

Computing

Lesson 6: Always Another Way

Data Representation

Dharini Krishnamoorthy



Task 1 - Vector Image Manipulation



Mix up an emoji (in your browser)

Steps	Instructions
<p>Use a browser (such as Firefox or Chrome) to open the vector image emoji.svg .</p> <p>You should see an emoji in your browser window.</p> <p>Note: This is an image file, which your browser has requested from a remote computer and has rendered for you.</p>	<p>The keyboard shortcut Ctrl ⊕ O should open the file selection menu, no matter which browser you are using.</p> <p>Select the name of the file that you will be opening.</p>



Task 1 - Vector Image Manipulation

Mix up an emoji (in your browser)

Steps	Instructions
Activate your browser's developer tools . They will allow you to inspect the individual geometrical shapes that make up the emoji and modify their attributes.	The keyboard shortcut <code>Ctrl ⊕ Shift ⊕ I</code> should activate the developer tools, no matter which browser you are using. Alternative: In Firefox : Click on the sandwich menu  Web developer ▸ Toggle tools In Chrome : Click on the More menu  More tools ▸ Developer tools



Task 1: Vector image manipulation

```
<circle cx="24" cy="21.5" r="20">  
<ellipse cx="24" cy="5.5" rx="6" ry="1.5"/>  
<ellipse cx="24" cy="45.5" rx="16" ry="1.5"/>  
<circle cx="24" cy="21.5" r="20"/>  
<ellipse cx="36" cy="26.5" rx="2.5" ry="1.5"/>  
<ellipse cx="12" cy="26.5" rx="2.5" ry="1.5"/>  
<circle cx="13.5" cy="20.5" r="1"/>  
<circle cx="34.5" cy="20.5" r="1"/>  
<path d="M24,38.5c5.6,0,10.3-4, ... />  
<path d="M24,33.5c-3.2,0-6.1, ... />
```

This is what you will see in the browser window : a textual description of the image, specifying the coordinates and sizes of the shapes.



Credit: Emoji Smileys image:Wikimedia

The browser reads the description and renders the image. This is what you will see in the browser:



Task 1 - Vector Image Manipulation

Mix up an emoji (in your browser)



Steps	Instructions
In the Inspector window (Firefox) or Elements window (Chrome), select individual shapes (circles, ellipses, paths) and modify their attributes.	<p>Click on the code for a shape to select it.</p> <p>Double-click on any of the attributes in the code to modify it:</p> <ul style="list-style-type: none">• (cx,cy) is the centre of a circle or ellipse• r is the radius of a circle• rx and ry are the radii of an ellipse <p>For example, select a circle and change cx="24" to cx="28" or r="20" to r="30". You can delete a shape by clicking on its code (selecting it) and then pressing the Delete key.</p>

Undo (Ctrl ⊕ Z) and redo (Ctrl ⊕ Y).



Task 1 - Vector Image Manipulation

Mix up an emoji (in your browser)

Steps	Instructions
In the Inspector window (Firefox) or Elements window (Chrome), select individual shapes (circles, ellipses, paths).	<p>Click on the code for a shape to select it.</p> <p>You should be able to see its styling attributes (like colour) in the Styles window. For example:</p> <pre>.tongue { fill:  rgb(255, 135, 175); stroke:  rgb(69, 65, 60);</pre> <p>Modify the RGB values for the fill or stroke attributes to change the colours:</p> <p>fill is the fill colour of a shape and stroke is the stroke colour of a shape</p>



Task 1 - Vector Image Manipulation

Mix up an emoji (in your browser)

If you like your mixed-up emoji, you can **save** it as: mixedup.svg.

The keyboard shortcut Ctrl ⊕ S should open the file selection menu, no matter which browser you are using. Select the name of the folder that you will be saving to.



Task 2: Compression

Part 1: Calculate (uncompressed) image size
The image file kingfisher.bmp has a **resolution** of 1024x720. Its **colour depth** is **24 bits**.

Steps	Instructions
Use this information to compute the number of bits required to represent this image.	Write your answer here:
Convert this size to bytes and then to megabytes .	Write your answer here:



Task 2: Compression

Part 1: Calculate (uncompressed) image size

Steps	Instructions
Locate the image file kingfisher.bmp. What is the actual size of the file, in megabytes (MB)?	Use a file manager to locate the image file. Right-click on the file and view its Properties to see its size. Write your answer here:
Is the size that you computed in Step 1 identical (or even similar) to the actual size of the file?	Write your answer here:



Task 2: Compression

Part 2: Compression

Steps	Instructions
Locate the image file kingfisher.bmp. What is the actual size of the file, in megabytes (MB)?	Use a file manager to locate the image file. Right-click on the file and view its Properties to see its size. Write your answer here:
Open the image file kingfisher.bmp in GIMP.	Use the menus: File ▸ Open Or Use the keyboard shortcut: Ctrl ⊕ O



Task 2: Compression

Part 2: Exporting image

Steps	Instructions
Export the image to a new file format, as kingfisher.80.jpg.	Use the menus: File ▸ Export As... Or Use the keyboard shortcut: Ctrl ⊕ Shift ⊕ E Then, specify the file name for the new image file. In the Export Image as JPEG dialogue, set the Quality to 80 and click the Export button.



Task 2: Compression

Part 2: Compression

Steps	Instructions
Locate the new image file kingfisher.80.jpg. What is the size of the new image file, in megabytes (MB)?	Use a file manager to locate the new image file. Right-click on the file and view its Properties to see its size. Write your answer here:
The new image file has the same resolution and the same colour depth as the original image. How can you explain the substantial difference in size between the two files?	Write your answer here:



Task 2: Compression

Part 2: Exporting image

Steps	Instructions
Export the image to a new file format, as kingfisher.20.jpg.	Use the menus: File ▸ Export As... Or Use the keyboard shortcut: Ctrl ⊕ Shift ⊕ E Then, specify the file name for the new image file. In the Export Image as JPEG dialogue, set the Quality to 20 and click the Export button.



Task 2: Compression

Part 2: Compression

Steps	Instructions
Locate the new image file kingfisher.20.jpg. What is the size of the new image file, in megabytes (MB)?	Use a file manager to locate the new image file. Right-click on the file and view its Properties to see its size. Write your answer here:
Zoom in on the image to see how the low level of quality that you selected while exporting has affected the way in which details are rendered.	Make sure that the Toolbox has been activated. Use the menus: Windows ▸ Toolbox Then, select the Zoom tool. Click on any part of the image to zoom in. Control-click on the image to zoom out.



**Click here to download
additional assets for
this lesson**

