



UNIVERSITÀ DI PARMA

LABORATORY #1

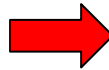
- Load lenna.png
- Print on console R G B channels using `std::cout`
- Initially in order
- Then with a `\n` at the end of each line

OpenCV uses BGR as default!

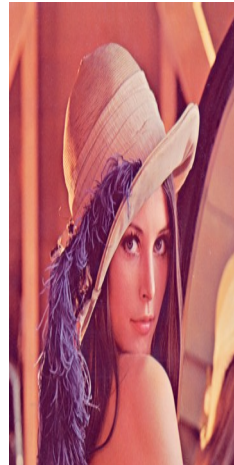
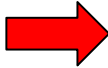
- Subsample lenna.png (2x)
- Basically create (and show) a new image with $w/2$ and $h/2$ size
- Take 1 column and 1 row every 2 from original image



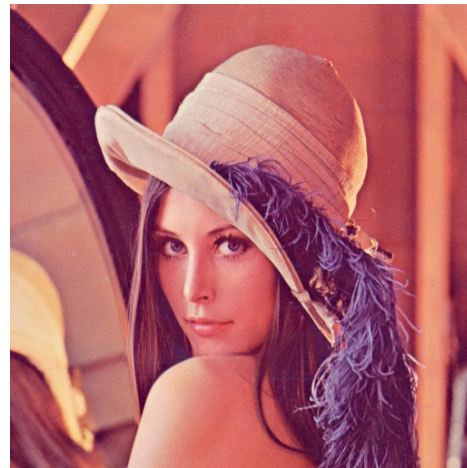
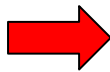
- Subsample lenna.png (2x) for rows only...
- Basically create (and show) a new image with w and $h/2$ size
- Use 1 row every 2 from original image



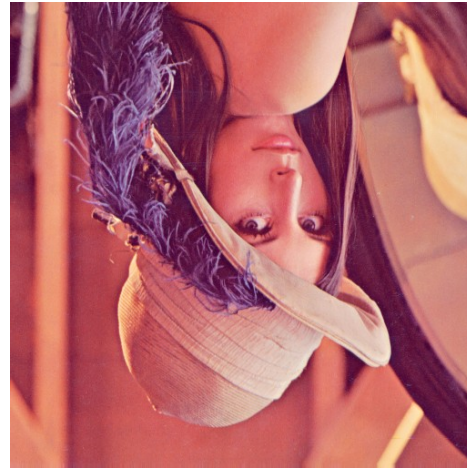
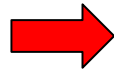
- Subsample lenna.png (2x) for columns only...
- Basically create (and show) a new image with $w/2$ and h size
- Use 1 column out of 2 from original image



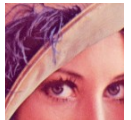
- Horizontally flip lenna.png
- Create a new image (w*h) inverting columns order



- Vertically flip lenna.png
- Create a new image ($w \times h$) inverting rows order



- Crop lenna.png
- Take from input (getopt()) the coordinates and size of a cropping area
- Create and show a new image using the defined cropping area
 - Check cropping area
 - Use `cv::Mat::data` only
 - Then use `cv::Mat` specific constructor



- Same as previous but
- Random position and size
- Please check image vs vrop position/size
 - Mandatory checks!

- Create a lenna image with padding
- 0 padding
- Use `getopt()` to specify padding size

- Split lenna image in four parts (same size)
- Create a new image using those parts shuffling them

