Subtractive Color

John C. Hart

CS 418

Interactive Computer Graphics

CMY Subtractive Color

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

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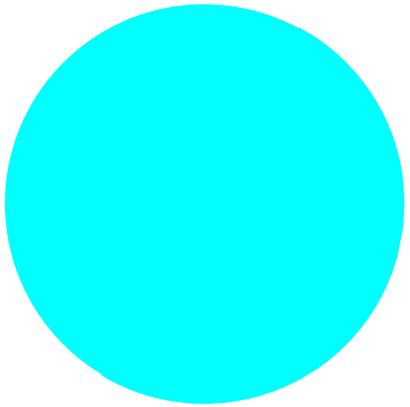

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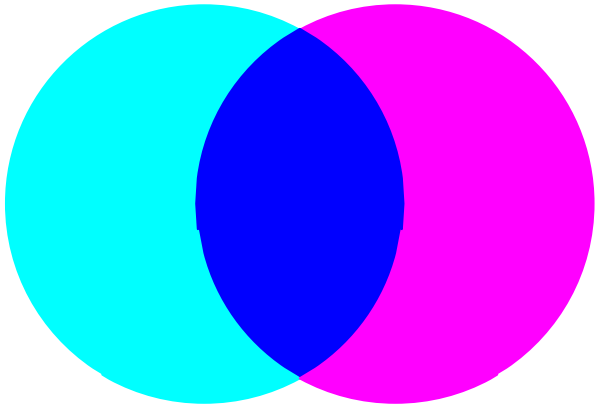

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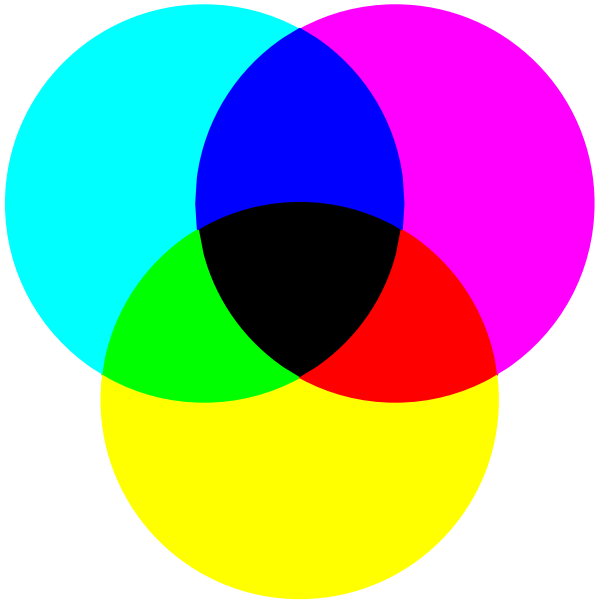

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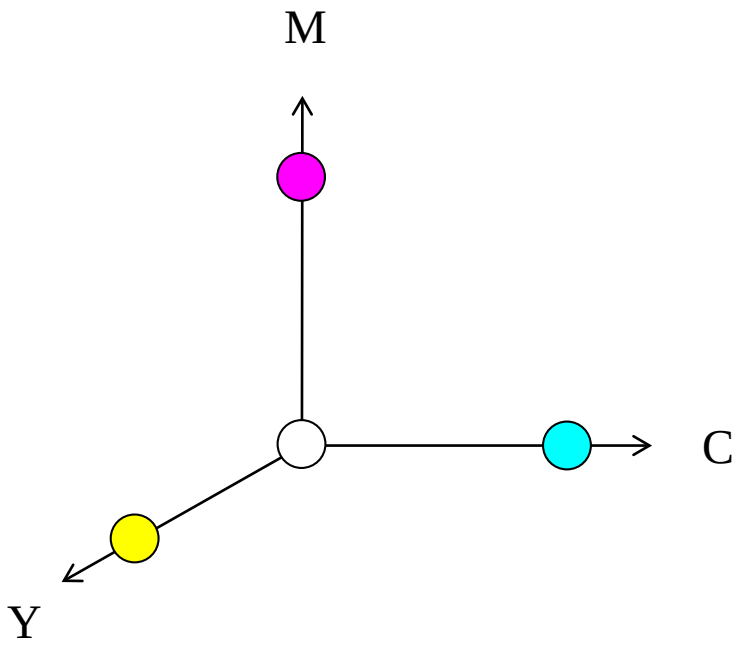

