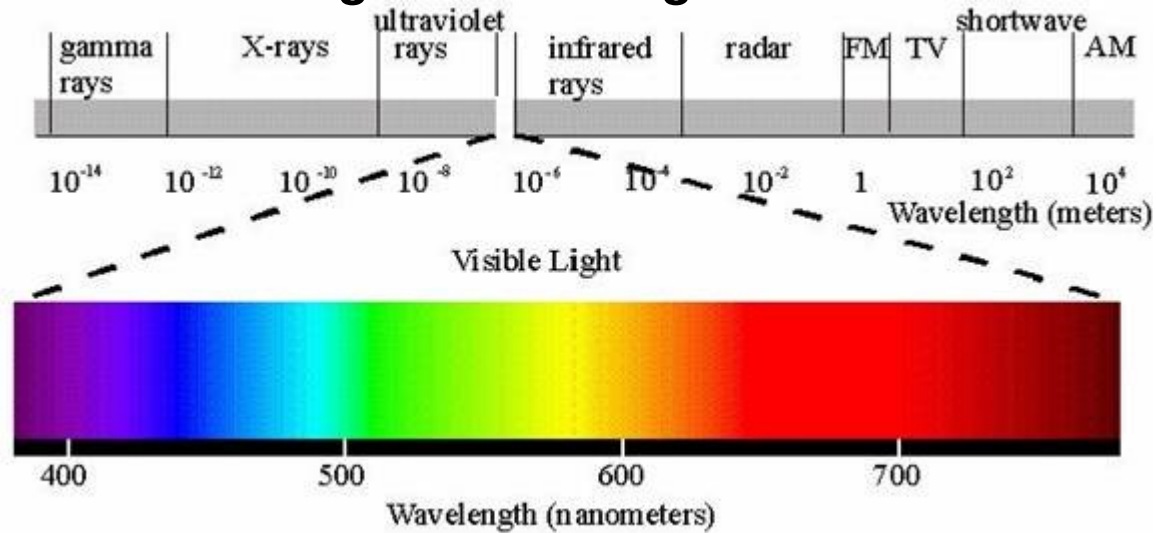
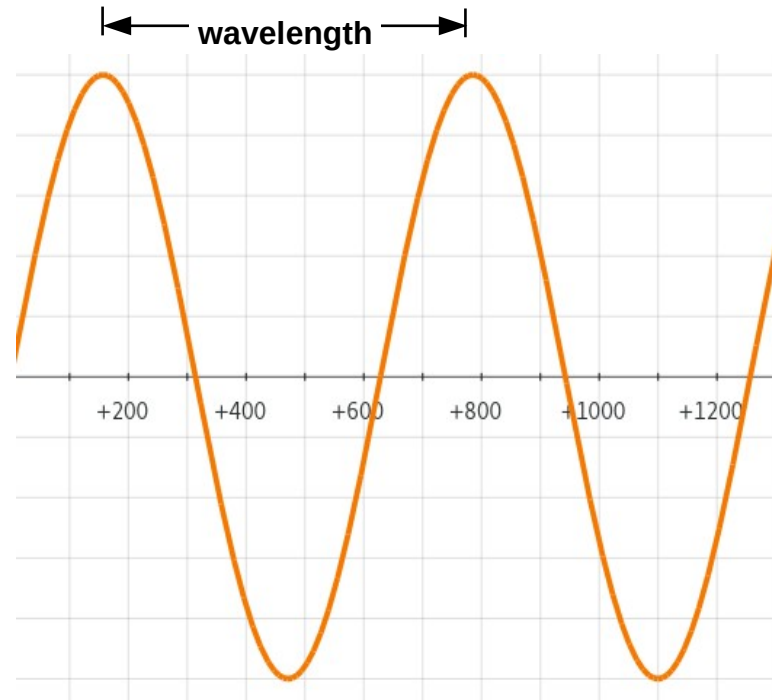


The optical spectrum for visible light covers electromagnetic waves with wavelengths that range between 390-700 nm.

