EECS22 Lab Week3

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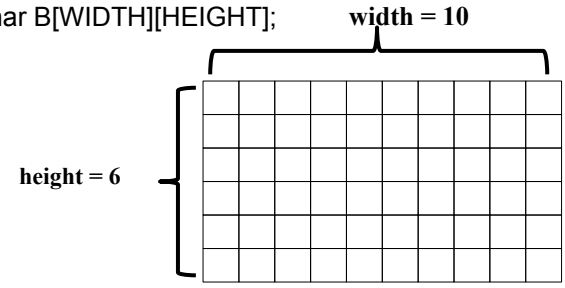
Assignment 2

- A manual driven digital image processing program.
- Using function calls for image inputing / outputing, image processing, and testing.
  - Function declaration, function definition, function call
  - Function parameters, argument.
  - Scope of the variables.
- Two-week assignment. Plan the schedule of your work. Start it early!
  - Week1: Setup the working environment. Design the user menu. Build up the frame of the operation functions. Try 1~2 operations on the image?
  - Week2: Complete the operations. Test your program?
- Use the web browser to view your image.

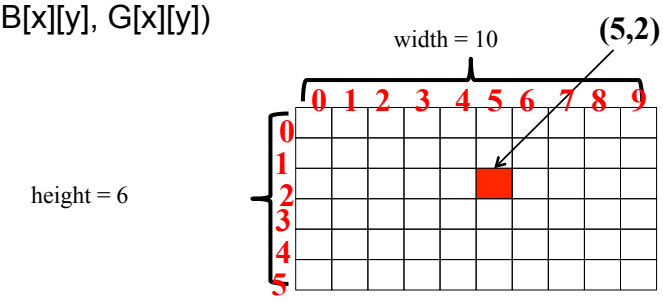
How to manipulate a picture

- The data structure to represent a picture in computer
  - Two-dimensional arrays for the intensities of each pixel
    - unsigned char R[WIDTH][HEIGHT];
    - unsigned char G[WIDTH][HEIGHT];
    - unsigned char B[WIDTH][HEIGHT];



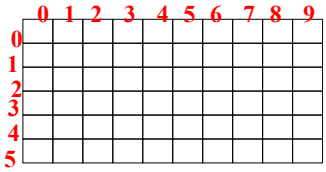
How to manipulate a picture

- How to access every pixels in a picture
  - Coordinate of a pixel (x, y),
    - **x** is the number of the column
    - **y** is the number of the row
  - The color tuple of the pixel (x, y) is (R[x][y], B[x][y], G[x][y])



How to manipulate a picture

- How to access every pixels in a picture in C
  - List all the possible coordinates of a pixel
    - (0,0), (1,0), (2,0), …, (9,0)
    - (0,1), (1,1), (2,1), …, (9,1)
    - …
    - (0,5), (1,5), (2,5), …, (9,5)



  - Use two for-loops to scan all the pixels in a picture
    - Inner loop: fix the number of the column, iterate the pixels in the same column with different row numbers
    - Outer loop: iterate all the columns.

```
for (x= 0; x < WIDTH; x ++){
      for(y=0; y<HEIGHT; y++){
            operations for pixel(x,y);
      }
}
```


Assignment 2

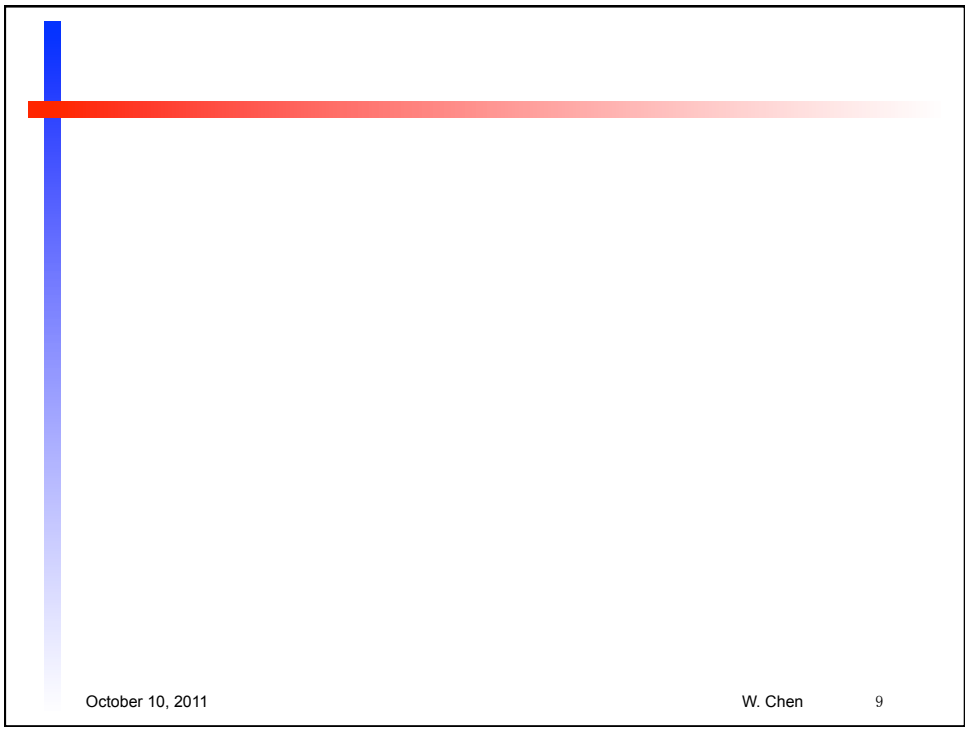
- Black & White
  - Get the average value of the three color channels for each pixel (x,y).
  - Set R[x][y], B[x][y] and G[x][y] to be the average value.
- Negative
  - Substract R[x][y], B[x][y] and G[x][y] from 255 and set the new value back.
- Flip horizontally
  - Swap pixel (x,y) and pixel (width-1-x, y)
  - Scan half of the picture

Assignment 2

- Mirror horizontally
  - Copy pixel (x, y) to pixel (width-1-x,y)
  - Scan half of the picture.
- Flip Vertically, Mirror Vertically

Assignment 2

- Test your program
  - AutoTest() function
    - Call all the other operation functions together in the program.
    - Be careful with the arguments for each functions.
    - Sample function calls are listed in the assignment.
- Global constants
- Scope of the variables
- Pass by reference when using array parameters.
- Function prototypes mentioned in the assignment are very helpful hints.


October 10, 2011
W. Chen
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