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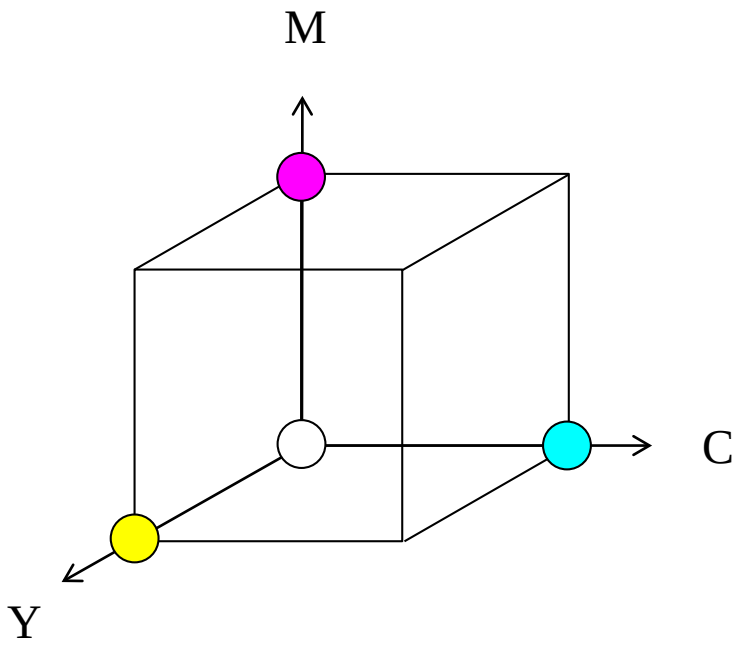

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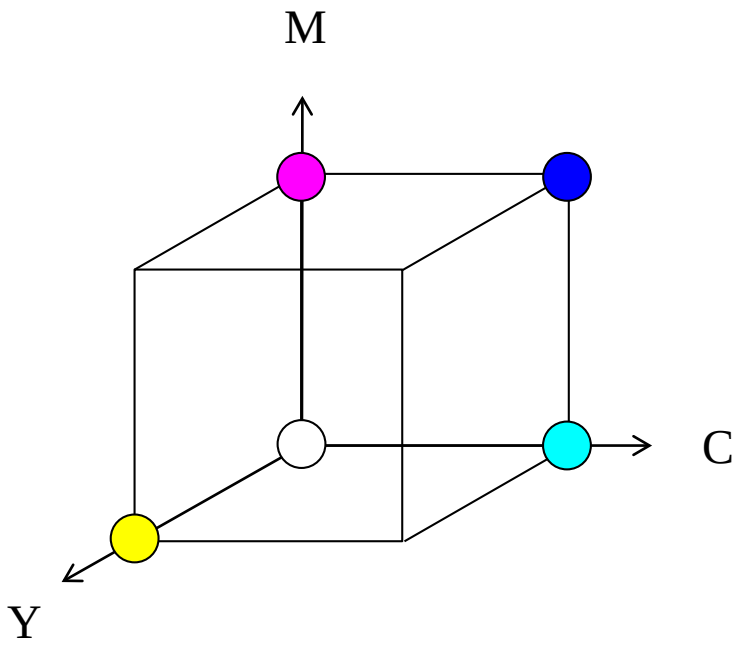

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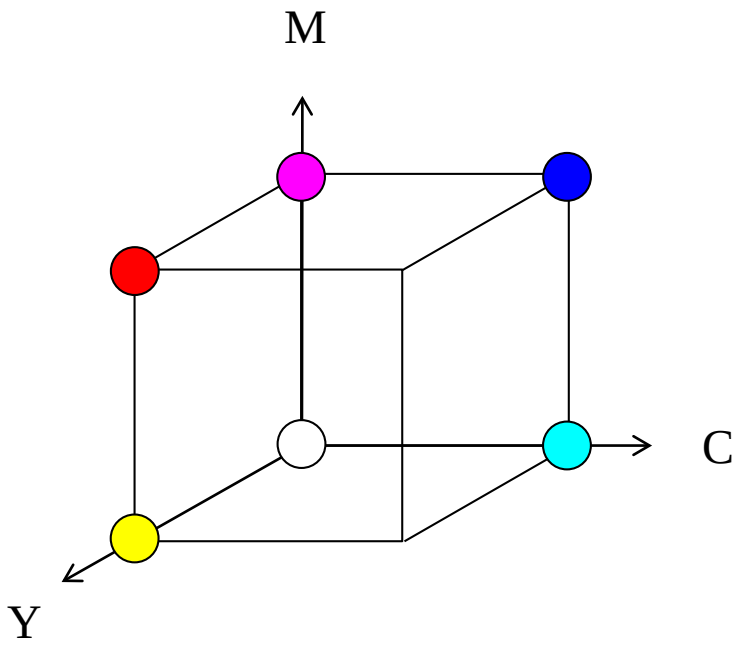

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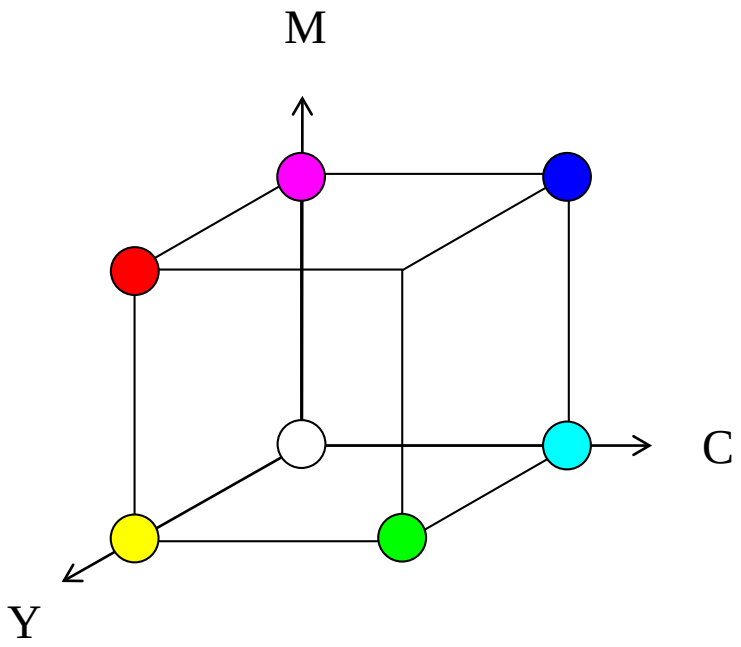
- Color model used in pigments and reflective materials (ink,paint)
- Grade school color rules
  - Blue + Yellow = Green? No.
  - Cyan + Yellow = Green



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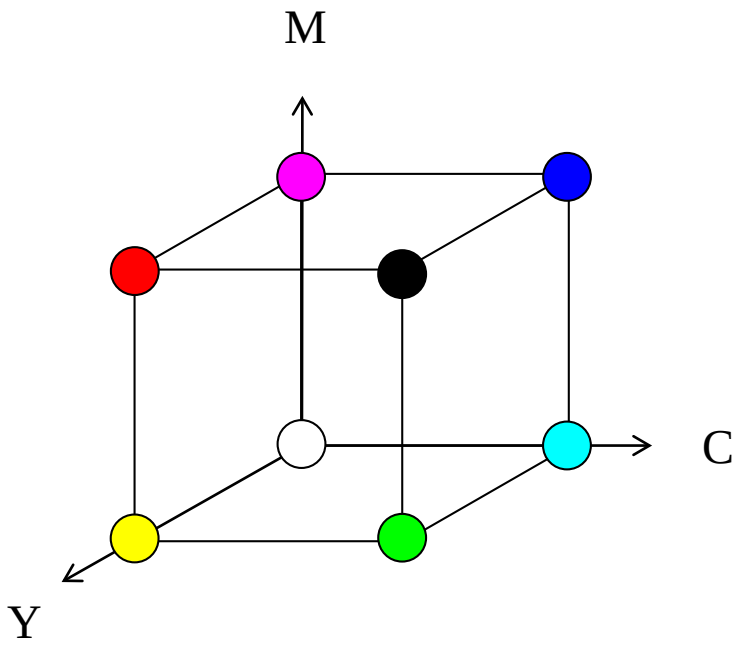

