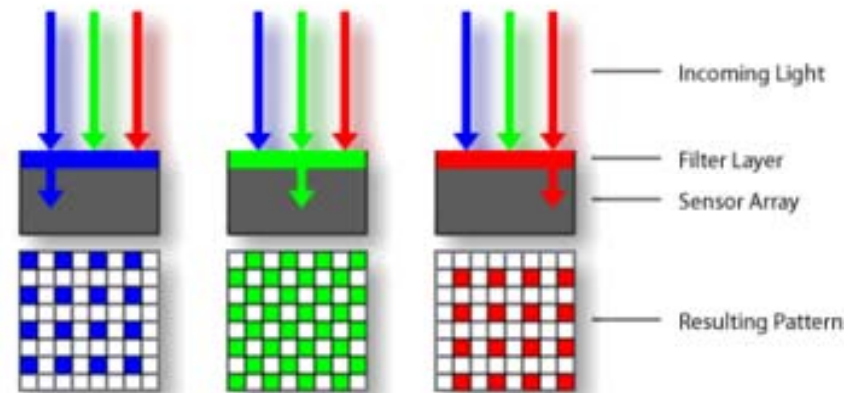
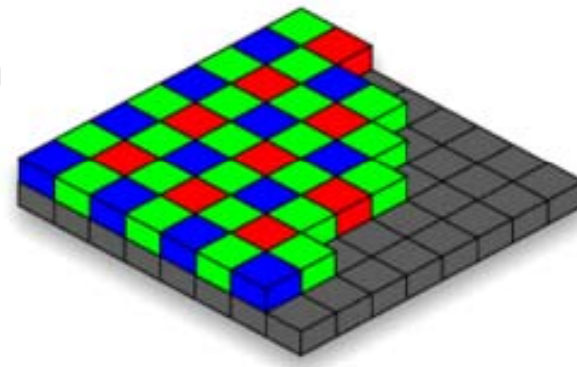


# Bayer Pattern

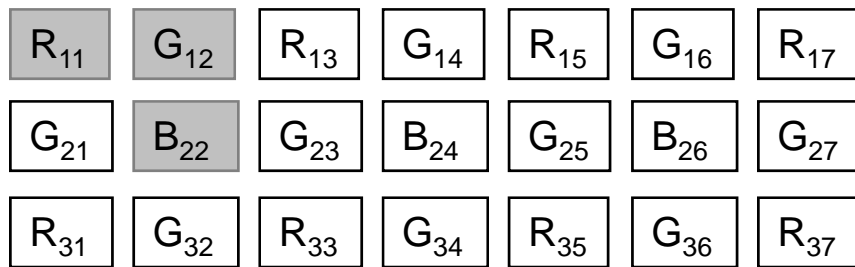
- Invented by E. Bayer at Kodak in 1976, it is a way to arrange RGB filter on a squared grid of photosensors
- 50% green, 25% red, 25% blue
- mimic eye's greater sensitivity to green wavelengths
- need *demosaicing* to interpolate the color information from neighbor units



# Demosaicing

- Reproduce the original image
- Avoid artifacts
- Often must be efficient

1 Simple nearest neighbor, take the missing colors from the nearest pixel



$$R_{11} = R_{11} \quad R_{12} = R_{13}$$

$$G_{11} = G_{12} \quad G_{12} = G_{12}$$

$$B_{11} = B_{22} \quad B_{12} = B_{22} \quad \dots\text{etc}$$

## 2 Bilinear interpolation

$R_{11}$	$G_{12}$	$R_{13}$	$G_{14}$	$R_{15}$	$G_{16}$	$R_{17}$
$G_{21}$	$B_{22}$	$G_{23}$	$B_{24}$	$G_{25}$	$B_{26}$	$G_{27}$
$R_{31}$	$G_{32}$	$R_{33}$	$G_{34}$	$R_{35}$	$G_{36}$	$R_{37}$
$G_{41}$	$B_{42}$	$G_{43}$	$B_{44}$	$G_{45}$	$B_{46}$	$G_{47}$

$$R_{22} = 0.25 \cdot (R_{11} + R_{13} + R_{31} + R_{33})$$

$$G_{22} = 0.25 \cdot (G_{12} + G_{21} + G_{23} + G_{32})$$

$$B_{22} = B_{22}$$

$$R_{25} = 0.5 \cdot (R_{15} + R_{35})$$

$$G_{25} = G_{25}$$

$$B_{25} = 0.5 \cdot (B_{24} + B_{26})$$

## 3 More sophisticated methods to reduce artifacts (but computationally more expensive)...