

# Grayscale Image Conversion

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# Technical Specification

- C language
- OpenMP (Parallel Computing)
- Image File format: .bmp
- Max resolution: 800 x 800
- Linux/Ubuntu OS

# How it works??

1. Open **C language** program
2. Specify the **input image path**
3. Specify **new output image path**
4. Every pixel of **colour** image will be **transformed** to **grayscale** image
5. **For loop** is used for image conversion
6. **OpenMP** will convert all the pixels in parallel
7. Compare **conversion timings** with sequential approach

Conversion: ---->



Original Colour Image



Greyscale Converted Image

# Program OutPut:

```
saaurabh@saaurabh-desktop:~$ gcc main.c -fopenmp -o main
saaurabh@saaurabh-desktop:~$ ./main

Image Height: 800
Image Width: 800
Image Bit Depth: 24
Image Total Pixels H x W: 640000
Total Threads: 4

Success!

Total Parallel Time (s): 0.222585
saaurabh@saaurabh-desktop:~$
```

# Pseudo Code:

```
FILE *fIn = fopen("images/lena_color.bmp", "rb");
FILE *fOut = fopen("images/lena_gray.bmp", "wb");

#pragma omp parallel private(i) shared(buffer)
{
    #pragma omp for nowait
    for(int i = 0; i < imgSize; i++)
    {
        buffer[i][0] = getc(fIn);    //red
        buffer[i][1] = getc(fIn);    //green
        buffer[i][2] = getc(fIn);    //blue
        int temp = 0;

        temp = (buffer[i][0]*0.3) + (buffer[i][1]*0.59) + (buffer[i][2]*0.11);
        //grey scale conversion

        putc(temp, fOut);
        putc(temp, fOut);
        putc(temp, fOut);
    }
}

printf("Success!\n");
```

# What we are learning:

1. OpenMP in image transformation
2. Parallelize the conversion FOR LOOP with: `#pragma omp for`
3. Make execution **time efficient** than sequential
4. Utilize maximum physical **machine cores**



# Under Process:

- Tackle race conditions
- Thread barrier efficiency

# Future Milestones

- Convert any image with higher resolution ( > 800x800 )
- Convert .bmp format to other formats ( .bmp ----> .jpg or .png or other )
- Convert any image formats to any other formats
- Convert multiple images at a time

Thank you !