FONTS

A font maps character data from an internal representation to a visual one suitable for display on an output device. A Java font object contains three components:

- **A typeface**
- **A style**
- **A size**

A typeface determines how each character is visually rendered. Each typeface applies a consistent look to the character set. Over the centuries, printers have designed different typefaces to serve various utilitarian and aesthetic purposes.

### Examples

<table>
<thead>
<tr>
<th>The original Garamond typeface was created by Claude Garamond around 1540 for King Francis I of France. It was adopted by the French government for printing official documents and became widely used throughout Europe. It is considered one of the most readable typefaces for printed media.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caslon refers to several typefaces created by William Caslon (1692-1766), who is considered to be the first major English typographer. His typefaces and their variants were used extensively throughout the British empire and were the most common typefaces used in Colonial America.</td>
</tr>
</tbody>
</table>
**Examples**

The Helvetica typeface was created in 1957 by Max Miedinger and Eduard Hoffmann. Its great clarity has made it popular for signage world-wide.

**Style** is akin to what a traditional typesetter would call *emphasis* – a means of making certain words stand out by visually exaggerating them from the rest of the text. Java recognizes four styles in a font object: *plain*, *bold*, *italic* and *bold-italic*.

**Examples**

| Every word in this sentence is plain. | Every word in this sentence, except this **bold** one, is plain. |
| Every word in this sentence, except this *italic* one, is plain. | Every word in this sentence, except this **bold-italic** one, is plain. |

**Font size** specifies the dimensions (i.e. width and height) of the characters in the font. The basic unit is the *point*, which, in Java, is exactly \( \frac{1}{72} \) of an inch.

**Examples**

| 9 pt | 18 pt | 36 pt | 72 |

An 18 pt character, however, is not necessarily \( \frac{1}{4} \) ” tall when displayed because the character’s dimensions in points must be transformed to dimensions appropriate to whatever device displays
the character. In particular, to render a character onto a computer display, the graphics context must transform the character’s size from points to pixels. A character 16 pixels tall appears much larger if displayed at a pixel density of 92 ppi than if displayed at 300 ppi.

To build a font object in Java, you use the API class `java.awt.Font`. Here are two of its constructors.

<table>
<thead>
<tr>
<th>Two Constructors of java.awt.Font</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>public Font( String typeface, int style, int size )</code></td>
</tr>
<tr>
<td>// Creates a font object with the typeface, style and point size specified by the arguments.</td>
</tr>
<tr>
<td><code>public Font( Font font )</code></td>
</tr>
<tr>
<td>// A copy constructor that duplicates the font object passed as an argument.</td>
</tr>
</tbody>
</table>

**Examples**
Consider this Java applet.

```
import java.applet.Applet;
import java.awt.*;

public class FontDemo extends Applet {

    Font font = ________________________________;

    public void paint( Graphics g ) {
        super.paint( g ); // call Applet paint
        g.setFont( font );
        g.drawString( "Welcome to Applets!", 20, 80 );
    }
}
```
The following examples show how the applet window appears if the given code is filled into the blank on line 6 of `FontDemo` (shown above).

```java
new Font( "Courier New", Font.BOLD, 20 )
```

```java
new Font( "Trebuchet MS", Font.PLAIN, 20 )
```

```java
new Font( "Times New Roman", Font.ITALIC, 20 )
```
### Exercises

1. Enter the **FontDemo** applet into jGRASP and complete it so that it displays the GUI shown to the right.

![Applet Viewer: MyApplet4.class](image1)

Welcome to Applets!

2. Modify your solution to Exercise 1 so that it displays the message using various typefaces, sizes and styles.

3. Write a Java applet to display this verse of Thomas Gray’s poem *Elegy Written in a Country Churchyard* in Garamond typeface and italics style. Space the lines uniformly leaving some room at the top.

![Applet Viewer: MyApplet.class](image2)

The boast of heraldry, the pomp of power,
And all that beauty, all that wealth e’er gave
Await alike the inevitable hour.
The paths of glory lead but to the grave.