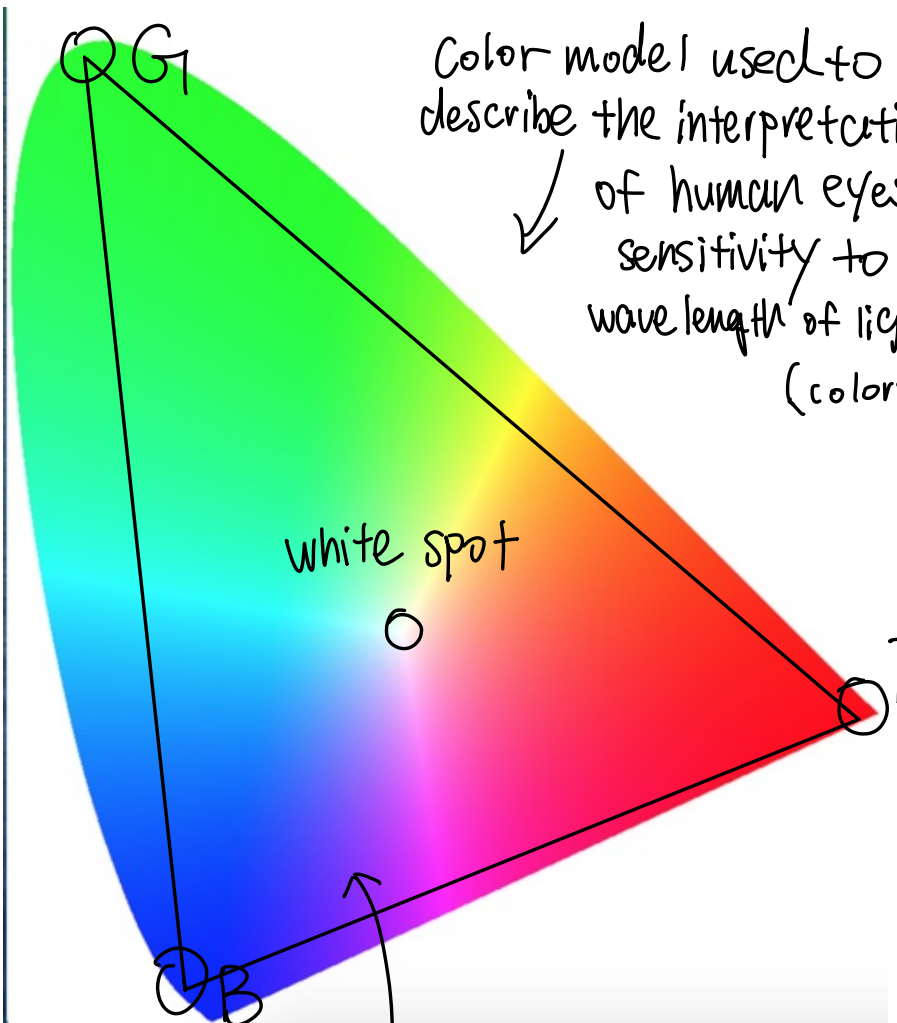

SIPG

CIE 1931

Quantify colors



Color model used to describe the interpretation of human eyes' sensitivity to different wavelength of lights (colors)

Color space / Gamut

region a viewer can display color

Dynamic Range & EV

Dynamic range: the ratio between the darkest & brightest areas a camera can sense.

PS. human eyes are much more sensitive to changes in dark areas than changes in bright areas.

mark: M1

→ Therefore, human's eyes interpret light as index instead of linear

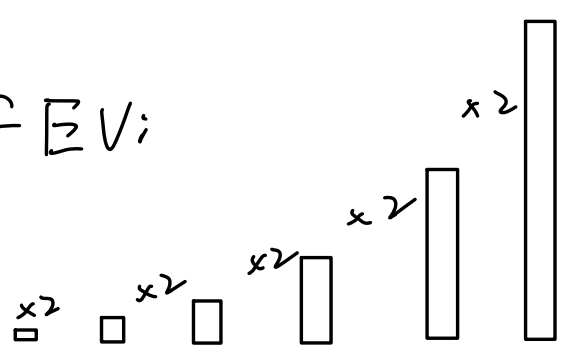
→ only doubling brightness can give enough stimulation to human eyes.

