LULEÅ TEKNISKA UNIVERSITET

D0017E LTU Labb 3b

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1 Task 1

1.1 Question 1

```
enum TGA_TYPE {
    /* Uncompressed formats */
    TGA_UNCOMPRESSED_PALETTE = 1, uncompressed color mapped image
    TGA_UNCOMPRESSED_RGB = 2, uncompressed true color image
    TGA_UNCOMPRESSED_MONOCHROME = 3,uncompressed grey scale image
    /* Run-length encoded formats */
    TGA_RLE_PALETTE = 9,run length encoded color mapped image
    TGA_RLE_RGB = 10,run length encoded true color image
    TGA_RLE_MONOCHROME = 11, run length encoded grey scale image
    /* Reversed ordering */
    // Represents 48 which in ascii is '0'
    TGA_FLIP_MASK = 0x30
};
```

The value $0\text{x}30_{16}$ in binary: 00110000_2 the specification says that 4$^{th}bithastobe0andoursis.The5^{th}and6^{th}bitarethe$

1.2 Question 2

The size of the TGA_HEADER struct is 18 bytes which is consistent with the provided specification.

1.3 Question 3

The header uses: #pragma pack(1) to assert that the compiler does not realign the structs. You could use _Alignas to do the same thing.

1.4 Question 4

```
void copy_pixel(PIXEL_RGB24 *dst, const PIXEL_RGB24 *src) {
    dst->B = src ->B;
    dst->R = src ->R;
    dst->G = src ->G;
}
```

the src variable is a const since we just want a memory adress in the stack while the dst variable needs to be altered and therefore can not be a const.

1.5 Question 5

When you "#Include" a header or file the code is loaded in before compilation so the functions and variabels in TGA_READ is stored on the stack just as any other function.

1.6 Question 6

TGA_FILE_OPEN_FAILED exception is thrown if the file failed to read (or file is less than 7 bytes) and that value equates to -98.

1.7 Question 7

```
(head.imageDescriptor && TGA_FLIP_MASK)!=0
```

Returns -99 since the TGA_FLIP_MASK is set to 0x30 as a start not 0. So either removing this check entirely or changing the ! to = would solve the problem.

1.8 Question 8

It assigns the file pointer value to the pointer that was passed when the function was called.

1.9 Question 9

Alpha Chanel is active since the msb is set to one ($10010101110100000010000_2$).

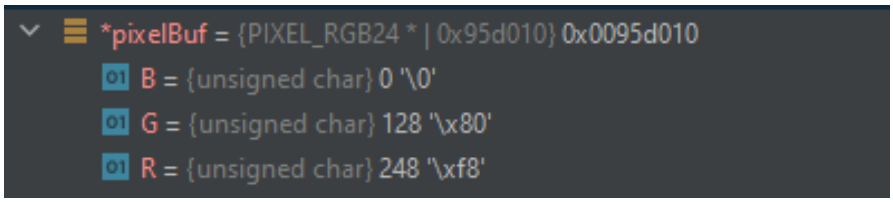

Figure 1.1: Color values for the first pixel in the image

1.10 Question 10

sample.tga has the file size 33 kb and 16 bits per pixel. The sample-24bit.tga file has the size 49 kb and 24 bits per pixel. $33 \cdot \frac{24}{16} = 49$.

1.11 Question 11

The difference between the images is due to there being more color data that can be stored in 24 bits in comparison to 16 bits.

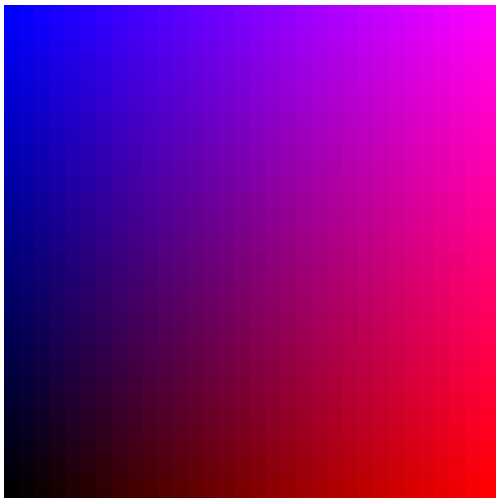

Figure 1.2: Gradient with 16 bit pixels

Figure 1.3: Gradient with 24 bit pixels

1.12 Question 12

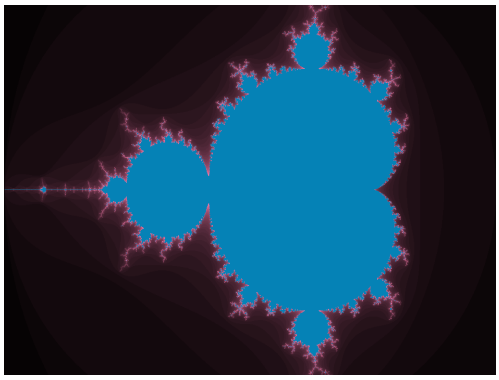

Figure 1.4: Mandelbrot fractal

1.13 Question 13

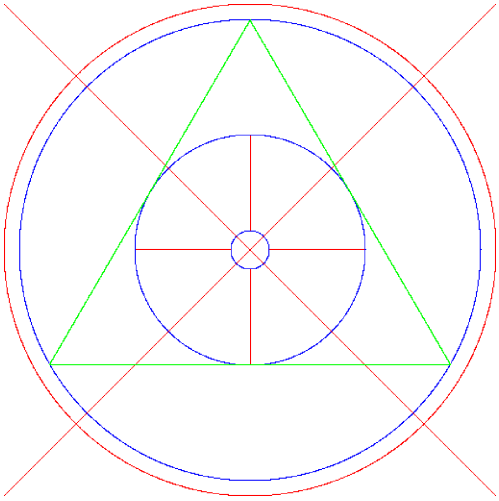

Figure 1.5: Novel lines and circles