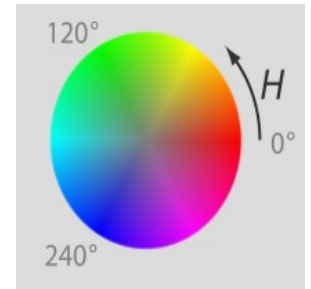
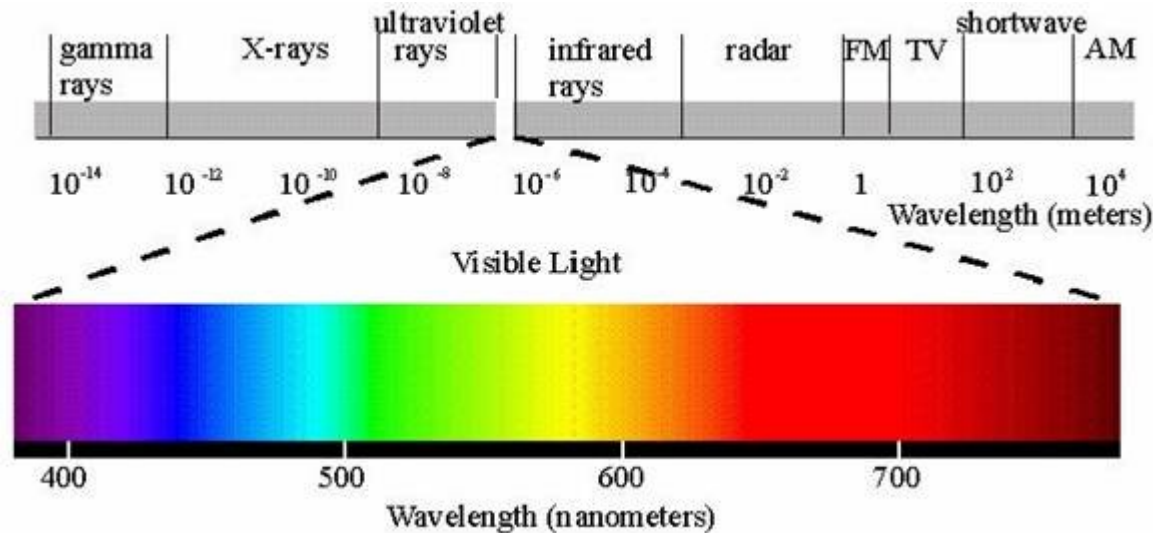


We model electromagnetic waves with trigonometric functions, where the **period** is the wavelength and the **amplitude** is the intensity.

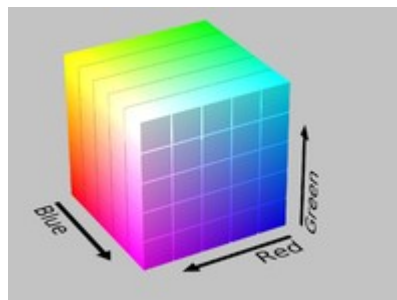
$$f(x) = 500 \sin\left(\frac{x}{100}\right)$$



We use two popular models for identifying colors on a computer.



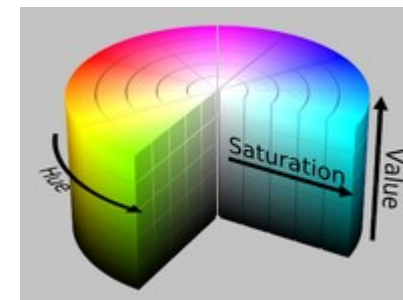
hue color wheel



RGB Model

A color is represented by three numbers between 0 and 255 that signify the relative ratios of red, green, and blue.

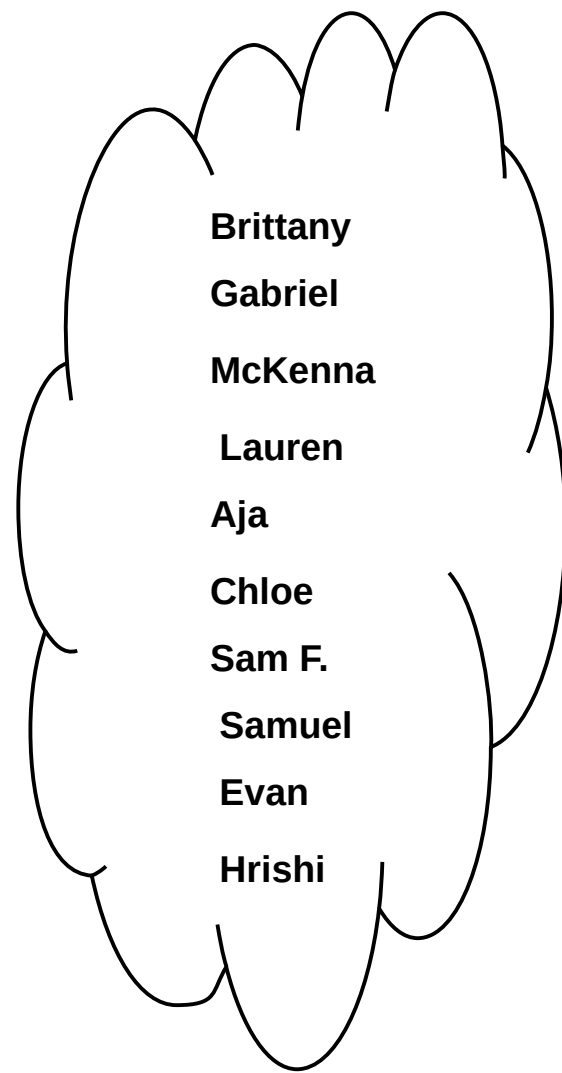
$$\{ (r,g,b) \mid r,g,b \in \mathbb{N} \text{ and } 0 \leq r,g,b \leq 255 \}$$



