Text and Fonts in Windows

**DrawString()**
- Graphics class member method to display a string on a graphics object
- Six overloaded forms
- All have Font as an argument

**Fonts**
- **FONT:** Typeface, style, size, attributes of characters in a character set
  - Provide control over visual aspect of text

**Categories of Fonts**
- Windows System Fonts
  - Always available
- Logical Fonts – Defined in separate resource files
  - Stroke fonts
    - Consist of line/curve segments – so continuously scalable
    - Legibility not good
  - Raster fonts—Bitmaps
    - Scaling by non-integer scaling factor difficult
    - Fast to display
    - Legibility very good
- TrueType fonts—Rasterized stroke fonts
  - Stored as strokes with hints to convert to bitmap
  - Continuously scalable
  - Fast to display
  - Legibility very good
  - Combine best of both stroke and raster fonts
- Device fonts
  - Native to output device (e.g., built-in printer fonts)

**Windows System Fonts**
- `Font = ANSI_FIXED_FONT`
- `Font = ANSI_VAR_FONT`
- `Font = DEVICE_DEFAULT_FONT`
- `Font = OEM_FIXED_FONT`
- `Font = SYSTEM_FONT`
- `Font = SYSTEM_FIXED_FONT`

**Some Stroke Fonts**
- Modern: AoBbCcDdEe
- Roman: AaBbCcDdEe
- Script: AaBbCcDdEe

Windows Stock Fonts
**Some Bitmapped Fonts**

- Courier AaBbCcDdEe
- MS Serif AaBbCcDdEe
- MS Sans Serif AaBbCcDdEe

Windows Raster Fonts

**Some TrueType Fonts**

- Courier New AaBbCcDdEe
- Courier New Bold AaBbCcDdEe
- Courier New Italic AaBbCcDdEe
- Times New Roman AaBbCcDdEe
- Times New Roman Bold AaBbCcDdEe
- Times New Roman Italic AaBbCcDdEe
- Arial AaBbCcDdEe
- Arial Bold AaBbCcDdEe
- Arial Bold Italic AaBbCcDdEe
- Σµ³λ ΑαΒβξξΔδΕΕ

Windows TrueType Fonts

**Changing Fonts**

Two important classes in System.Drawing:

- FontFamily
  - Specified by a string such as “Times New Roman”
- Font
  - A combination of a FontFamily, attributes (e.g., Bold, Italic, etc.), and a point size

**Font Class**

Three categories of Font constructors:

- Based on an existing Font object
- Based on character string identifying the font family
- Based on a FontFamily object

**Simplest Font Constructor**

Creates a new font based on an existing font

New font is the same except for the font style

- Font(Font font, FontStyle fs);
  - FontStyle Enumeration
    - Regular 0
    - Bold 1
    - Italic 2
    - Underline 4
    - Strikout 8

  - Can use bitwise OR operator to combine Font styles

Examples:

```csharp
Font f = this.Font; // Get this form’s Font property
Font fItalic = new Font(f, FontStyle.Italic);
```

Can now draw with this new fItalic font

**MeasureString()**

Member of Graphics class

Returns width and height of imaginary rectangle bounding a string

Several overloaded forms

Simplest:

- MeasureString(string str, Font font);
- Returns a SizeF structure

Members are width and height of bounding rectangle in pixels

**Font-Bold-Italic Example Program**

Outputs text with one word bolded and another italicized

- Creates new fonts from form’s existing font

Uses MeasureString() to position each new word on the window’s client area
Creating Fonts by Name

Specify a font by giving its font family name, the point size, and optionally a style.

Font Constructors:
- Font(string strFamily, float fSizeInPoints)
  - There are about 72 “points” per inch
  - Anything smaller than 8-point is very hard to read
- Font(string strFamily, float fSizeInPoints, FontStyle fs)
  - strFamily must represent a TrueType font that is on the system
  
Font myFont = new Font(“Times New Roman", 12);  

The Font property of a window form can also be set in the form’s constructor, e.g.:
this.Font = new Font(“Arial", 24, FontStyle.Bold);  

Font-Name & Font-Sizes example programs
- Note use of foreach( ) C# construct
- And font.GetHeight(g): more general than MeasureString()
  - Could be used for a printer or screen graphics object

Font Class Properties

- All are read-only
- string Name Font family name
- FontFamily FontFamily Font family class
- FontStyle Style From constructor
- bool Bold True if boldface
- bool Italic True if italic
- bool Underline True if underlined
- bool Strikeout True if strikeout
- float Size From constructor
- GraphicsUnit Unit From constructor
- float SizeInPoints Computed from Size
- int Height Line spacing for video display
- Others

Example program: Font-Properties