CSCI-UA-4-005

Intro to Web Design + Computer Principles

Vector Graphics – Day 2

Professor Emily Zhao

M/W 12:30PM – 1:45PM

Agenda

- **Midterm Format**
- **Vector Graphics Pt. 2**
  - Paths
  - Creating SVGs with Adobe Illustrator
  - Gradients
  - Embedding SVGs
- **Open Workshop**

Midterm

Midterm

Date: Monday, October 23rd

Format: Multiple Choice

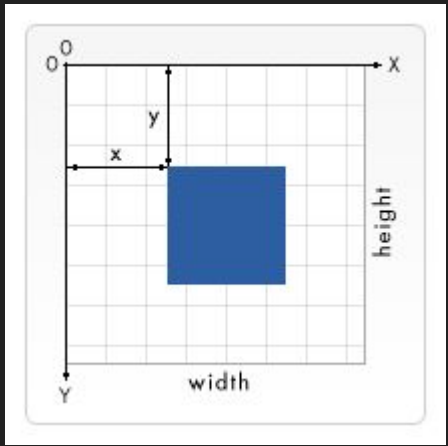
Topics Covered: Computer Principles, The Internet, Unix, HTML, CSS, Web Graphics

- Paper exam; no laptops/internet
- Open note (bring in whatever you need)
- 5-10 multiple choice questions per unit
- 25-35 multiple choice questions in reference to attached code

Vector Graphics

Paths

SVG Grid

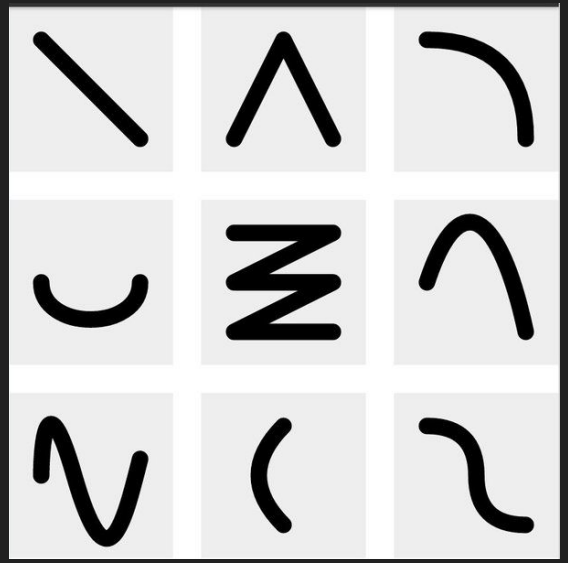



```
<svg width="75" height="75">
    <rect x="25" y="25" width="30" height="30" fill="blue" />
</svg>
```

<path>

Most powerful element in the SVG library of basic shapes

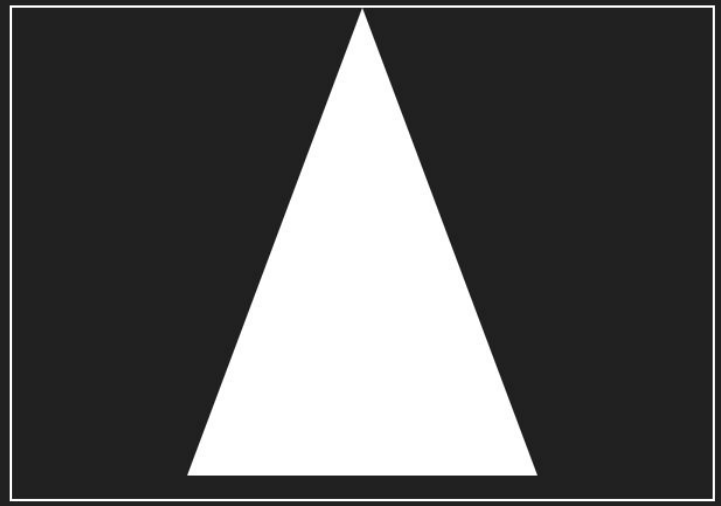
- Can be used to create rectangles, circles, ellipses, polylines, and polygons.
- Can create lines, curves, arcs, and basically any other shape, too.