HSV Model

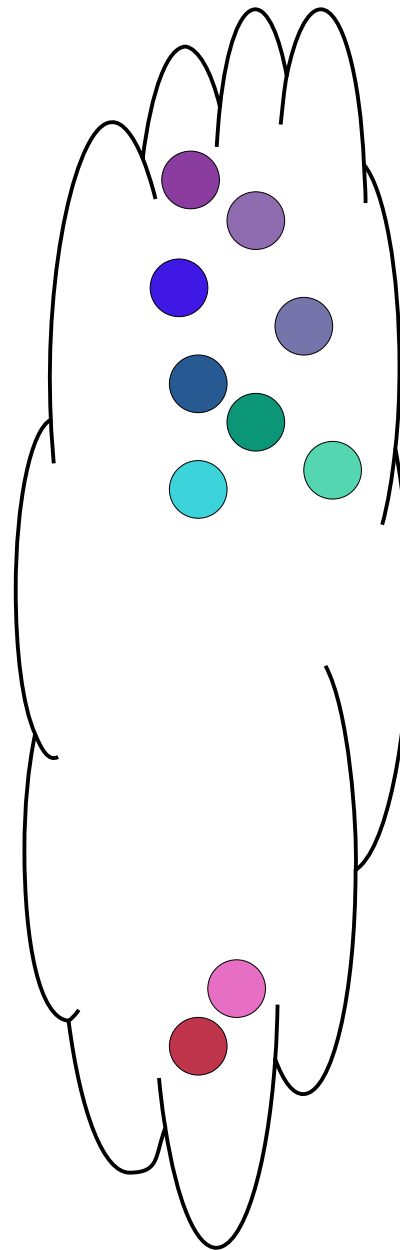
A color is represented by an angle between 0 and 360 that signifies the angle for hue on the color wheel along with percentages for relative saturation and color value.

$$\{ (h,s,v) \mid h,s,v \in \mathbb{N} \text{ and } 0 \leq h \leq 360, 0 \leq s,v \leq 100 \}$$



