

# Subtractive Color

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John C. Hart

CS 418

Interactive Computer Graphics

# CMY Subtractive Color

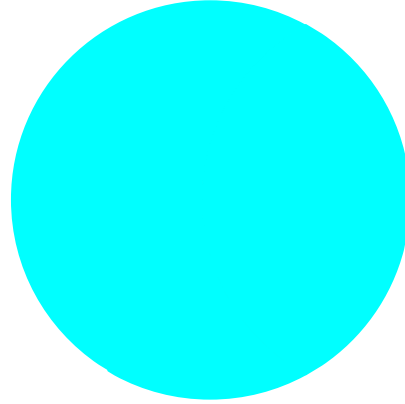
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- Cyan, Magenta, Yellow
- Color model used in pigments and reflective materials (ink, paint)

# CMY Subtractive Color

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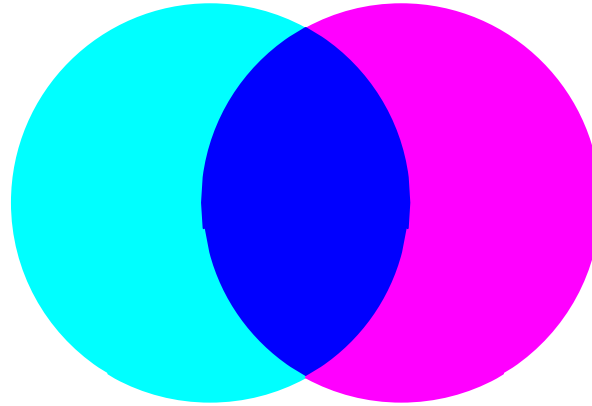
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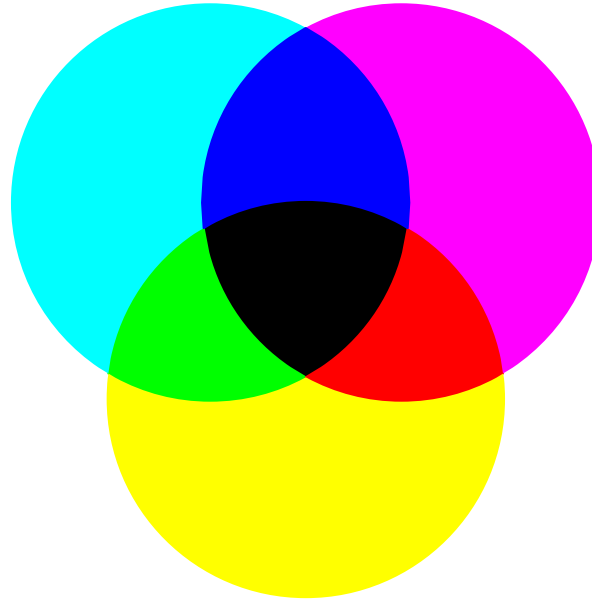
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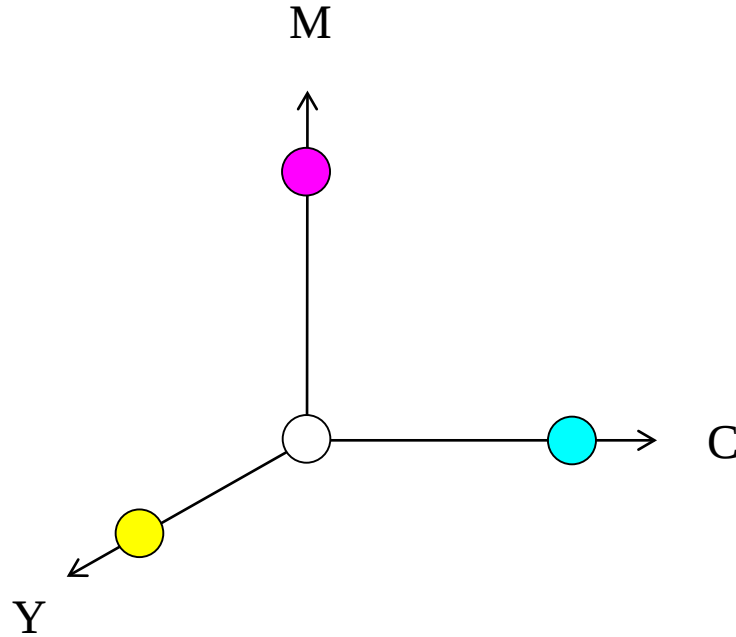
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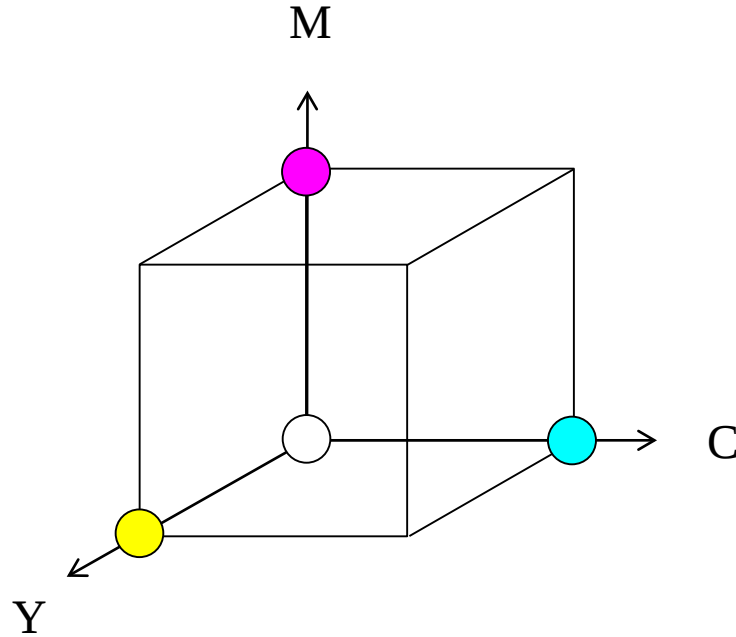