→ Exposure value (multiple of light)

(+1 EV = doubling the brightness of previous ev)

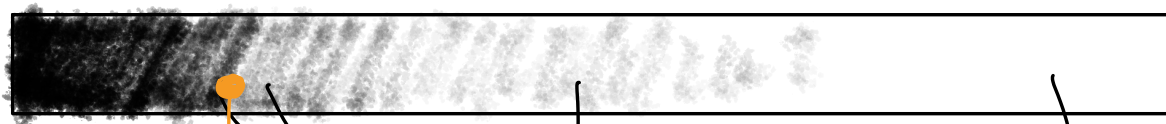
Ex:

6 levels of EV:



Gamma Issue 1

Computer interpretation of lightness from 0-255:



mid gray:

Banding

mid-gray

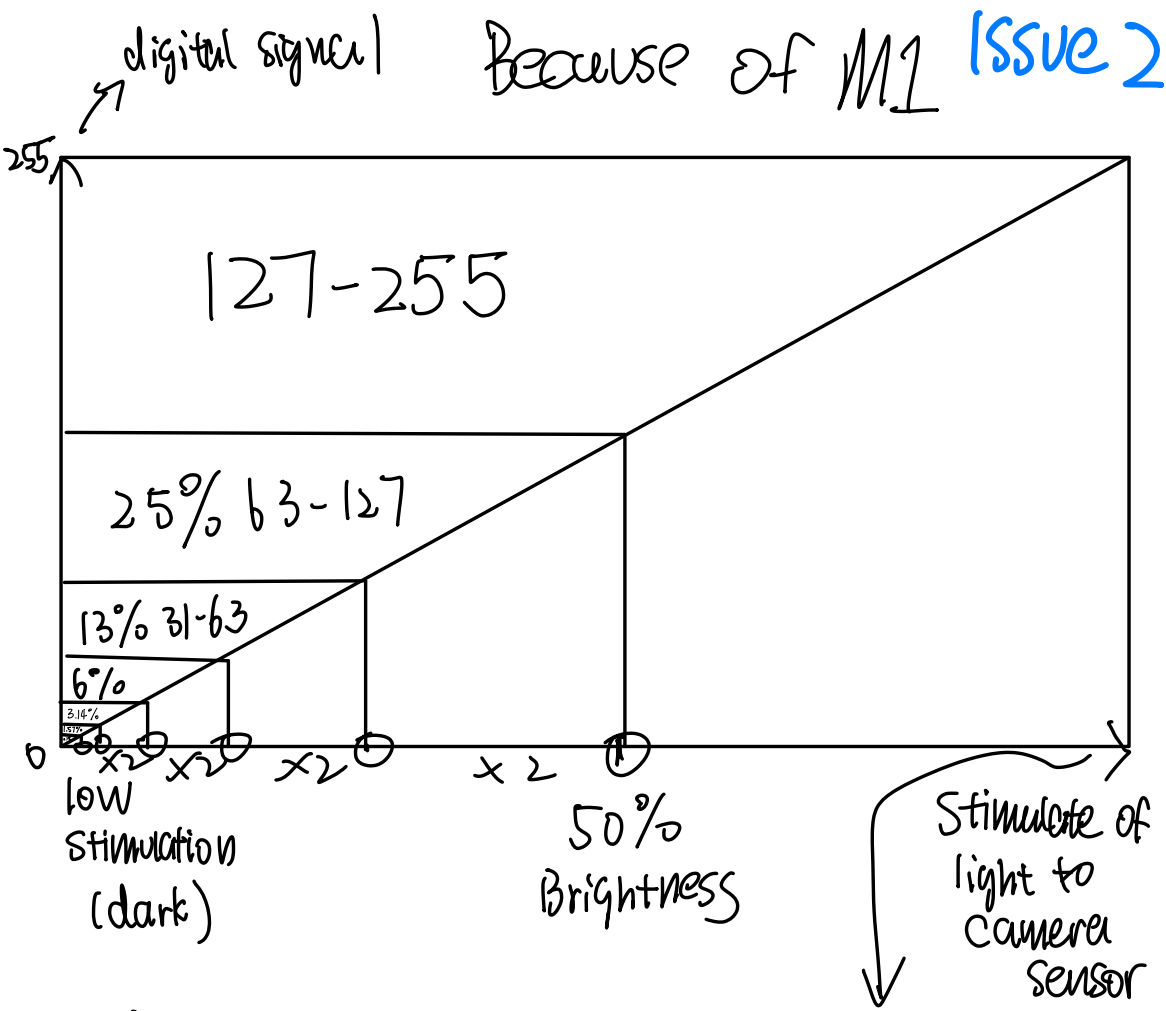
too bright

unequal
(less space for black)

too much space for white

18% gray = mid gray interpreted by human.

