corner of (x,y) and dimension width and
height
void drawOval(int x, int y, int width, int height);

draw a line: from (x1,y1) to (x2, y2)
void drawLine (int x1, int y1, int x2, int y2);

draw a character string at (x1,y1), extending to the right
void drawString(String str, int x, int y);
*/

/* draw a 100 wide, 50 high rectangle with top left corner 60, 70 */
page.drawRect(60,70,100,50);

/* declare a String variable called Message */
String Message = "How are you?";

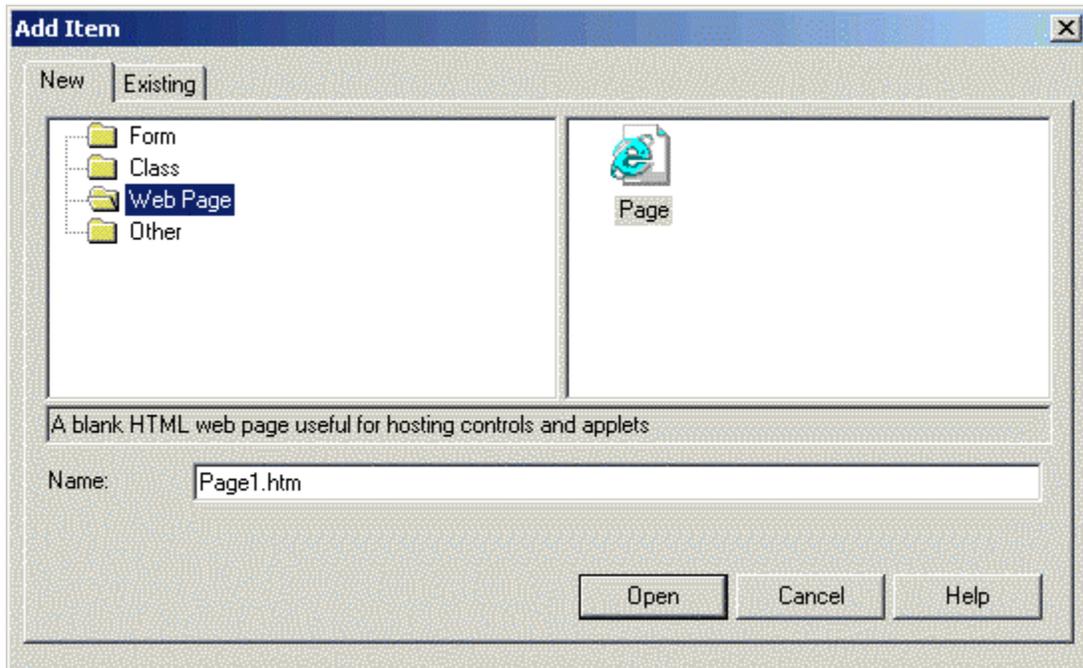
/* print the message in the picture */
page.drawString(Message, 80,90);
}
}

```

- Where it says YourClass, you should substitute the name of your class.
- Now Build your program (**B**uild **⚡**Build).

Step 4 (Add a Web page)

- From the menu bar select: **Project** → **Add Web Page...**
- You should see the following window:



- Just as above, in the left pane select **Web Page**.
- Enter a name for your web page in the **Name** field (make sure to keep the **.htm** extension). Use the same name as your class, with an **.htm** extension instead of a **.class** or **.java** extension. Here, the page would be named “YourClass.htm”.
- Your window should have 3 tabs at the bottom called (**Design, Source, Quickview**). Click the **Source** tab. You can now see the HTML code (which is a different language from Java). Change your HTML file by adding one line so it looks like the following:

```
<HTML>
<HEAD>
<META NAME="GENERATOR" Content="Microsoft Visual Studio 6.0">
<TITLE></TITLE>
</HEAD>
<BODY>

<P>&nbsp;</P>
<APPLET code="YourClass.class" height=300 width=500></APPLET>

</BODY>
</HTML>
```

You only need to add one line, in the right place:

```
<APPLET code="YourClass.class" height=300 width=500></APPLET>
```

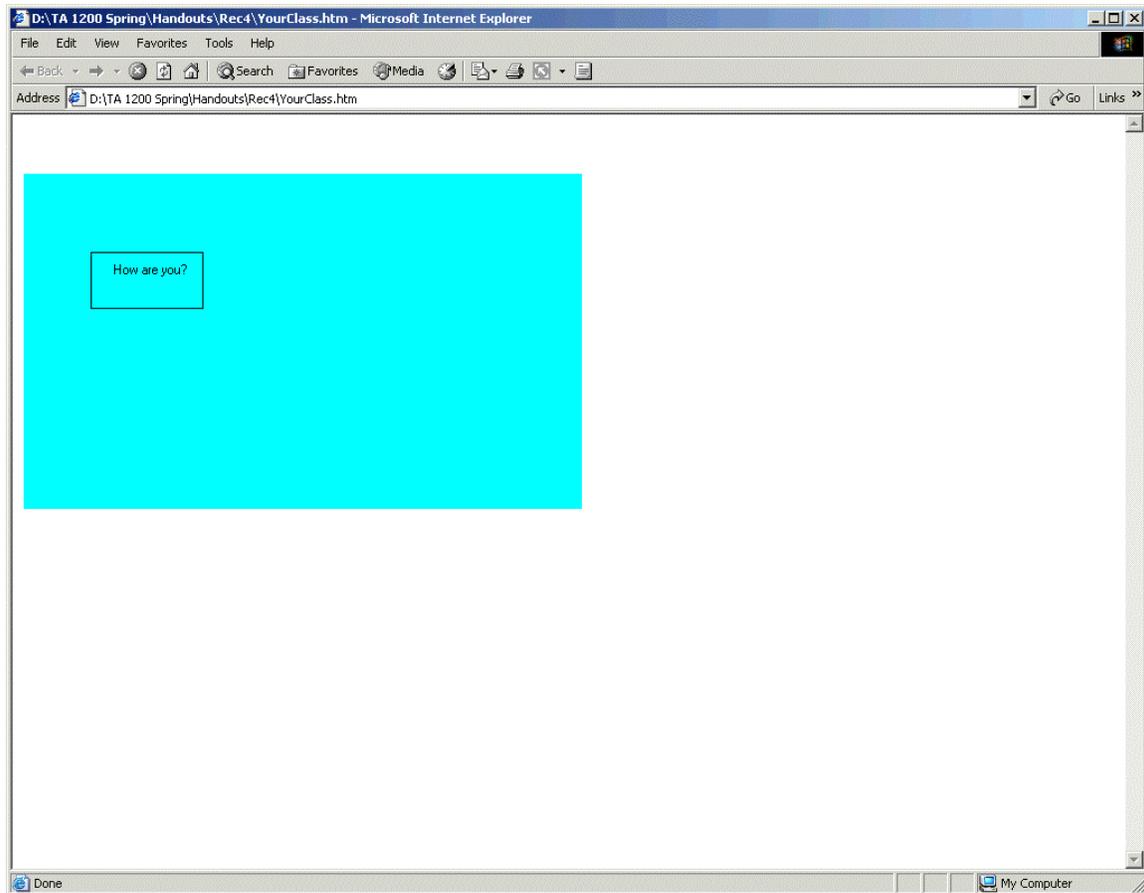
This tells Java to link the Web page to your code, and to define a 300 high and 500 wide canvas for you to draw on.

- Where it says “**YourClass.class**”, substitute in your class name (e. g., if your class is named **hw3** then you should use “**hw3.class**”).
- Now select the **Quick View** tab at the bottom of the window. You should see this:



Step 5 (View the applet through a Web browser)

- There are various ways of doing this. One way is to open up your favorite Web browser and type in the exact directory location of your .htm file. Or you can do the following:
 1. Minimize all windows and double click the **My Computer** icon.
 2. Navigate through the windows to locate your project folder. This is the same location you entered in Step 1.
 3. Double click on the .htm file.
 4. You should now see your applet running in the default Web browser (probably Internet Explorer).



Step 6 (Edit the applet and update the picture)

There are various ways of doing this. One way is to open up your favorite Web browser and type in the exact directory location of your file; the other is to use Java to display the updated .htm file.

Edit your code, as below, and make sure that you can Build successfully.