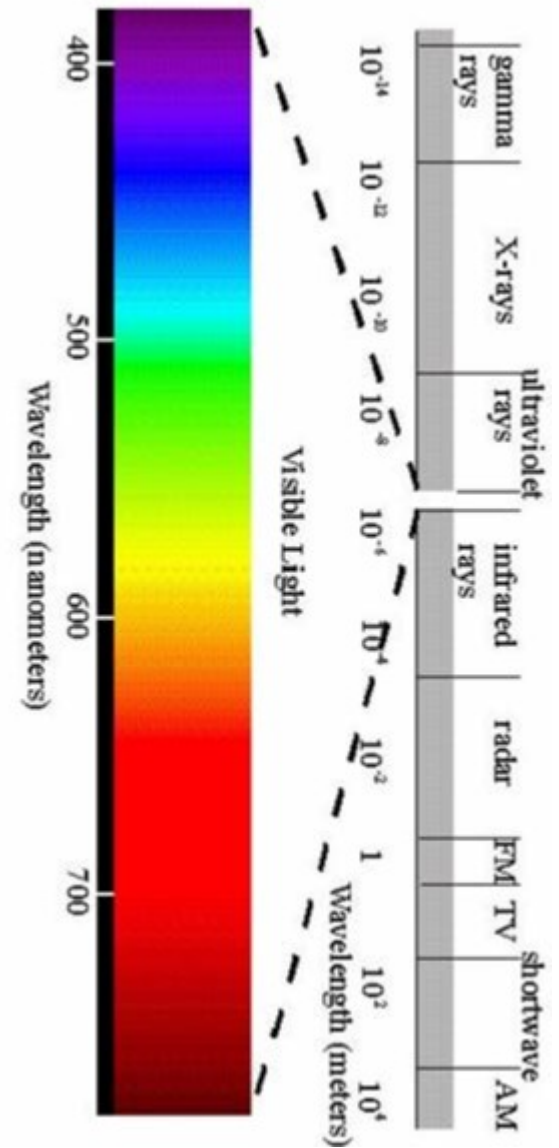
my students

10



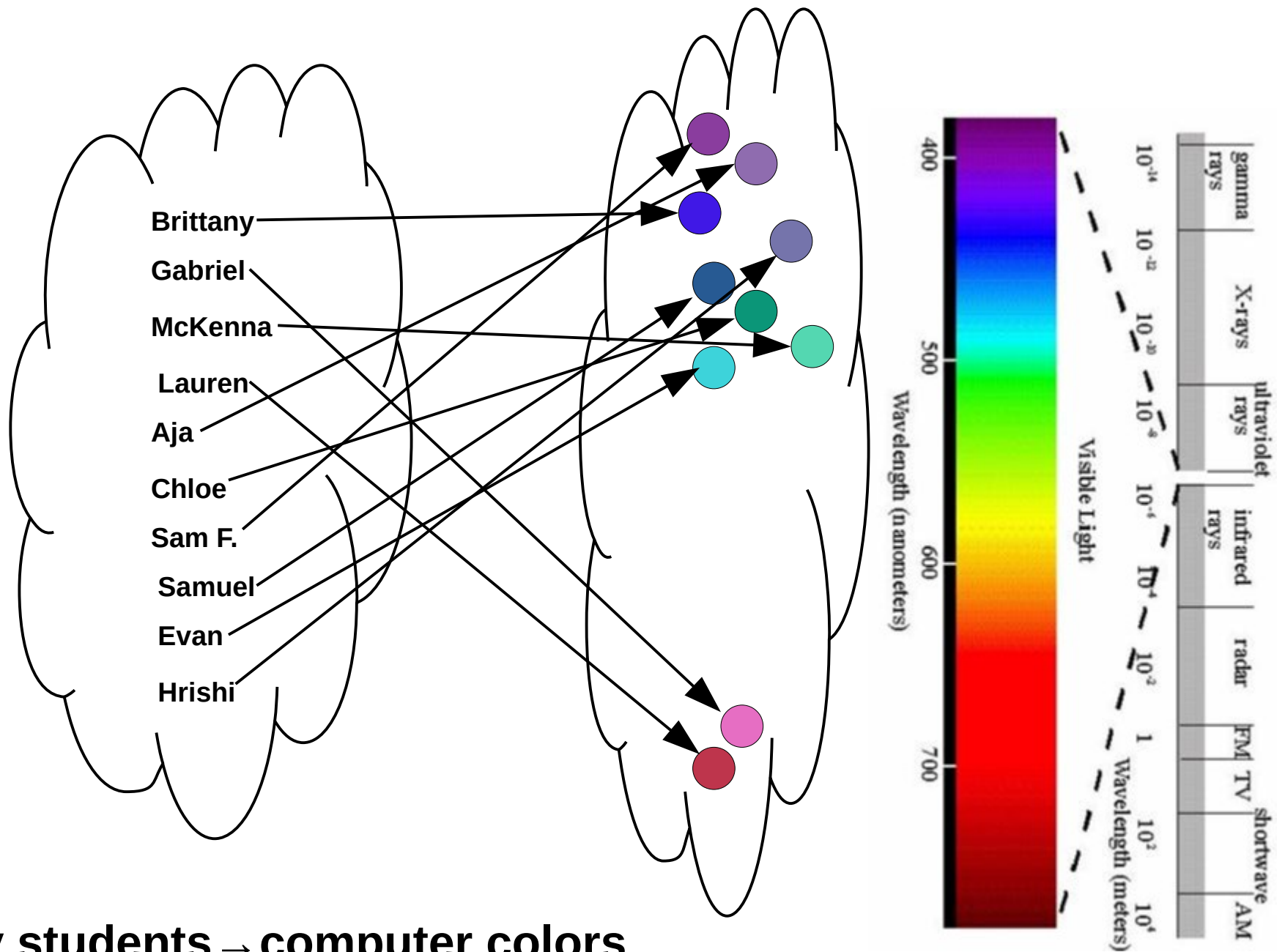
computer colors

16,777,216



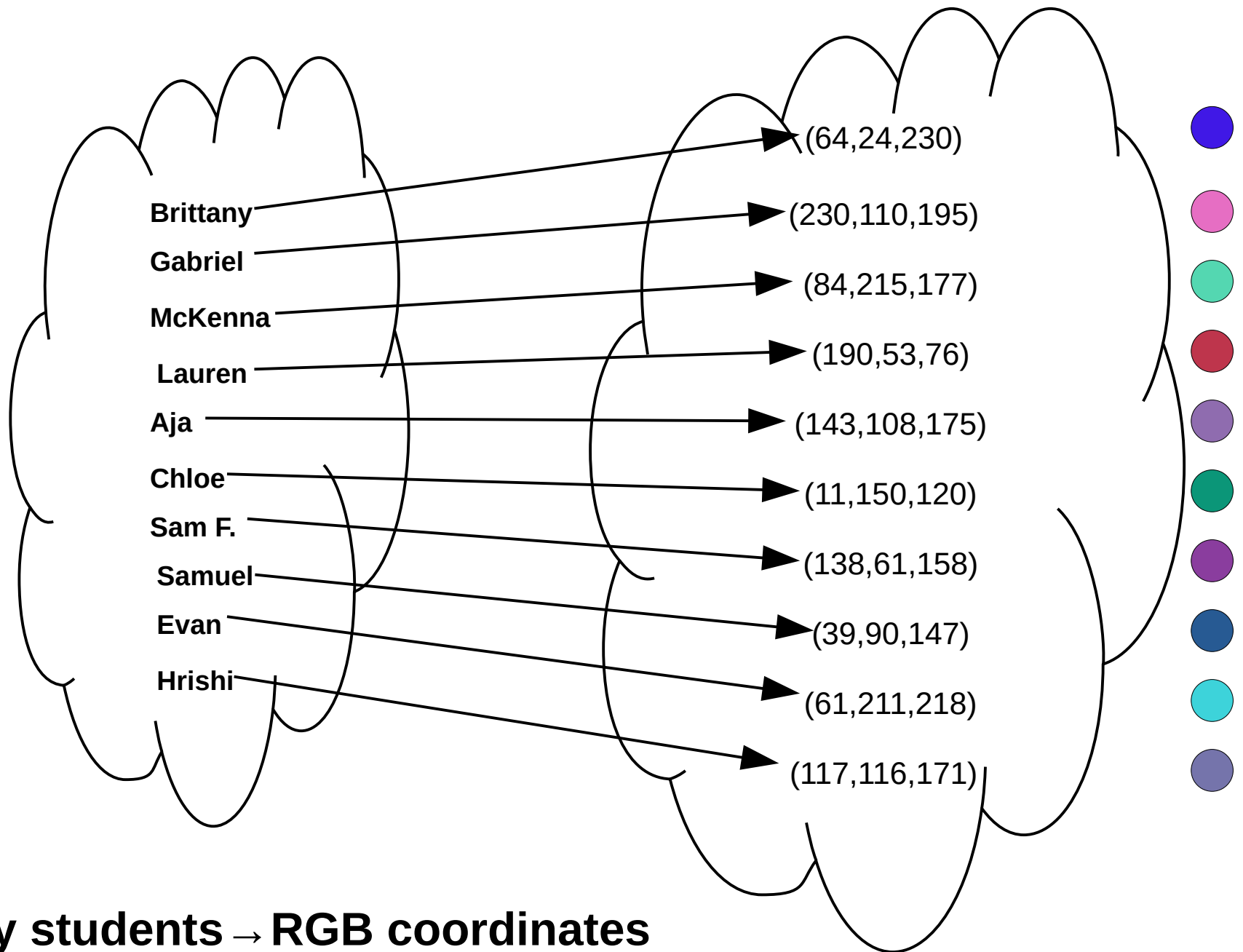
