CSCI3280 Bonus part Report

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This report is to show how to compress the size of bitmap ,and to convert RGB bitmap to Colored ASCII Art bitmap with better visual qualities.

To implement colored ASCII Art bitmap, I chose website as the result because of supporting colored ASCII. Since it will be a .html file, the program will print out the format of website when generate ASCII art bitmap. Such as:

```
fprintf( fout, "<!DOCTYPE html>\n<html>\n<head>\n</head>\n" );
fprintf(fout,"</body>\n");
fprintf(fout,"</html>\n");
```

To output:

```
<!DOCTYPE html>
<html>
    <head></head>
    <style>/*To get better visual quality*/</style>
    <body>/*To show colored ASCII art bitmap*/
/*generate each pixels*/<a style="color:rgb(red,green,blue);"> </body>
</html>
```

To take the benefit of web programming language, ASCII art bitmap can be colored. Also, to have better visual quality, I added <style>format into program. To make bitmap visualization, background color set to black, set size of font smaller, line height and letter space set closer.
In terms of showing color, each characters have an <a> format. The color of text depends on the bitmap that need to convert. If the text's color has to set to black, a space " " will output. Otherwise, to make the color of text visible enough, it will set to "@".

In terms of bitmap compression, to avoid the size of bitmap will too large that program cannot generate ASCII art bitmap, the program used a formula to calculate the number of compress ratio:

In math: round down(log10(width))* round down (log10(height))
In program: if(width*height >=65536)
compresssize= char(log10(width))*char(log10(height));

By using this formula, the program can flexibly compress the size of bitmap to decrease distortion of the original bitmap. For example: **a 4-megapixel bitmap can be compressed to 9:1 ASCII art bitmap. But 256x256 bitmap will not be compressed.**
After getting the ratio, the next step is to implement compression. To generate ASCII art bitmap directly, no matter the number of ratio, width and height, only the upper-left-corner pixel's data will be sampling. Take a 9-pixel district as an example:

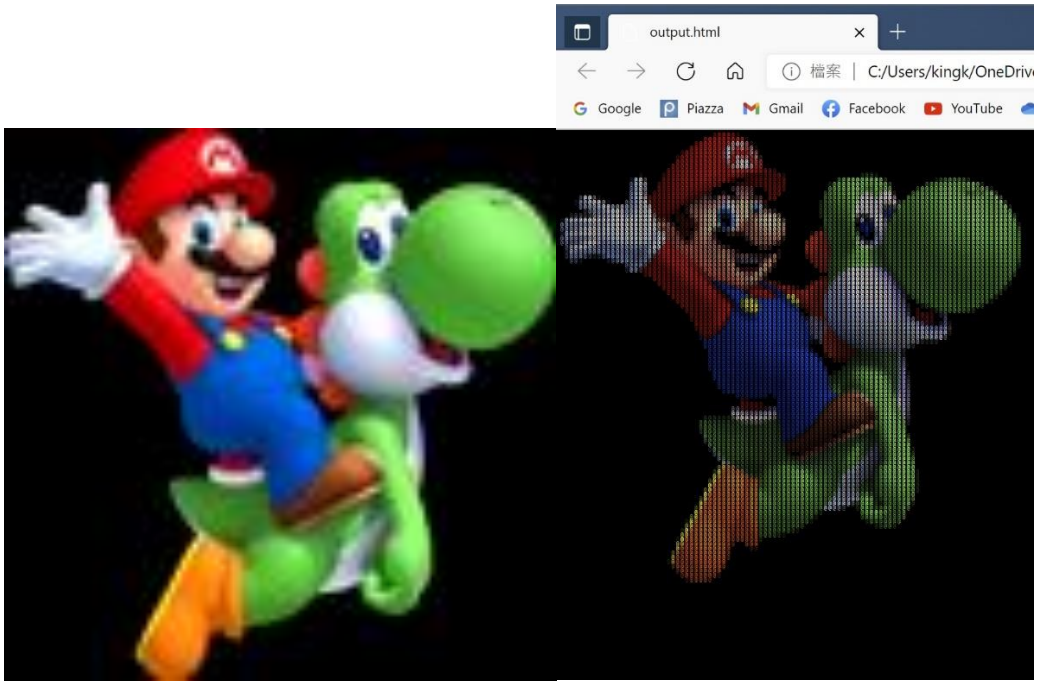
Sample	No	No
No	No	No
No	No	No

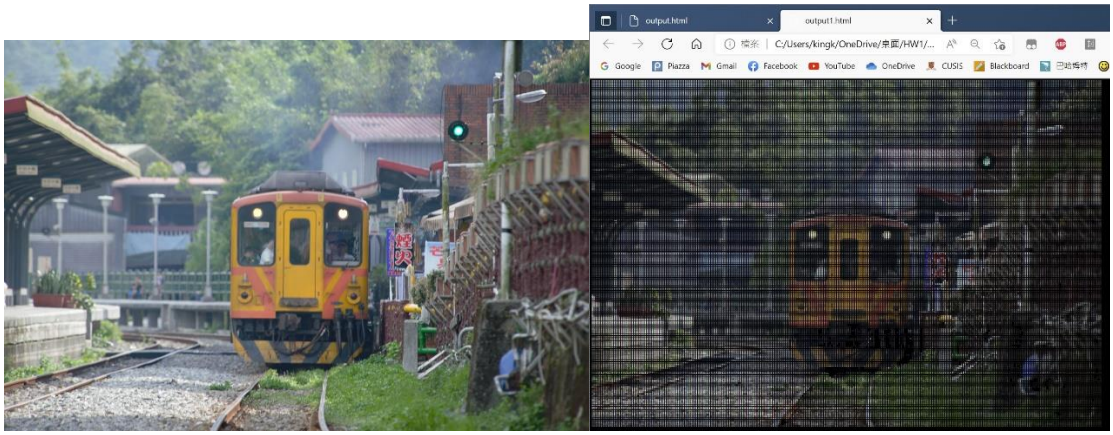
After compression, the bitmap only shows:

Sample

Even though it decreases the quality of bitmap, it can assure the bitmap can faster generate.

Some sample:


output.html
檔案 | C:/Users/kingk/OneDriv
Google
Piazza
Gmail
Facebook
YouTube


output.html
output1.html
Google
Piazza
Gmail
Facebook
YouTube
OneDrive
CUSIS
Blackboard