Because of M1 Issue 2



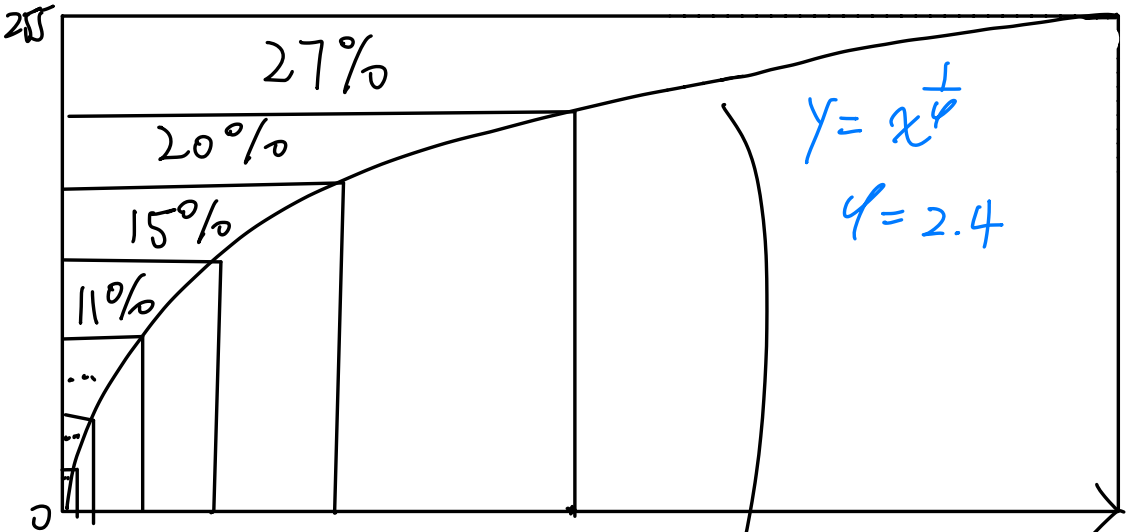
Problem:

127-255 brightness level used 50% of data

↳ every level is $\frac{1}{2}$ previous.

↳ causing extreme low data amount for low light areas.

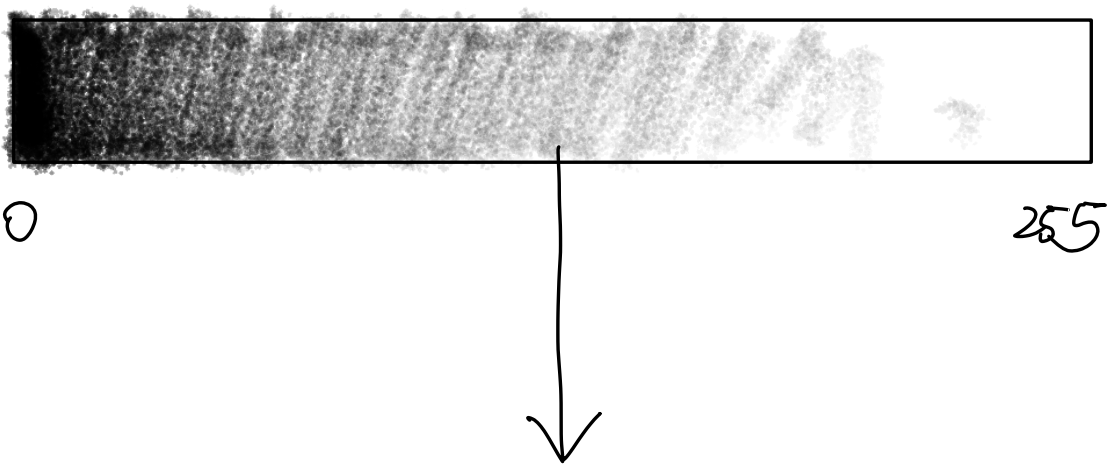
Because Issue 1 & 2:



Issue 2:
solved by giving more data space to dark areas.

Gamma curve

Issue 1



The luminance band is fixed by Gamma curve to fix banding, and equalized the distribution of luminance level.

Log curves:

- used to maximize dynamic range to record most

Formula for DR: $\log_2\left(\frac{\text{maximum brightness}}{\text{minimum brightness}}\right)$

↳ increase DR: ↑ maximum brightness

or ↓ minimum brightness

Cannot lower minimum brightness:

→ There will be noise in low-light areas when sensor detects. Therefore, lowest-brightness cannot be 0 as it will get submerged by noise.

log curves works by giving enough digital spaces to highlight areas to increase dynamic range.