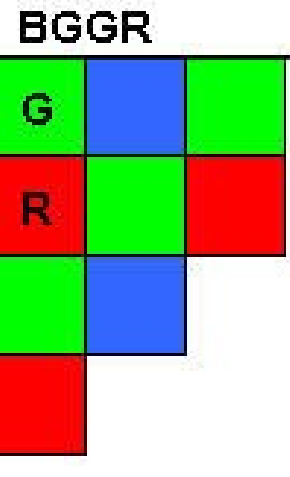
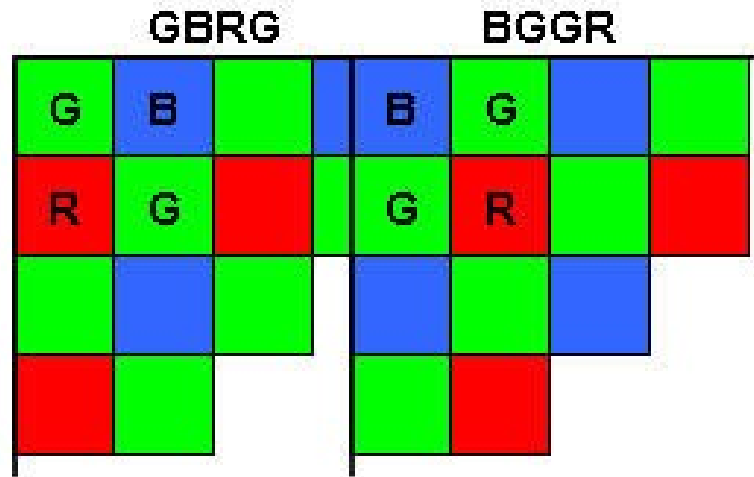
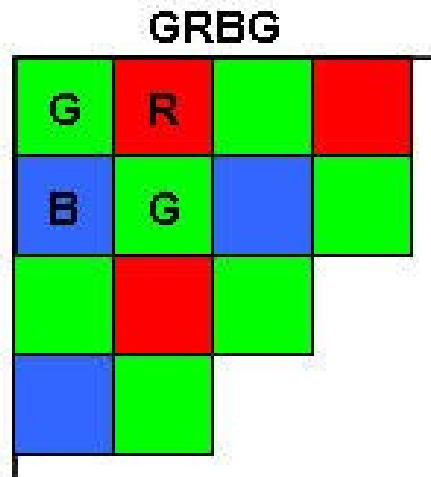
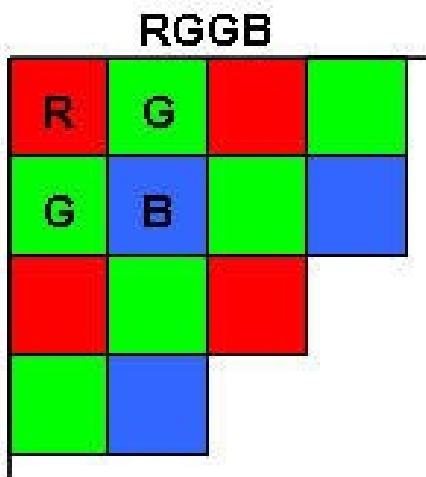


- Shuffle color channels
 - i.e. $R \rightarrow G$, $B \rightarrow R$, $G \rightarrow B$



Bayer patterns

- Load images in the bayer folder
- They are coded using some bayer pattern
 - Look at file name!



- Develop the following demosaicing procedure (DOWNSAMPLE)
- Output image should be CV_8UC1 with $w/2$ and $h/2$ size
- Use a 2x2 sliding window
- Use the average of G channels

- Develop the following demosaicing procedure (LUMINANCE)
- Output image should be CV_8UC1 with w and h size
- Use a 2x2 sliding window with the following formula
 - $R \cdot 0.3 + (G1 + G2) \cdot 0.59 / 2.0 + B \cdot 0.11$
- Warning: you need to consider that for each sliding step the pattern is different...

- Develop the following demosaicing procedure (SIMPLE)
- Output image should be CV_8UC3 with w and h size
- Use a 2x2 sliding window and put channel values as
 - R and B \rightarrow original R and B
 - G \rightarrow average of 2 Gs
- Warning: you need to consider that for each sliding step the pattern is different...