colors

∞



f :my students $\rightarrow$ computer colors

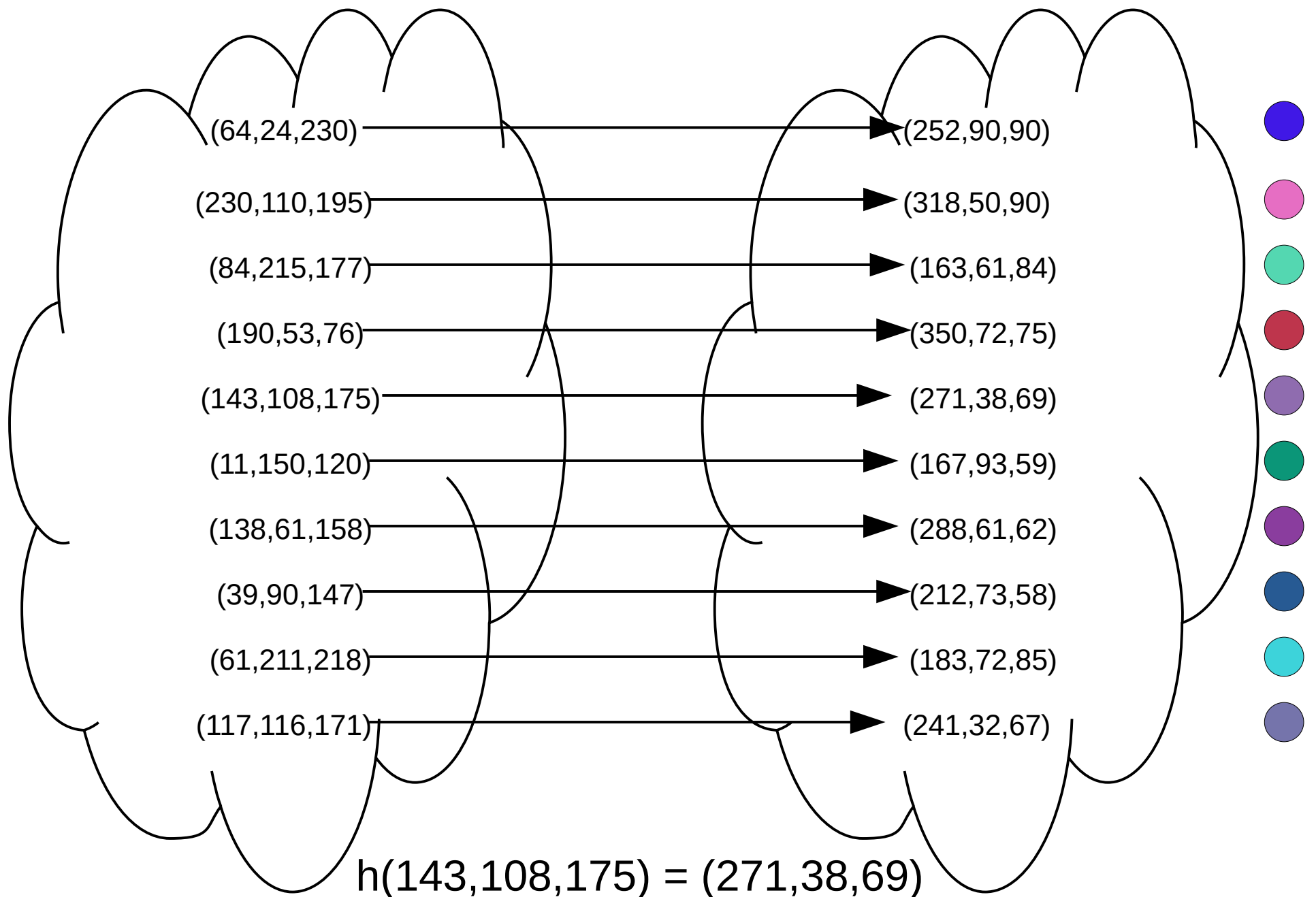
$$f(\text{Evan}) = \text{Light Blue}$$



g : my students $\rightarrow$ RGB coordinates

$g(\text{Evan}) = (61, 211, 218)$

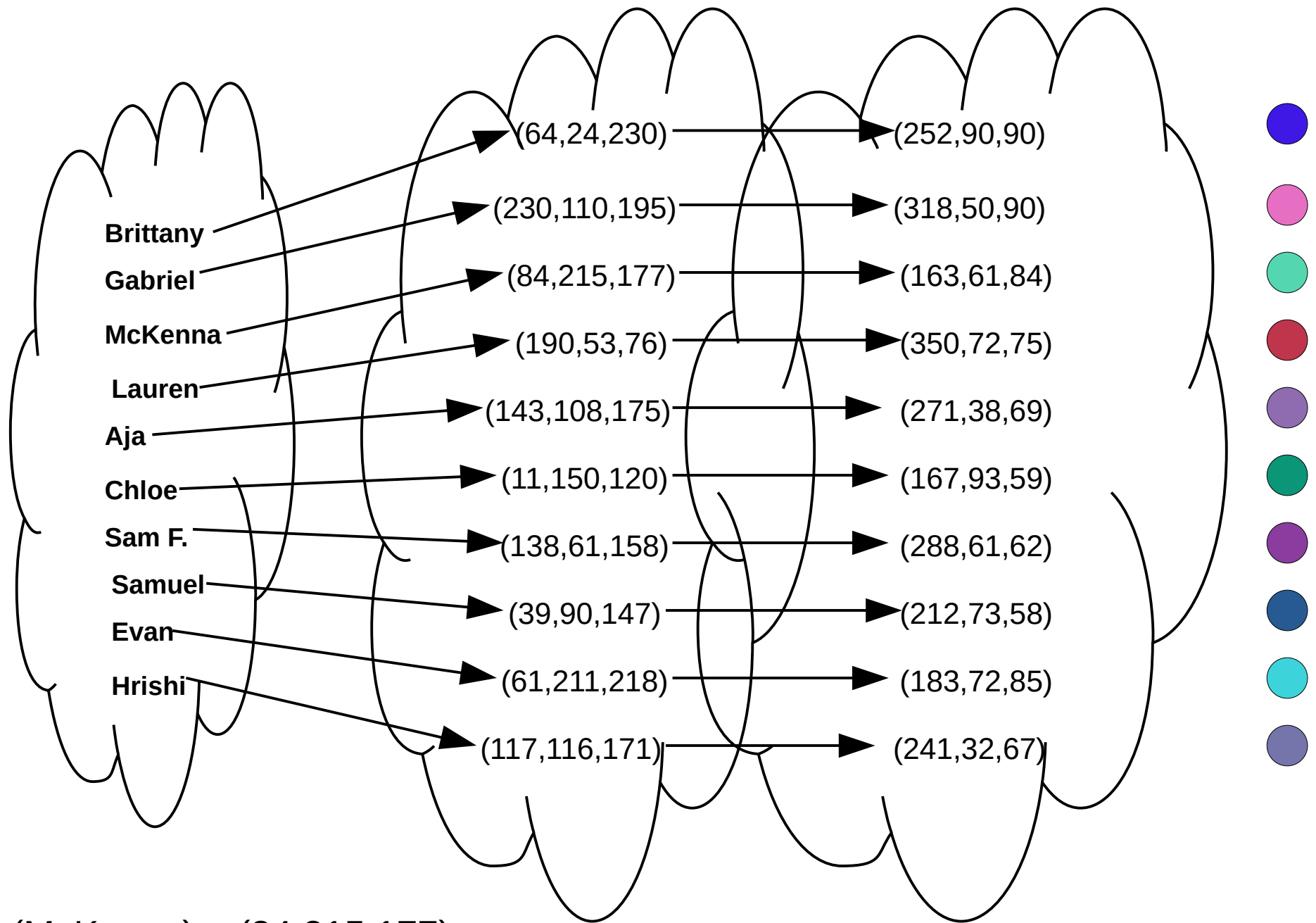
$\{ (r, g, b) \mid r, g, b \in \mathbb{N} \text{ and } 0 \leq r, g, b \leq 255 \}$