<path>

Defined by one attribute d

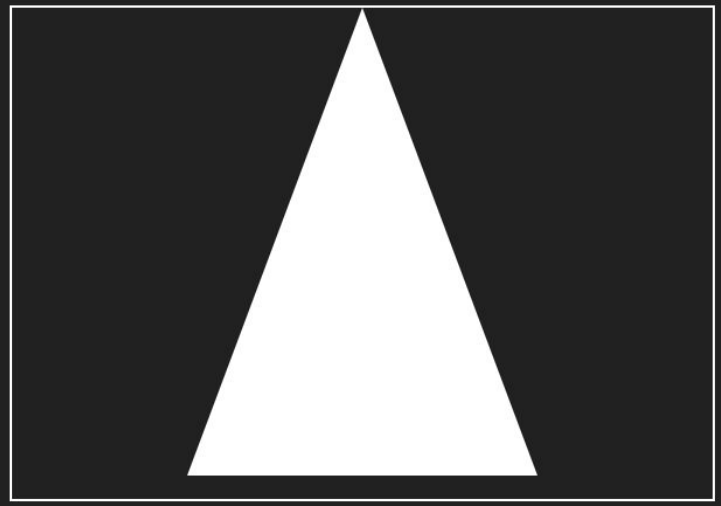
- The d attribute contains a series of commands and parameters used by those commands.
- All of the commands also come in two variants: an uppercase letter specifies absolute coordinates; a lowercase letter specifies relative coordinates.



```
<svg height="210" width="300">
  <path d="M150 0 L75 200 L225 200 Z" />
</svg>
```

`<path>` commands

M = moveto
L = lineto
H = horizontal lineto
V = vertical lineto
C = curveto
S = smooth curveto
Q = quadratic Bézier curve
T = smooth quadratic Bézier curveto
A = elliptical Arc
Z = closepath



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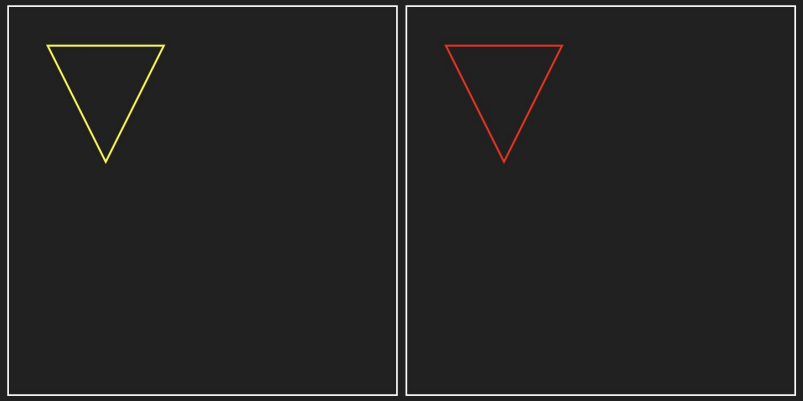
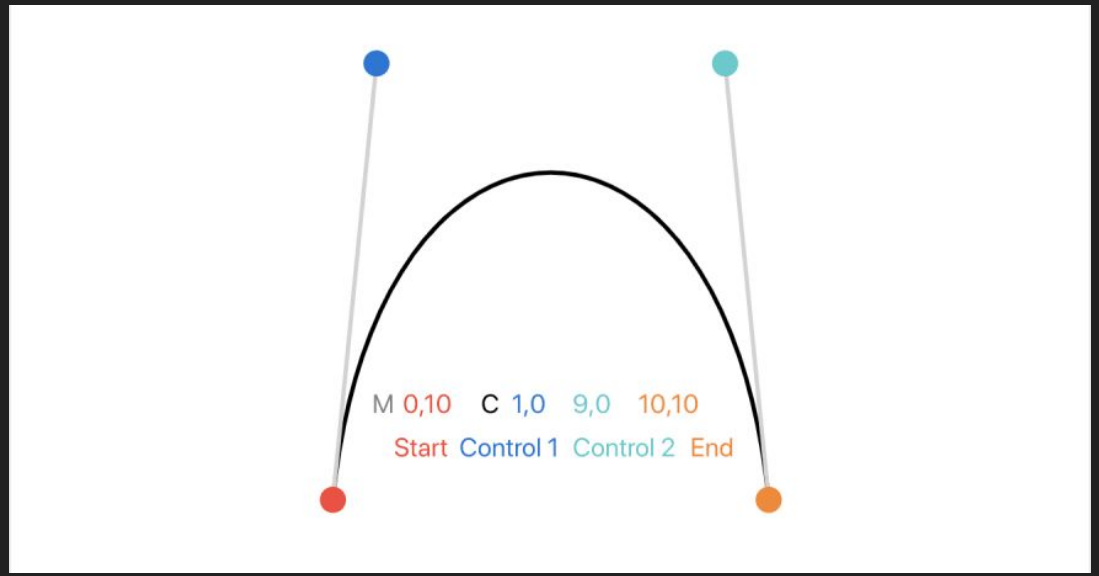


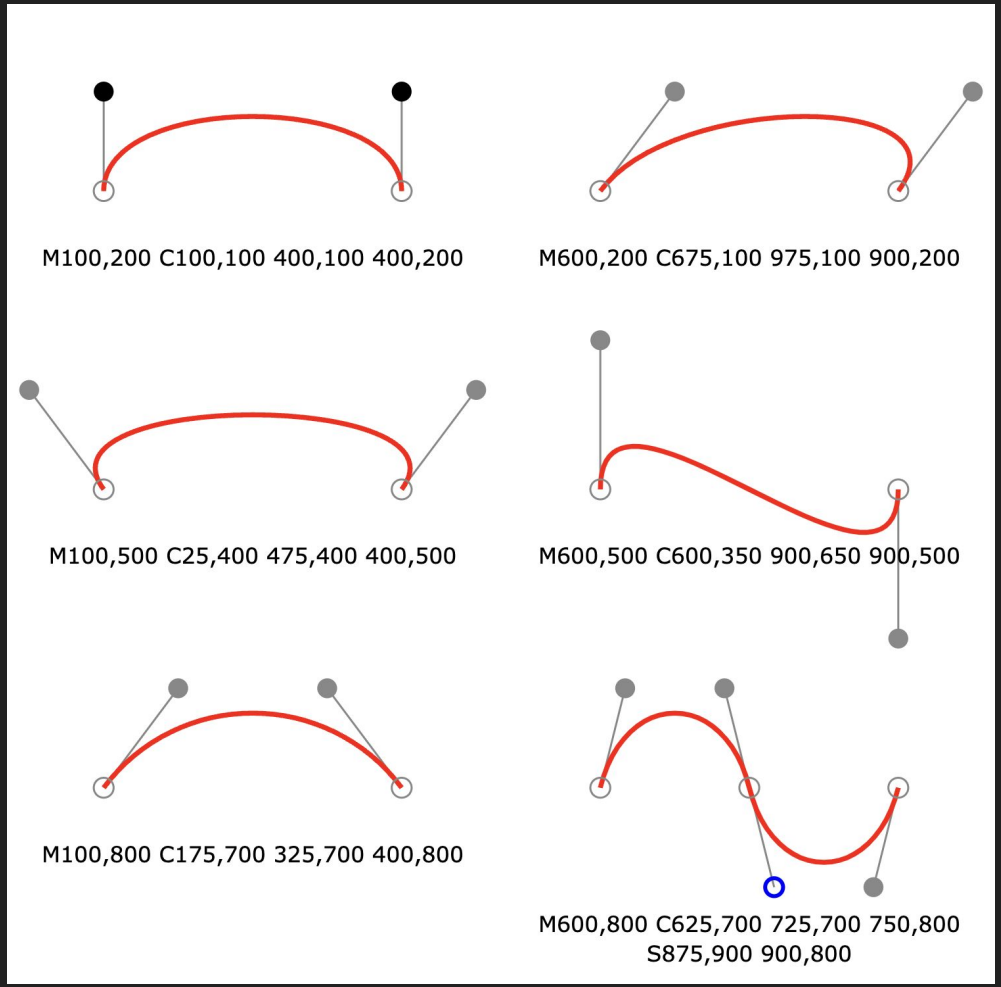
```
<svg width="200" height="200">
     <!-- Uppercase "M" command to move to (20, 20) -->
     <path d="M 20 20 L 80 20 L 50 80 Z" stroke="yellow"/>
</svg>

<svg width="200" height="200">
    <!-- Lowercase "m" command to move relative to the current position -->
    <path d="m 20 20 l 60 0 l -30 60 z" stroke="red"/>
</svg>
```

Bezier curve




```
<path d="M 0 10 C 1 0, 9 0, 10 10" />
```

Bezier curves



Creating SVGs with Illustrator + Inkscape

xmlns

`xmlns`

- An XML Namespace is a way to avoid naming conflicts when elements and attributes in an XML document
- Namespaces are identified by a unique URI (Uniform Resource Identifier)

```
<library xmlns:books="http://example.com/books">
   <books:book>
      <books:title>XML for Beginners</books:title>
      <books:author>Jane Doe</books:author>
   </books:book>
</library>
```

→ *Good explanation from StackOverflow*

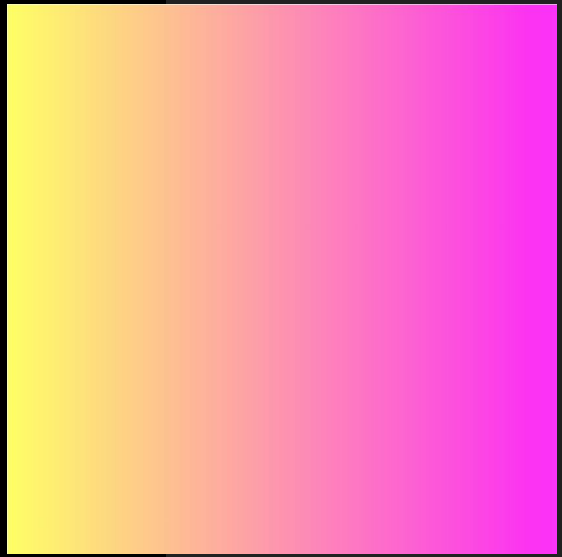
<defs>

`<defs>`

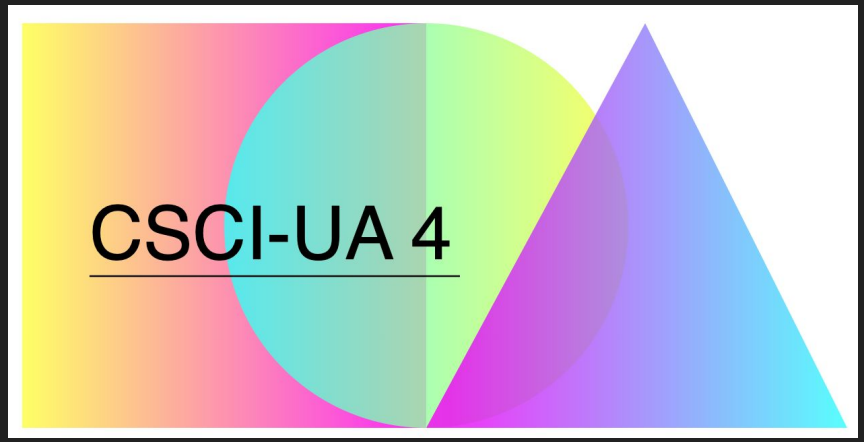
- You define reusable elements, patterns, gradients, filters, and masks that can be referenced and applied within an SVG document
- `<defs>` is used to separate and store these definitions, making the SVG document more organized and efficient
- After you define elements within the `<defs>` section, you can reference and apply them in the main body of your SVG document using elements like `<use>`, `<linearGradient>`, `<radialGradient>`, `<pattern>`, `<filter>`, or `<mask>`

Gradients

```
<svg width="550" height="300" xmlns="http://www.w3.org/2000/svg">
     <defs>
         <linearGradient id="gradient1">
           <stop offset="0%" stop-color="yellow" />
           <stop offset="100%" stop-color="magenta" />
         </linearGradient>
     </defs>

    <rect
     x="30"
     y="30"
     width="240"
     height="240"
     fill="url(#gradient1)"
     opacity="0.8"
    />
</svg>
```



Create the following logo



Create the following five elements:

(1) square
(2) circle
(3) polygon [triangle]
(4) text
(5) line

Uses <defs> to define your gradients

Square: yellow → magenta

Circle: cyan → yellow

Triangle: magenta → cyan

All the ways we can embed SVGs

- Inline with HTML
- External link using the HTML <a> element
- Embedding by reference using the HTML <img> element
- Referenced from a CSS property (i.e. background image)
- A stand-alone SVG web page

Open Workshop

Homework

- Assignment #5 (Vector Graphics) due Wed, October 18th
- Come in with questions for the Midterm Review