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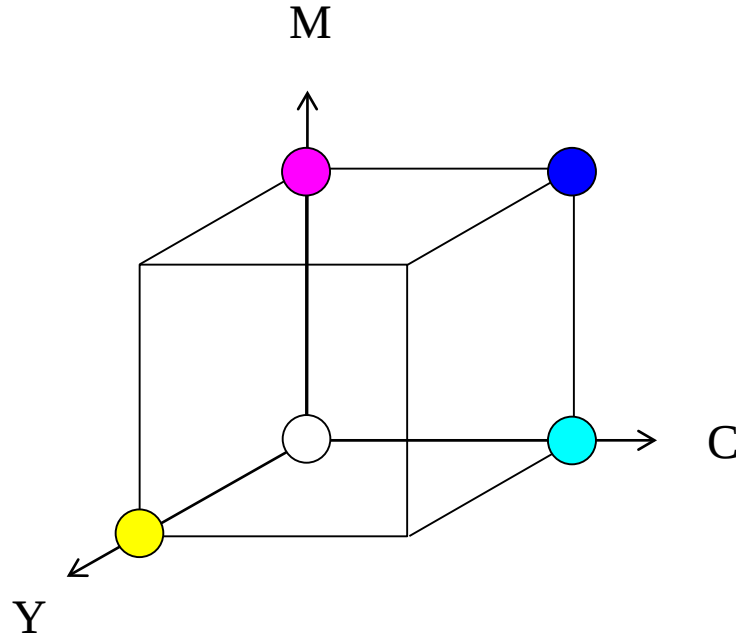
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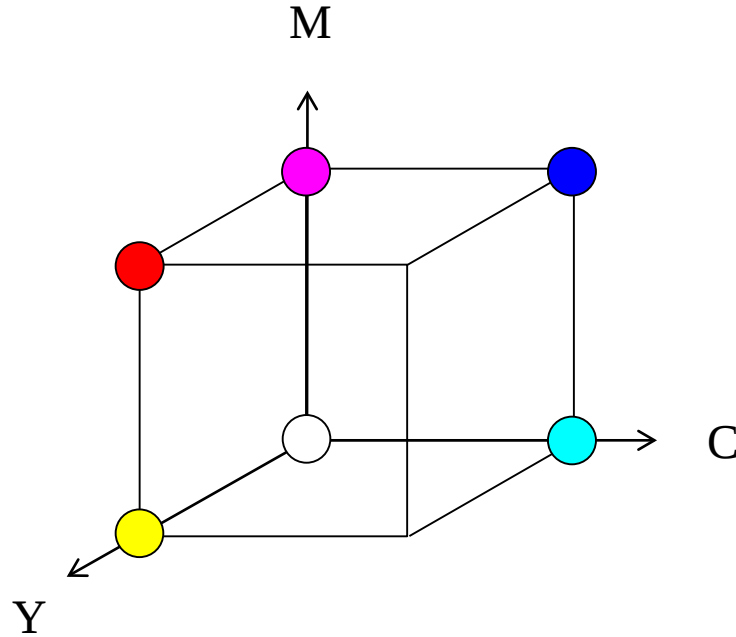
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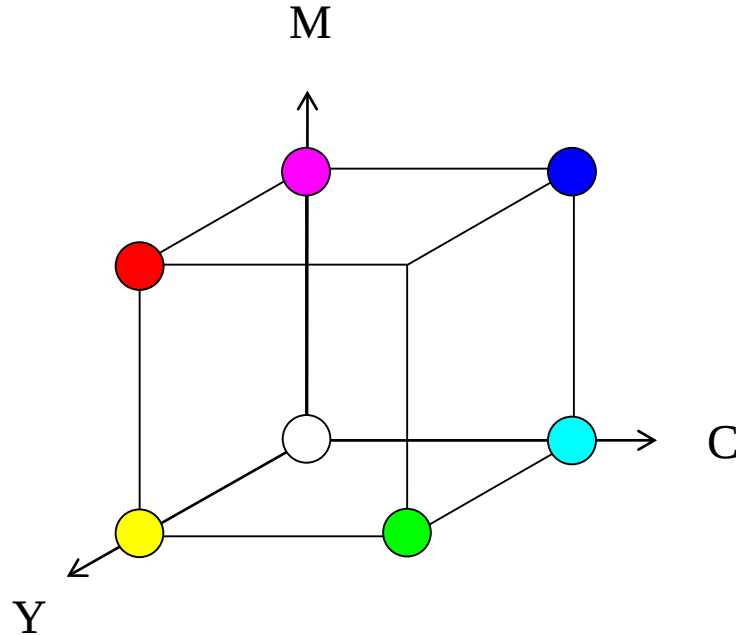
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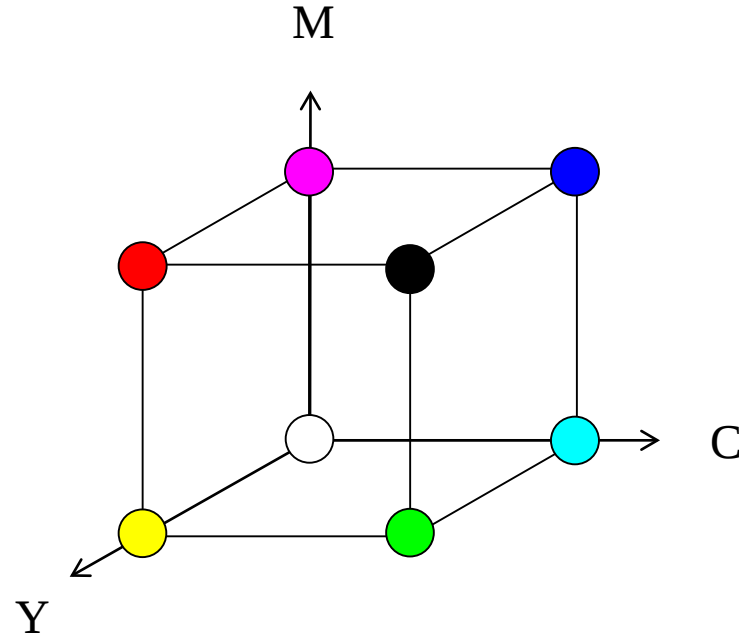
# CMY Subtractive Color

- Cyan, Magenta, Yellow
- Color model used in pigments and reflective materials (ink, paint)
- Grade school color rules
  - Blue + Yellow = Green? No.
  - Cyan + Yellow = Green



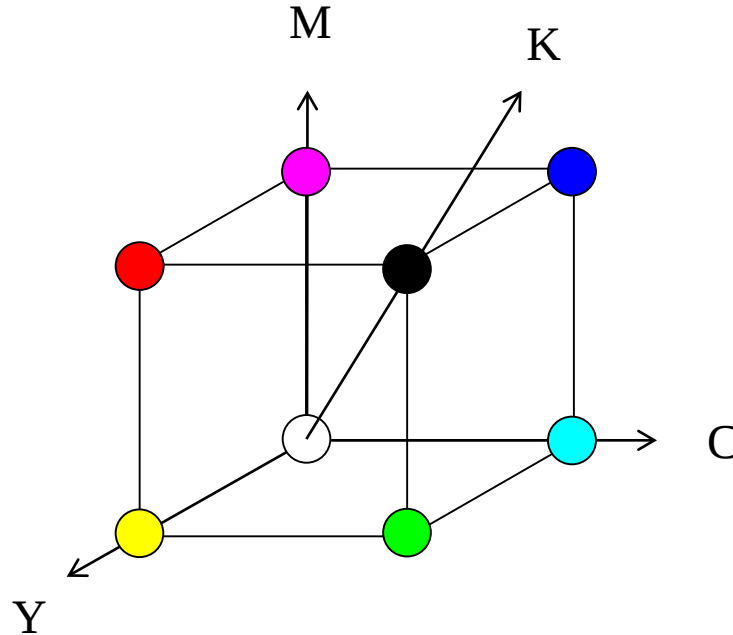
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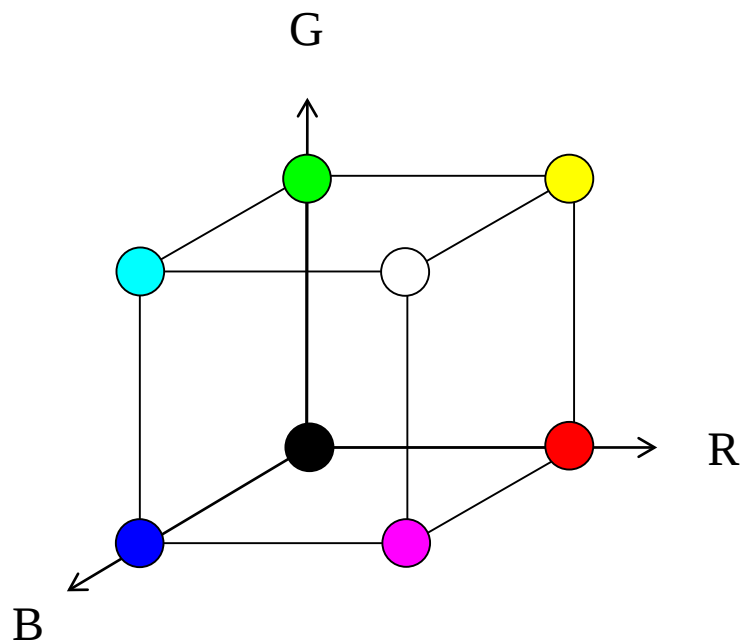
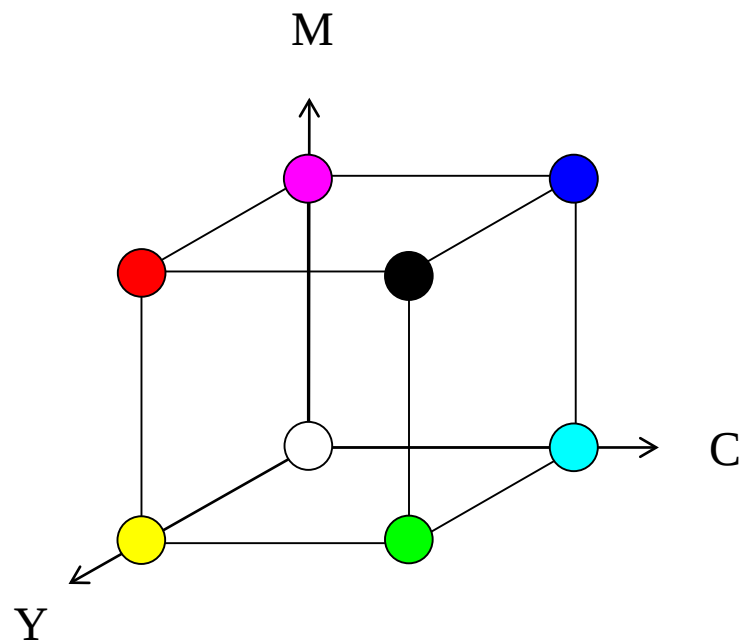
# CMY Subtractive Color

- Cyan, Magenta, Yellow
- Color model used in pigments and reflective materials (ink, paint)
- Grade school color rules
  - Blue + Yellow = Green? No.
  - Cyan + Yellow = Green
- Also CMYK (blackK)
  - $C + M + Y = \text{Brown?}$
  - $C + M + Y = \text{Black (in theory)}$
  - $C + M + Y = \text{Gray (in practice)}$
  - $C + M + Y$  wastes expensive color ink



# RGB to CMY

$$\begin{bmatrix} C \\ M \\ Y \\ 1 \end{bmatrix} = \begin{bmatrix} -1 & & 1 \\ & -1 & 1 \\ & & -1 & 1 \\ & & & 1 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \\ 1 \end{bmatrix}$$



# CMY to CMYK

$$\begin{bmatrix} C \\ M \\ Y \\ K \end{bmatrix} = \begin{bmatrix} 1 & -\min(C, M, Y) \\ & 1 & -\min(C, M, Y) \\ & & 1 & -\min(C, M, Y) \\ & & & \min(C, M, Y) \end{bmatrix} \begin{bmatrix} C \\ M \\ Y \\ 1 \end{bmatrix}$$