S-log 3: 17-level of DR

keeping highlight features

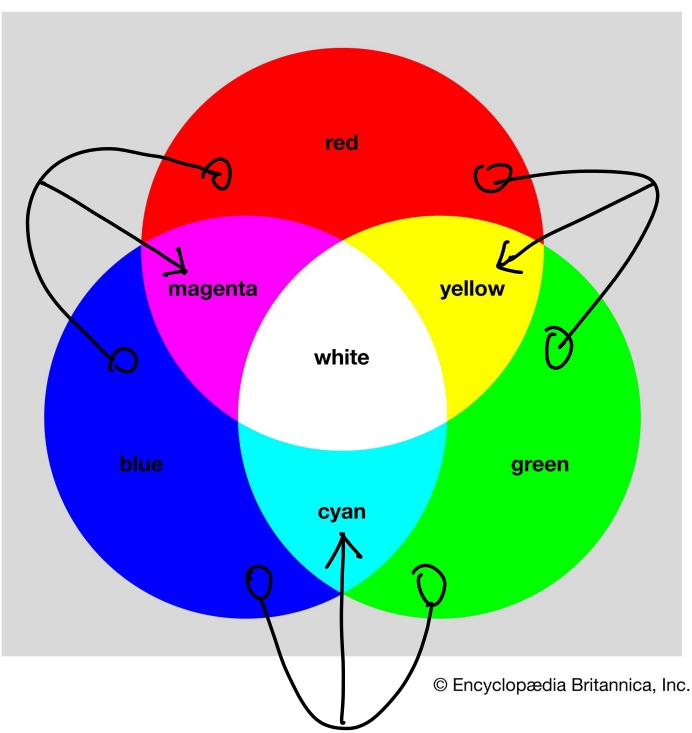
low light features

Color spaces:

RGB: Adding optical primary colors to create possible colors. Adjusting brightness of each color.

R+G+B= White

RGB color model



R+B = magenta

R+G = Yellow

B+G = cyan

M+Y = Red

M+C = Blue

C+Y = Green

Y-CrCb

4:2:2 ↓
↳ meaning only record chroma value of 1st & 3rd pixel in a row, 2nd & 4th pixel is copied from 1st & 3rd pixel.

Color space used for standard video recording, while compressing file size.

Instead of loging R-G-B three values. It logs the luminance value first (Y) } luminance signal

& then log the red difference & blue difference & combind. } chroma signal

Compression of YcrCb:

4:4:4 → meaning 4 pixel in a horizontal row

4:4:4 → meaning all 4 chroma values are recorded in first row

4:4:4 → Meaning all 4 chroma values are recorded in second row

B	G	G	B
R	B	R	B

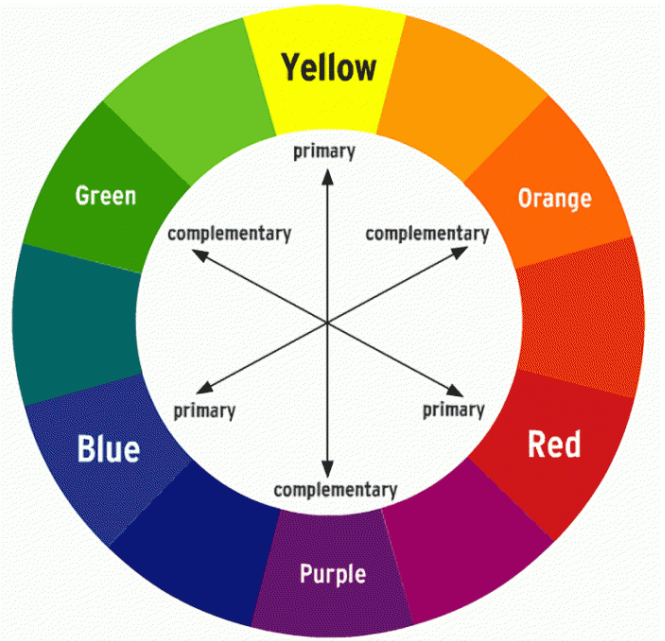
4:4:4 → no compression

4:2:2 → Compress 50%

2nd row is copied from 1st row.