```
/* bring in the Java applet libraries */  
import java.applet.*;  
import java.awt.*;  
  
public class YourClass extends Applet  
{  
    public void paint ( Graphics page)  
    {  
        /*  
        set the background color  
        void setBackground(Color color);  
  
        set foreground color  
        void setColor(Color color);
```

**you can change colors: check the text book, Page 147
for the color table**

***/**

setBackground(Color.cyan);

/*

**draw a rectangle from upper left corner of (x,y) and dimension width
and height**

void drawRect (int x, int y, int width, int height);

**draw a oval from upper left corner of (x,y) and dimension width and
height**

void drawOval(int x, int y, int width, int height);

draw a line from (x1,y1) to (x2, y2)

void drawLine (int x1, int y1, int x2, int y2);

draw a character string at (x1,y1), extending to the right

void drawString(String str, int x, int y);

***/**

page.drawRect(60,70,100,50);

String Message = "How are you?";

page.drawString(Message, 80,90);

/*

void fillRect (int x, int y, int width, int height);

void fillOval(int x, int y, int width, int height);

**These functions work the same way as the draw counterparts, but
shapes are filled with the current foreground color**

***/**

page.setColor(Color.yellow);

page.fillRect(150, 150, 60,60);

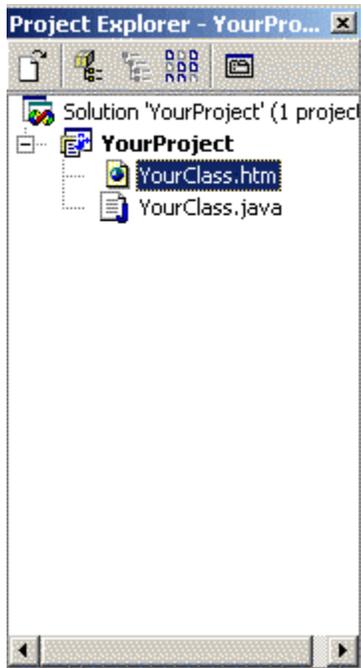
page.setColor(Color.lightGray);

page.fillOval(190,70, 80,80);

}
}

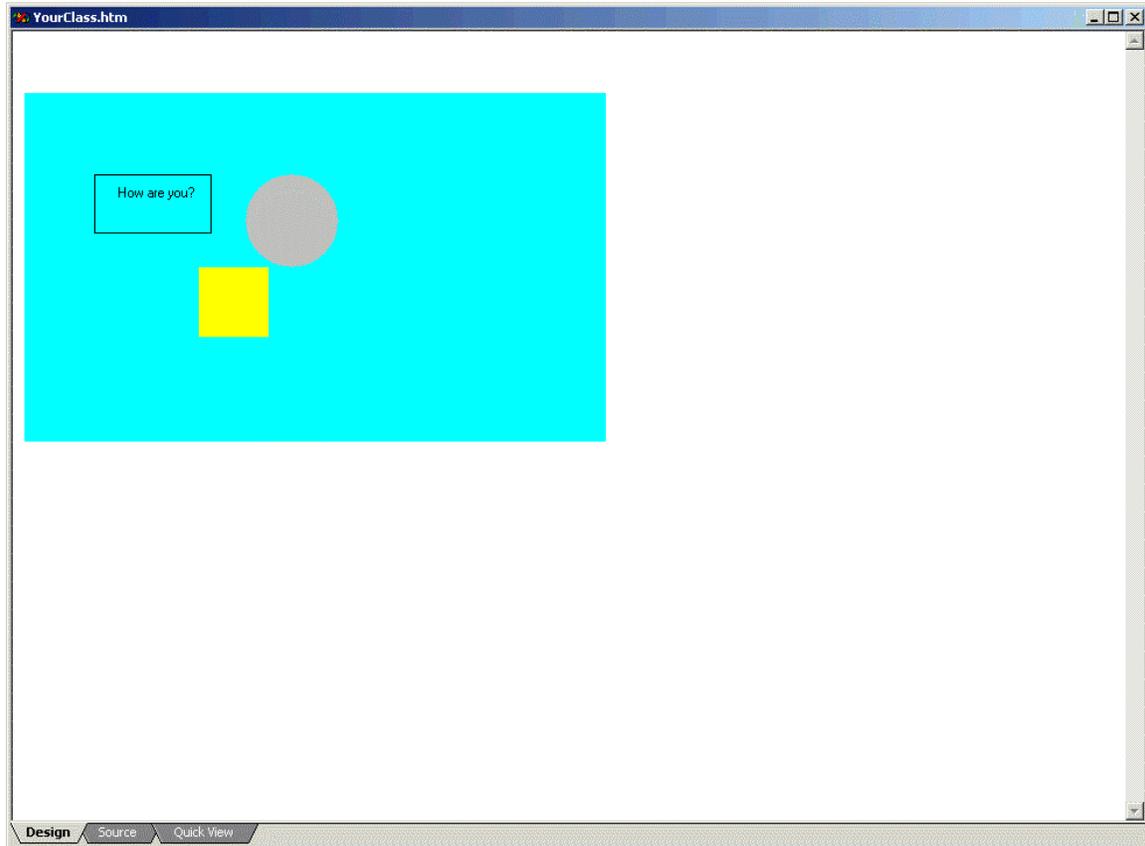
There are two ways to update the Web page.

Method 1: In the Project Explorer window,



double-click the YourClass.htm file (or whatever you named the .htm file) to open it, and select the QuickView tab.

You should see the following changes:



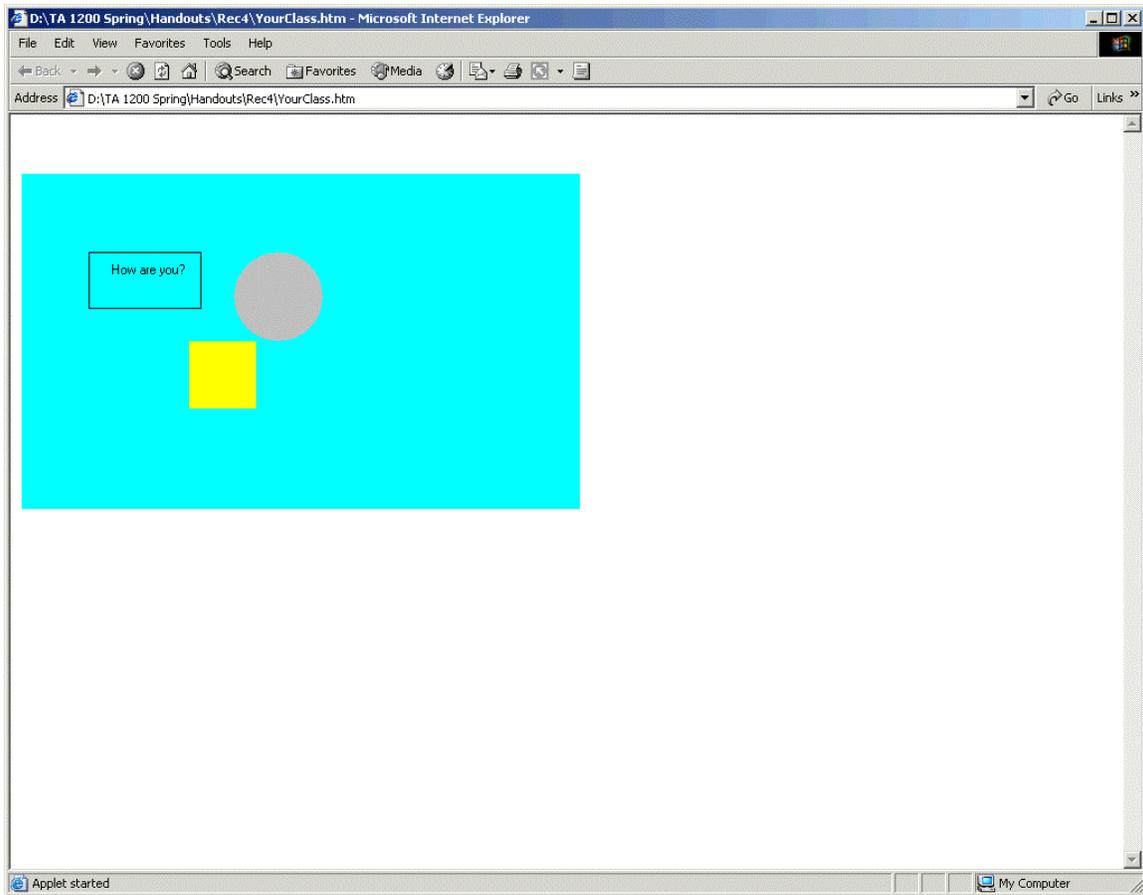
If these changes don't appear, then try closing and re-opening the .htm file, after making sure that your code can Build successfully.

Method 2:

This method seldom is used. But on some machines last year, method 1 did not work.

1. Change your code and rebuild it.
2. Go to the menu bar, choose Debug, and hit Start.

Your Web page should be visible here:



You can also play around with the textbook, chapter 4, for a more sophisticated treatment of applets. It's possible to animate a Web page with a Java applet, if that sounds like an interesting project for you.

On the next page is a 500 x 300 grid, which you can use to draw your figures on for planning the homework.