h: RGB coordinates → HSV coordinates

$\{ (r,g,b) \mid r,g,b \in \mathbb{N} \text{ and } 0 \leq r,g,b \leq 255 \}$

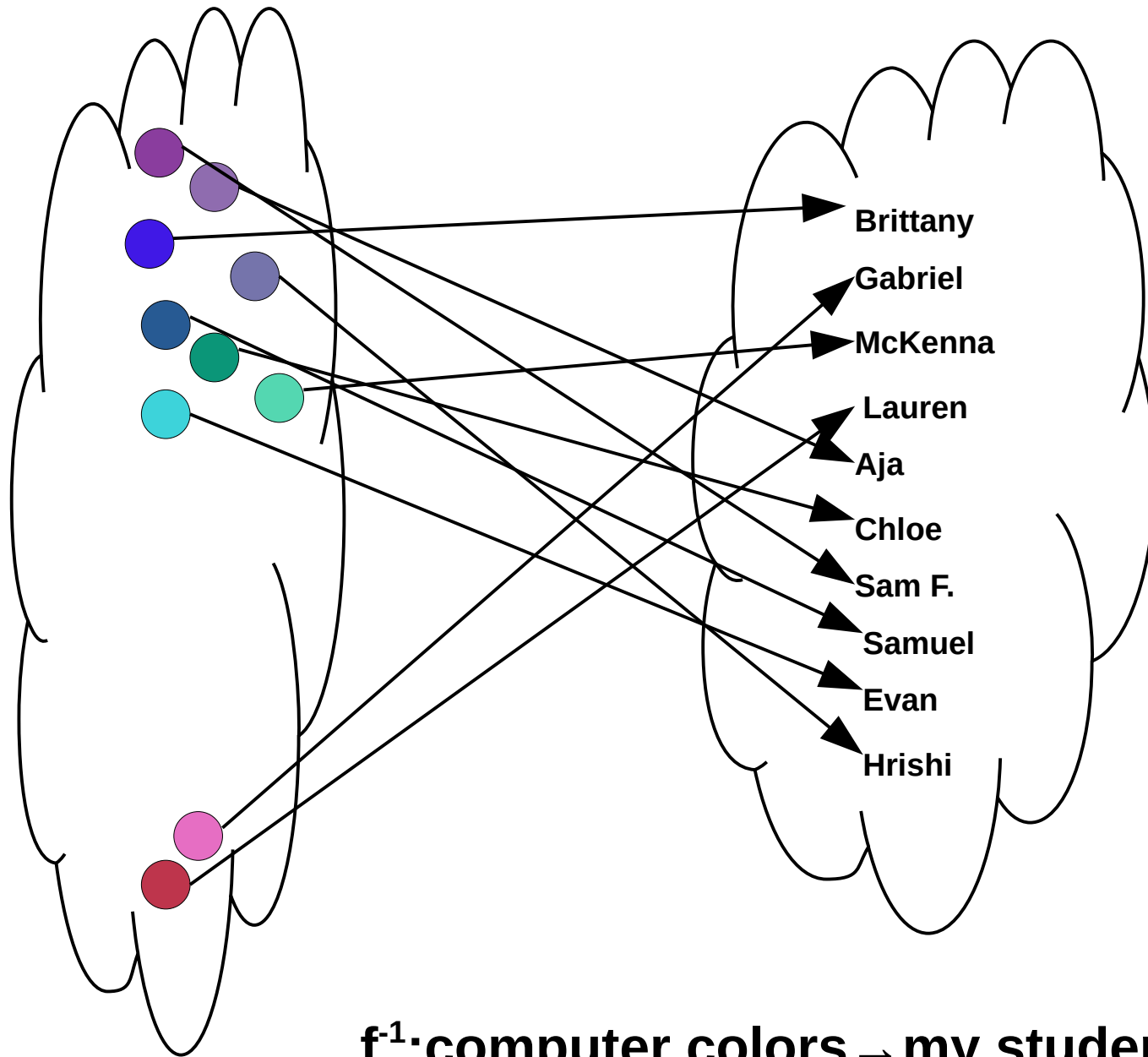
$\{ (h,s,v) \mid h,s,v \in \mathbb{N} \text{ and } 0 \leq h \leq 360, 0 \leq s,v \leq 100 \}$