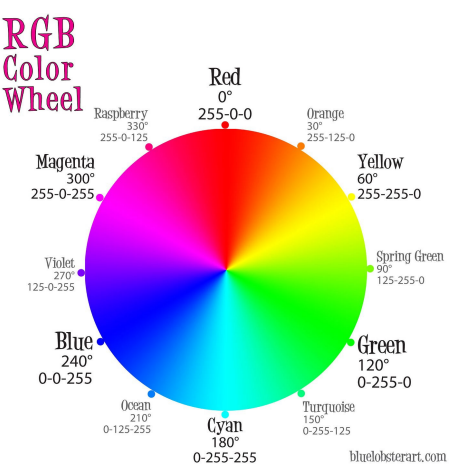
4:2:0 → Compress 75%

Color scheme design ——



① Monochromatic
- loneliness
- Tension when high sat

② Complementary hue:
- dramatic conflict
- cinematic tone



③ Adjacent hue:
- Calm
- Peace

Psychology & color

Cold/ warm tone

Hot and dynamic, activating, stimulating, exciting create accent, attention, show power and tension

not overwhelming as red, balanced, show friendly and inviting, creat energetic feel / idea.

Brightest color, happy, expansive and stimulating create expression of happiness / show age.

Show calm, balance and possibility. Represent harmony, stability and affluence.

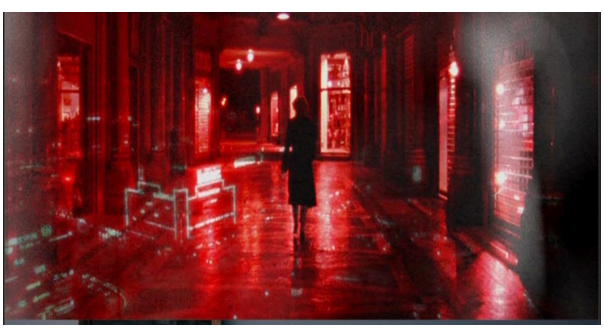
Represents dependability, trustworthy & security, Darker blues → business & design. Light → calm

nobility, abundance, dignity, creativity & imagination. Luxury, romance & spring.

Analyzation - Mood

low saturated orange and warm hue of color, showing calm and peaceful tone at late afternoon. medium contrast, light yellow in dark areas pure orange in bright areas.

Extremely saturated orange with monochromatic hue. Creating the tension and oppressing feel through the desert and sand / dangerous feel



Monochromatic high saturated, creating supernatural effect through the scene & highlights. Also building dramatic effect & sci-fi tone. Also building crisis feels.

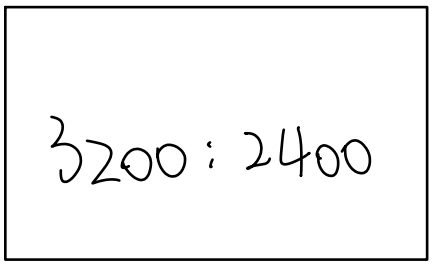
Cold hue tones, with low saturated colors. Color - Blue/cyan. very high contrast and sharp shadow outlines. Creating indifferent, cold and negative feelings.

Analyzation- Time.

Early morning, Calm and peace, Lifestyle, cold temp Blues hour 6-7 A.M.

Mid afternoon warm and cozy Sunlight. Calm 2-4 p.m.

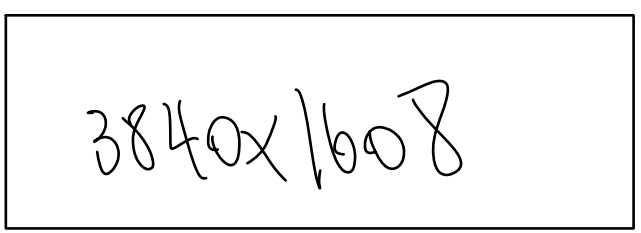
Aspect ratios:



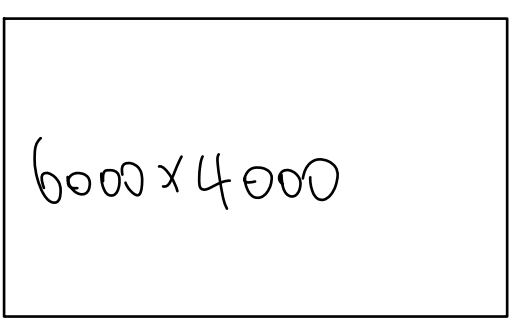
4:3 television production

1980 x 1080
3840x 2160
2160 x 1440

16:9 Common net video / TV production. Most common ratio.



2:39:1 Cinematic aspect ratio. Movie production.

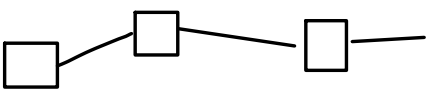


3:2 Still photography Production

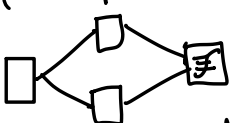
Nodes in Davinci Resolve

nodes are a diagram showing the process of color adjustments.

