CMPT 165
Graphics – Part 2

June 17th, 2015

Key concepts (from last class)

Image resolution

Pixel, bits, unit of bytes

Intensity vs. coordinates

Color-depth

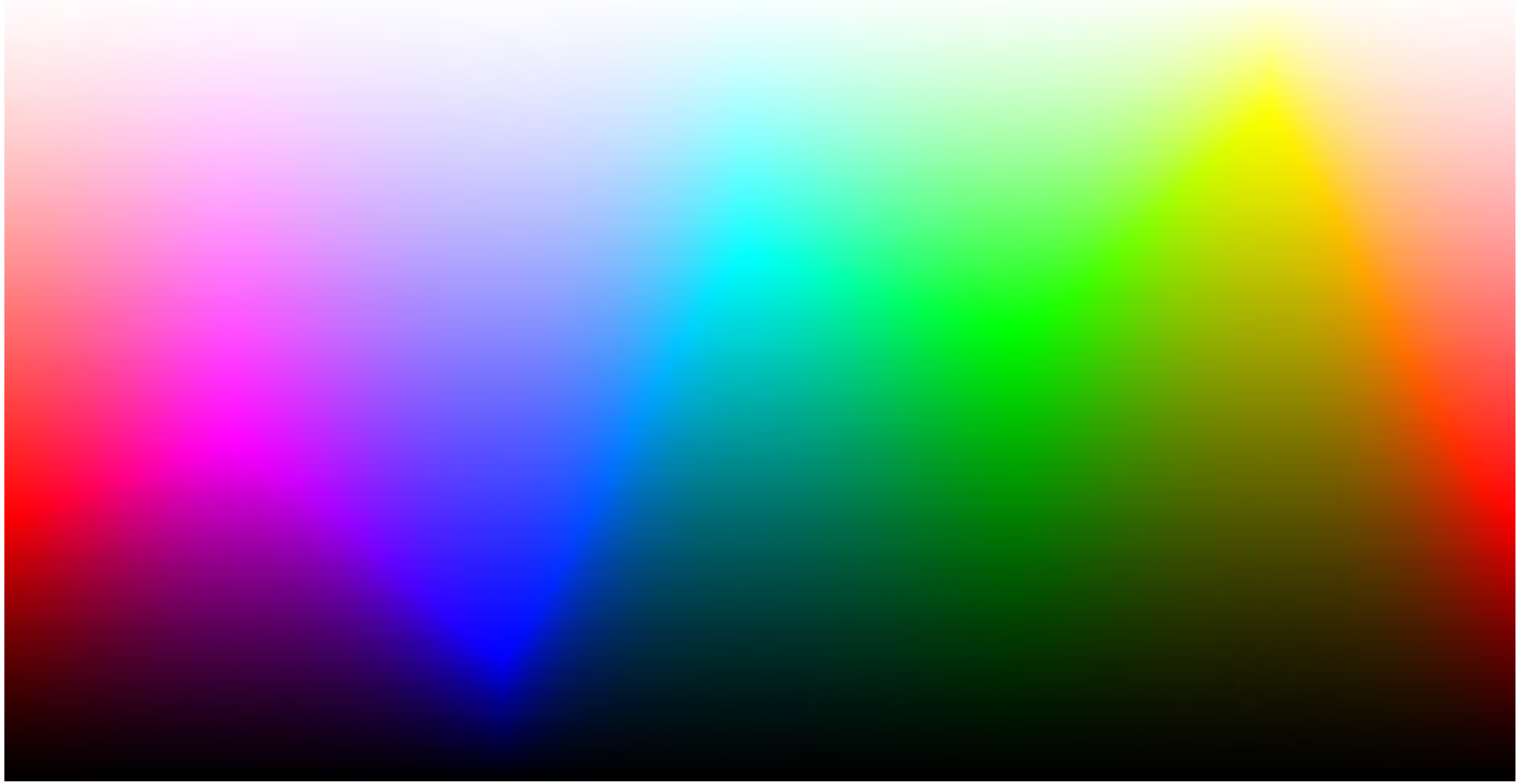
Color Dithering

Compression

Transparency

Color-depth

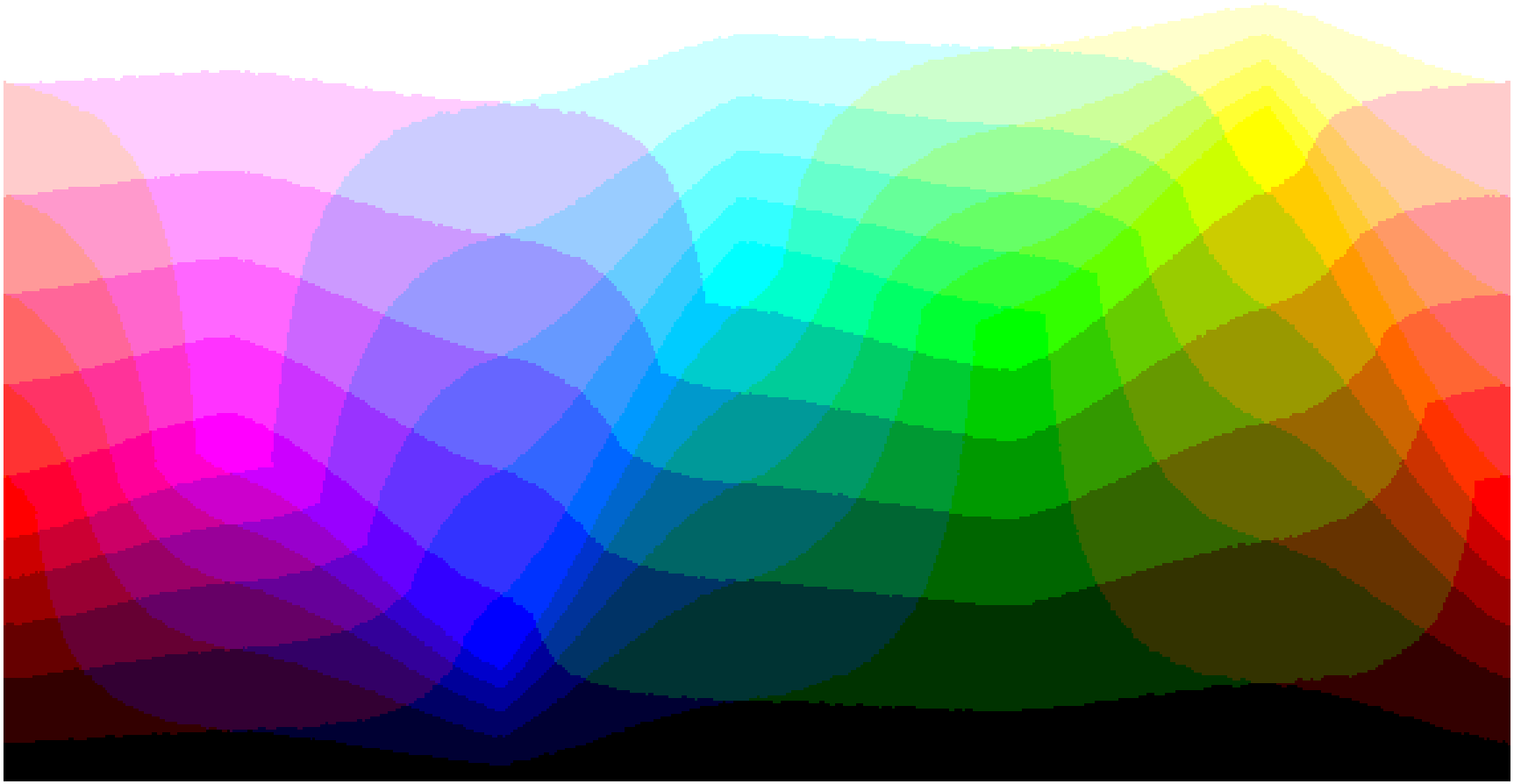
24-bit “True color”