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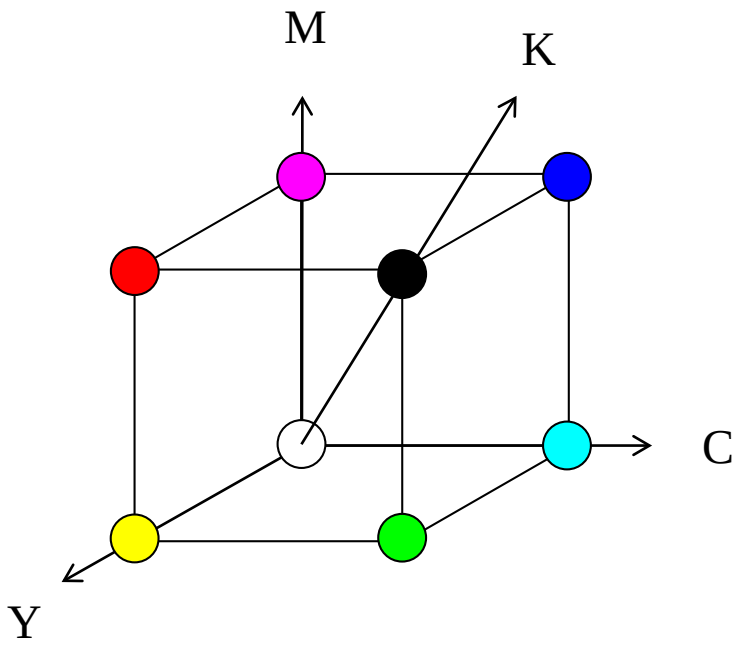
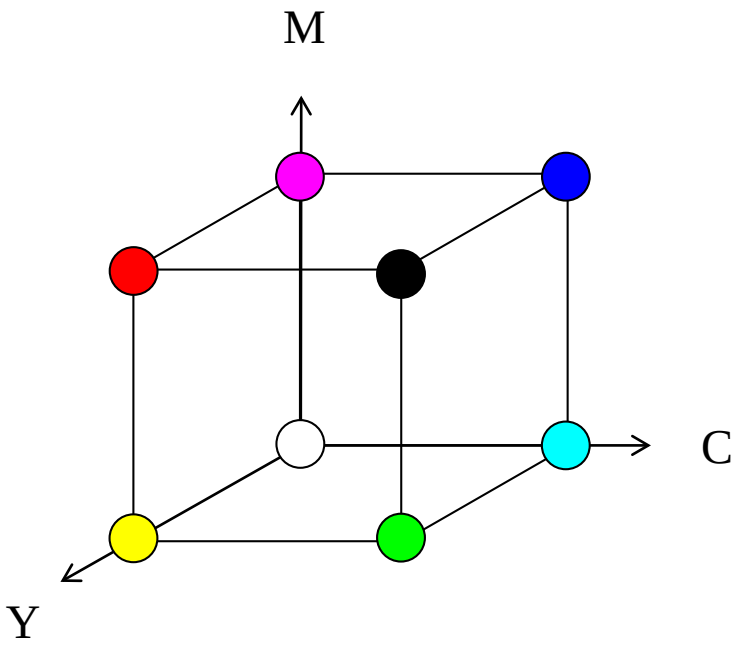
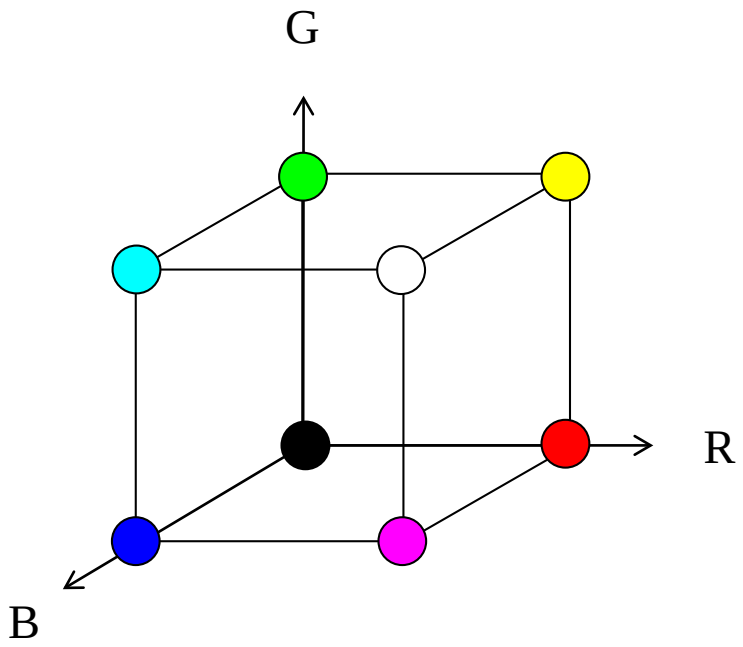
  - Blue + Yellow = Green? No.
  - Cyan + Yellow = Green
- Also CMYK (blacK)
  - C + M + Y = Brown?
  - C + M + Y = Black (in theory)
  - C + M + Y = Gray (in practice)
  - C + M + Y wastes expensive color ink



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

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