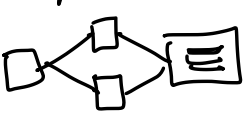
① Serial nodes: node affected by previous



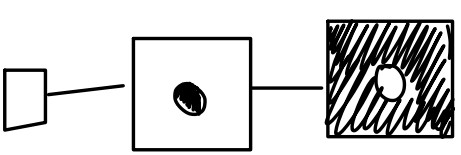
② Parallel nodes: containing signal at same time from previous node.



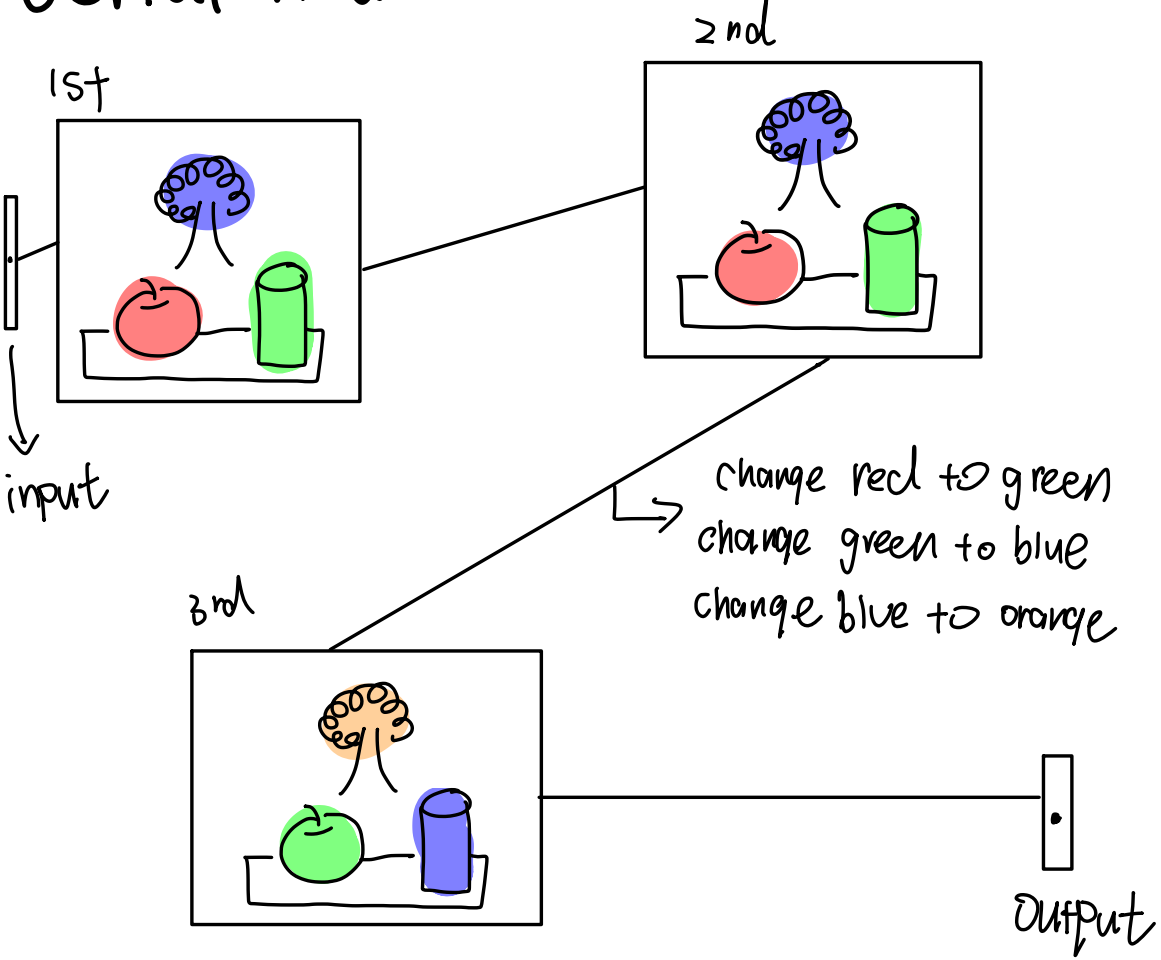
③ Layer nodes: The node lower in the position on the diagram appear on top of last node.



④ Outside nodes: node selecting a certain region absolute opposite from previous region.