Example from https://en.wikipedia.org/wiki/List_of_monochrome_and_RGB_palettes

Color-depth

8-bit



Example from https://en.wikipedia.org/wiki/List_of_monochrome_and_RGB_palettes

Key concepts from last class

Image resolution

Pixel, bits, unit of bytes

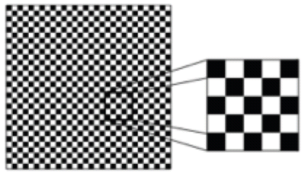
Intensity vs. coordinates

Color-depth

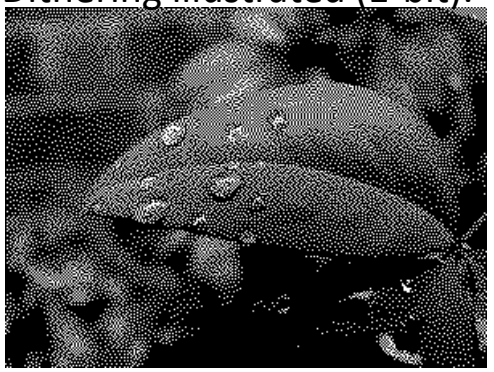
Monochrome, 8-, 16-, 24-bit, etc.

Dithering

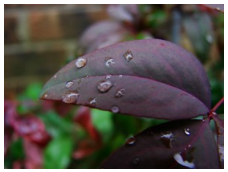
How & Why

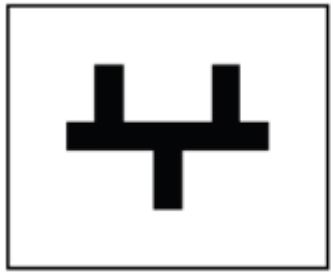


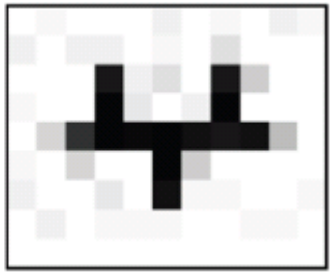
Dithering illustrated (1-bit):



24-bit:

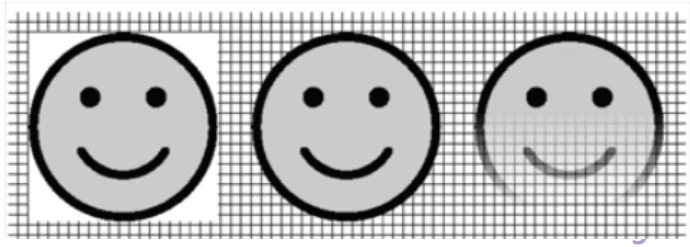






Transparency

Opacity, transparency, alpha channel



Comparison of file formats

	GIF	JPEG	PNG	TIFF
Color depth	8-bit	24-bit or 8-bit	24-bit	8-bit or 16-bit
Compression	Lossless compression	Lossy compression	Lossless compression	Both available
Support for transparency?	1-bit	N/A	8-bit	8-bit
Support for animation?	Yes	N/A	Yes	No
File extension	.gif	.jpg	.png	.tif or .tiff

More comparisons at:
https://en.wikipedia.org/wiki/Comparison_of_graphics_file_formats

<map>

<map> creates an image-map with clickable areas

1) Create the map:

<map>

Required attribute specification:

name="planetmap"

<area>

Possible attribute specifications:

shape="rect" coords="x1,y1,x2,y2"

shape="circle" coords="x,y,r"

2) Reference the map in <img>:

usemap="name_of_map"

```
<img src="planet.gif" alt="Planets" usemap="#planetmap">

<map id="planetmap">
  <area shape="rect"   coords="0,0,82,126" href="#sun"    alt="Sun">
  <area shape="circle" coords="90,58,3"    href="#mercur" alt="Mercury">
  <area shape="circle" coords="124,58,8"   href="#venus"  alt="Venus">
</map>
```

File formats covered so far…

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These are known as bitmap: mapping from integers to bits

Grid of pixels → arrangement of (x,y,color)

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Today:

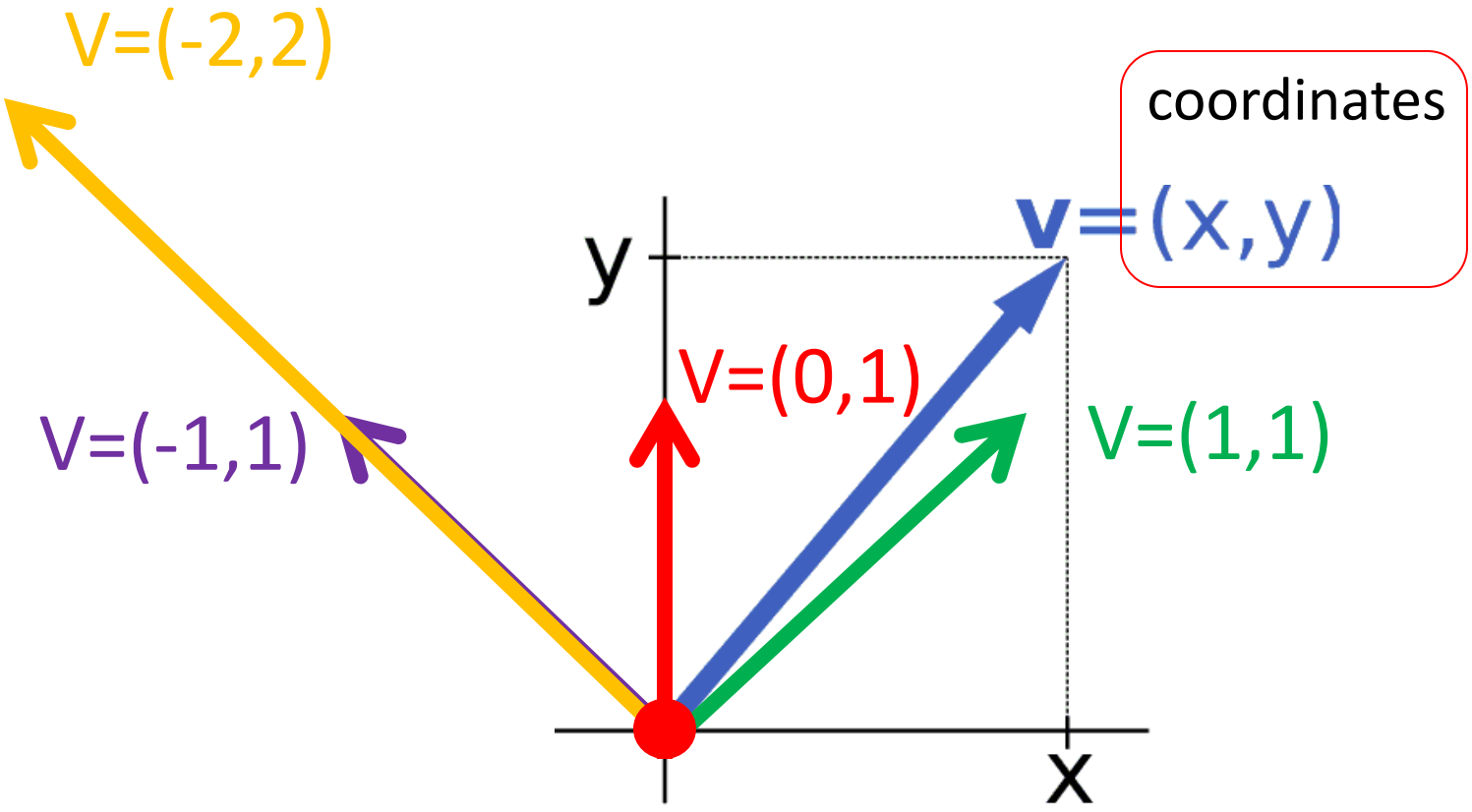
SVG

SVG = Scalable Vector Graphics

Vector

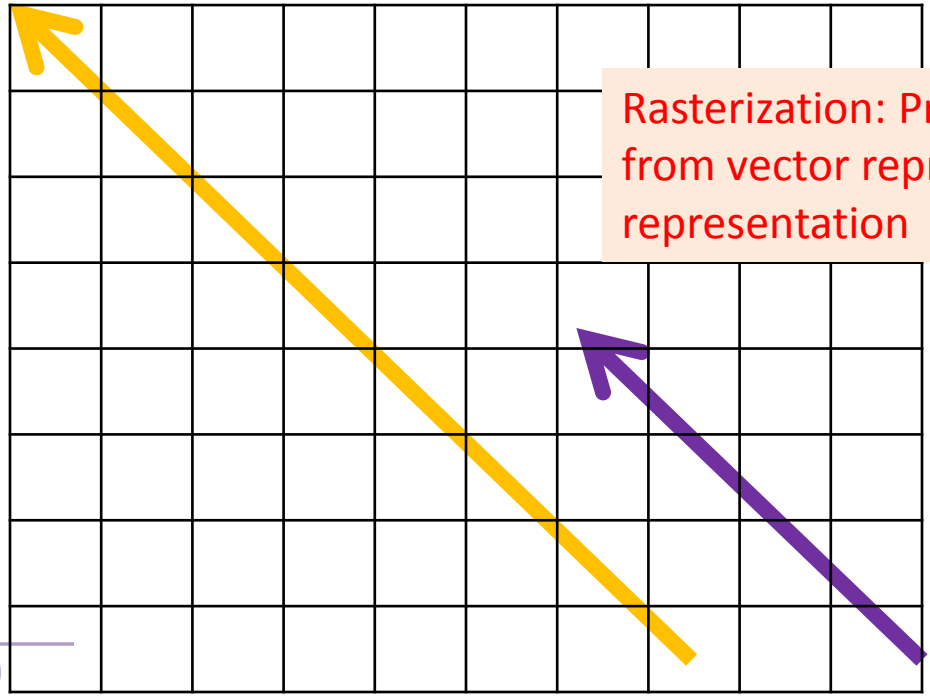
Q: V=(-1,1) x 2?

Multiplication ➔ Scale (e.g. scale factor)



Scalable Vector Graphics

- Scalability of a system:
  - ability to handle a *growing* amount of work
  - …in a well-behaved manner
- Scalable: remains compact despite of increased demands
  - Example:
    1. store line as bitmap?
    2. draw line as vectors graphics: V=(-1,1) x 2?



Rasterization: Process of converting from vector representation to pixels representation

Scalable Vector Graphics

- Text-based
- Represent graphics with mathematical constructs
  - Shapes represented with lines
  - Colors within shape can be compactly described mathematically

Pro's:

☺ Highly compact file format

☺ Scalable: no concerns for image resolution

☺ **Transformations** will create no artifacts (e.g. zooming-in or rotating images, etc.)

Con's:

☹ not rendered same way in all browsers

Example SVG

Just like XHTML, SVG uses XML (similar syntax)

```
<svg xmlns="http://www.w3.org/2000/svg" version="1.1">

        <circle
        cx="125" cy="125" r="75" fill="orange"
        />
        <rect
        x="25" y="25" width="200" height="200" fill="lime" stroke-width="4" stroke="pink"
        />
        <polyline
        points="50,150 50,200 200,200 200,100" stroke="red" stroke-width="4" fill="none"
        />
        <line
        x1="50" y1="50" x2="200" y2="200" stroke="blue" stroke-width="4"
        />
</svg>
```

SVG editors

Open-source software:

- Inkscape (Mac, Windows, and Linux)

Proprietary software:

- Adobe Illustrator (Mac and Windows)
- OmniGraffle (Mac)

Online:

http://svg-edit.googlecode.com/svn-history/r1771/trunk/editor/svg-editor.html

Questions?