$g(\text{McKenna}) = (84,215,177)$

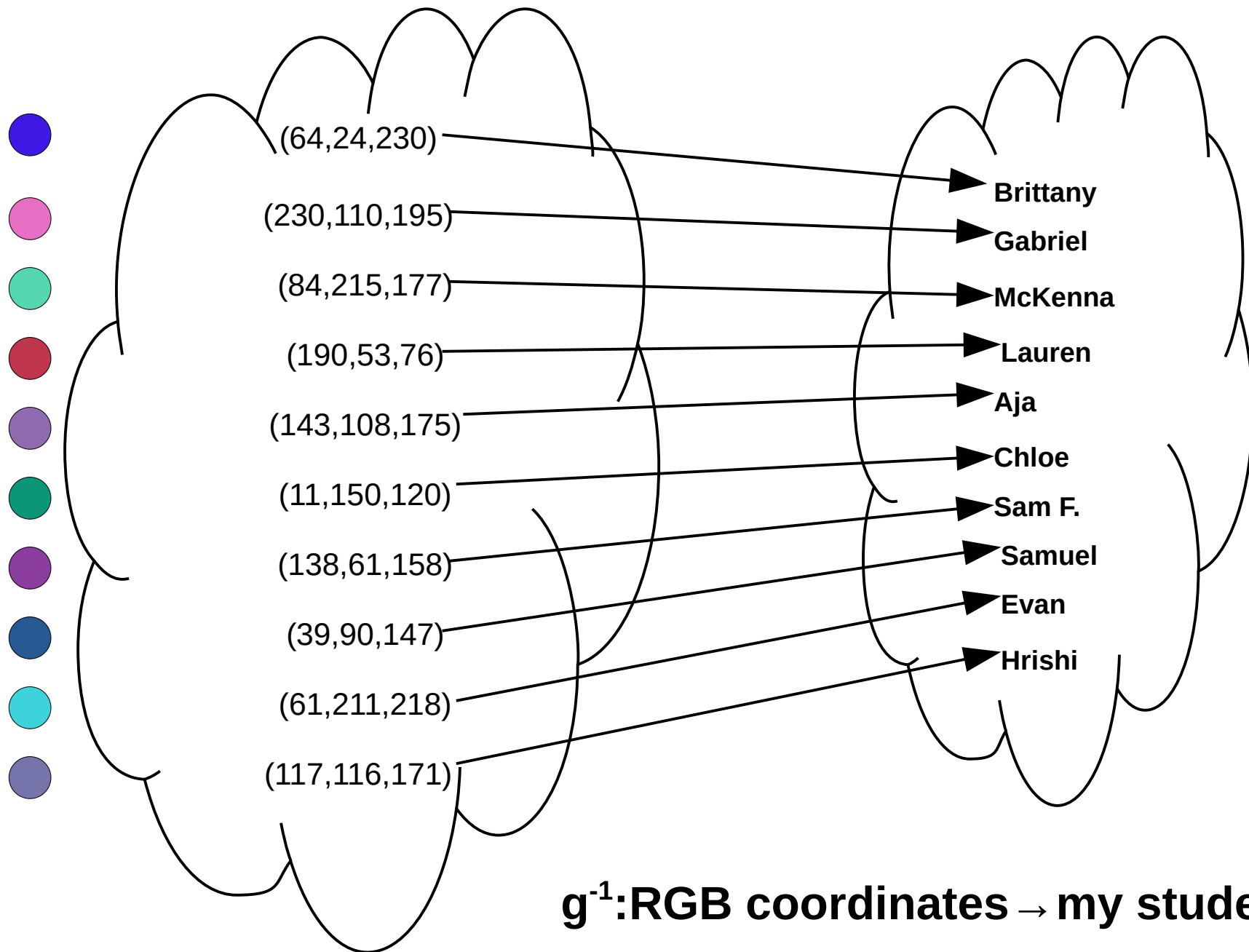
$h(g(\text{McKenna})) = (163,61,84)$

$h \circ g: \text{my students} \rightarrow \text{HSV coordinates}$



f^{-1} : computer colors $\rightarrow$ my students

$$f^{-1}(\text{red circle}) = \text{Lauren}$$



g^{-1} : RGB coordinates $\rightarrow$ my students

$\{ (r,g,b) \mid r,g,b \in \mathbb{N} \text{ and } 0 \leq r,g,b \leq 255 \}$

$g^{-1}((117,116,171)) = \text{Hrishi}$