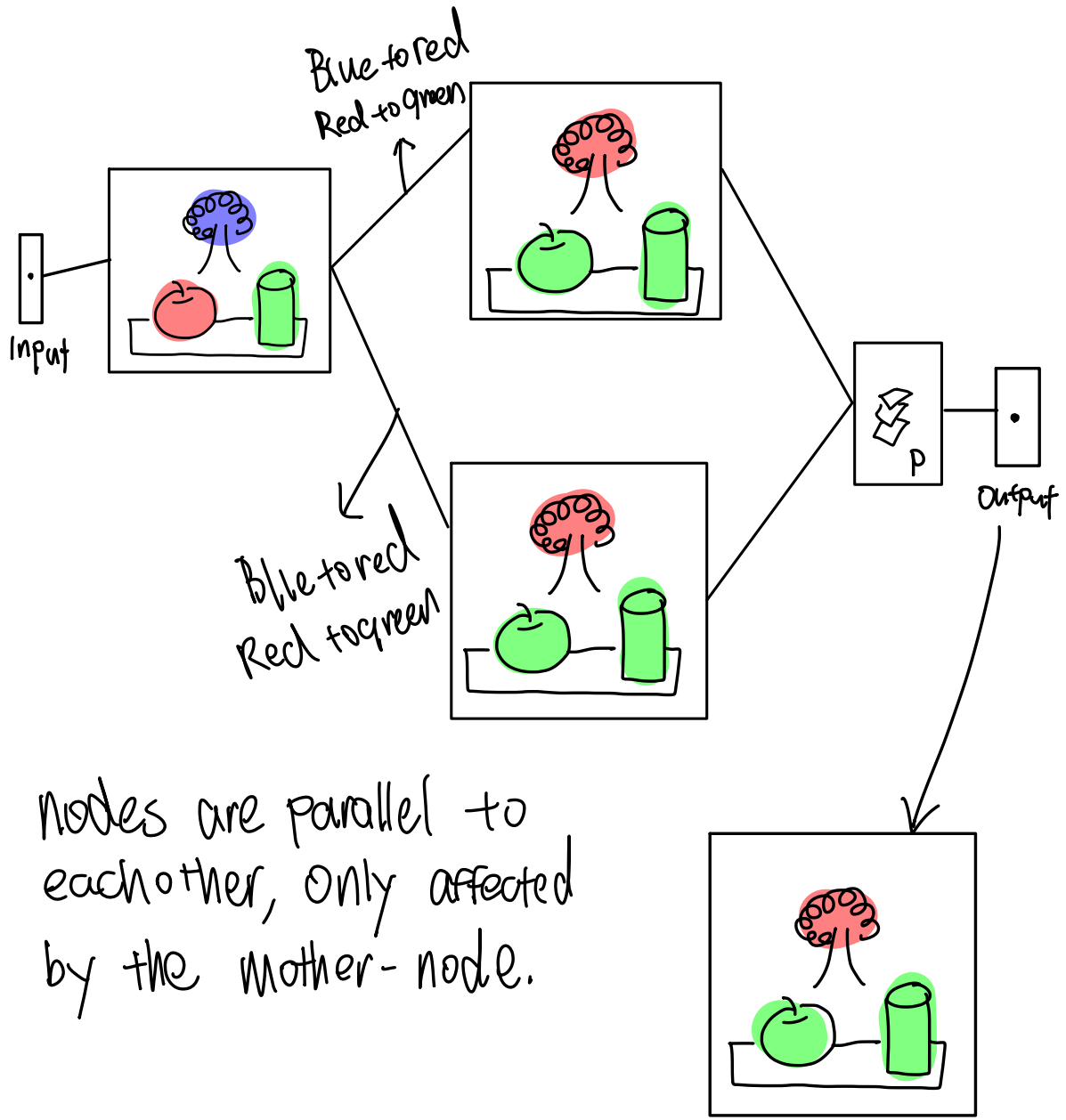


Serial nodes:



In serial nodes, all nodes are arranged in sequence. The node is always affected by the previous one. Like a food recipe with steps.

Parallel nodes



nodes are parallel to eachother, only affected by the mother-node.

