EECS10 Discussion Week8

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Recursions

- Factorial of "n".
  - Recursive formula.
  - $f(n) = n * f(n - 1)$ while $n > 1$, n is positive;
    $= 1$ otherwise $(n = 0)$.
- The stack frame of the program
  - Hack the code by using "gdb".
  - Track the control flow of the program.

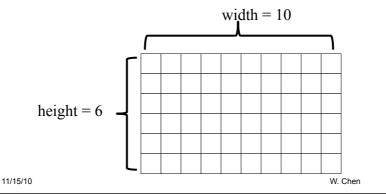November 15, 2010   W. Chen   2

Homework 7

- 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.

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Homework 7

- How to represent a picture in computer:
  - A picture is composed of pixels
  - One color for each pixel
  - Three components to represent one color (R, G, B)

width = 10

height = 6

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RGB color model

- Three components to represent one color
- 3-tuple (R, G, B)
  - R: intensity of red
  - G: intensity of green
  - B: intensity of blue
  - Basically, the range of the intensity is [0, 255], use **char** to for each intensity
- Color Examples
  - **Red (255, 0, 0), Green(0,255,0), Blue(0,0,255),**
  - **Yellow(255,255,0), Cyan(0,255,255), Magenta(255,0,255)**
  - **White(255,255,255), Black(0,0,0)**

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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];
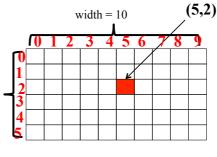   - unsigned char B[WIDTH][HEIGHT];

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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])

width = 10   **(5,2)**

0 1 2 3 4 5 6 7 8 9

height = 6

0 1 2 3 4 5

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How to manipulate a picture

- How to access every pixels in a picture in C
  - 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);
    }
}
```

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