Layer nodes:

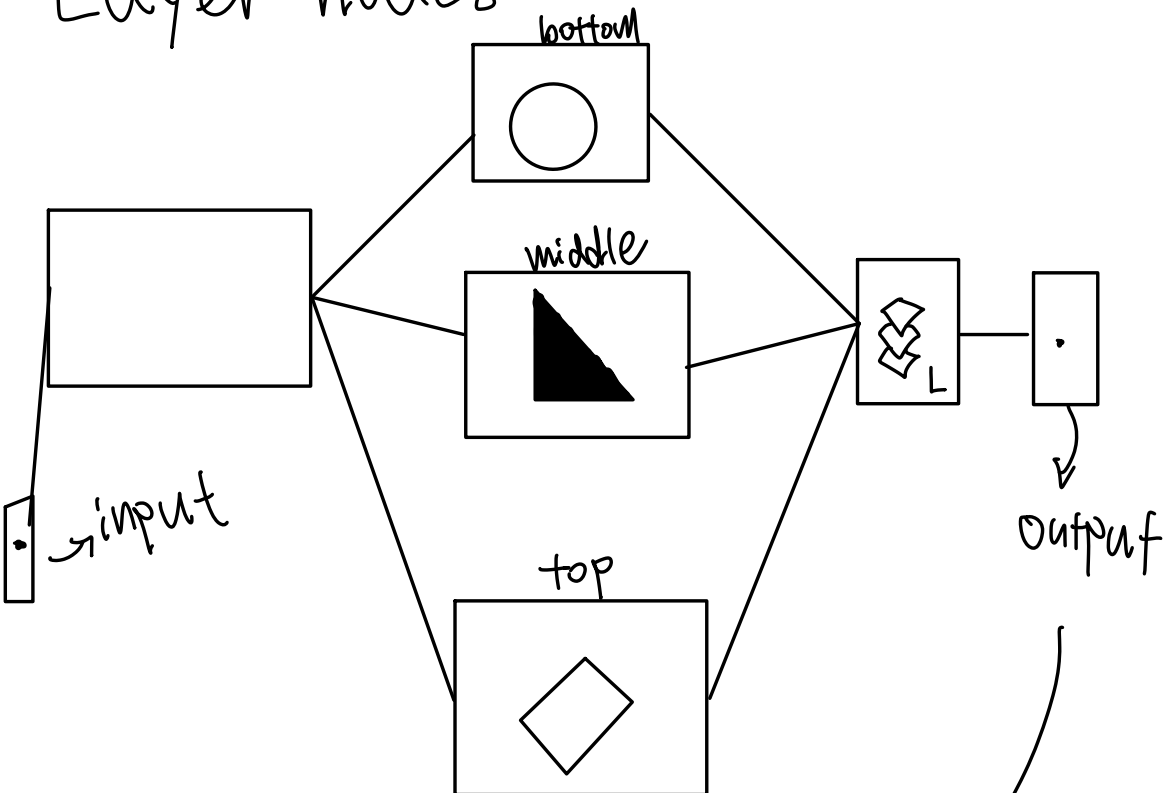
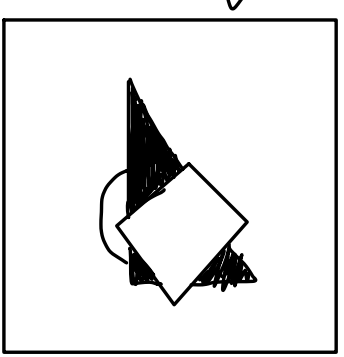
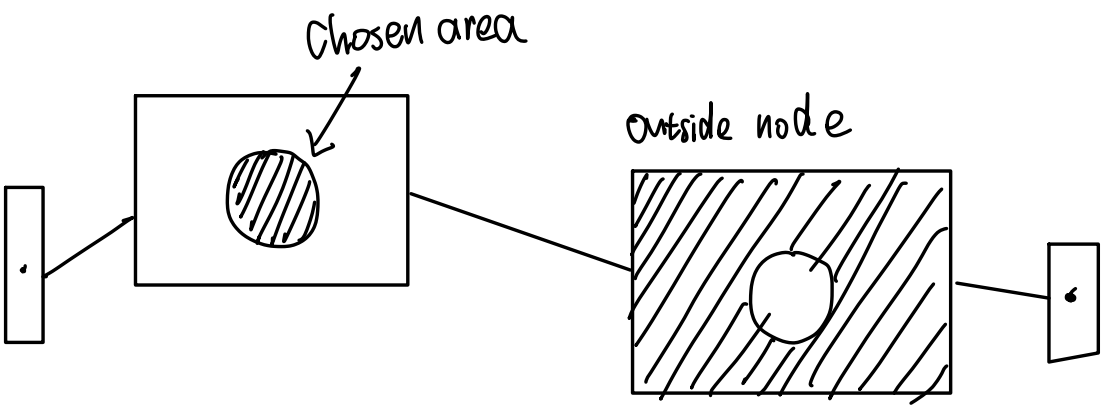


Diagram: down → up

Layer: top → bottom



Outside nodes:



RGB nodes: