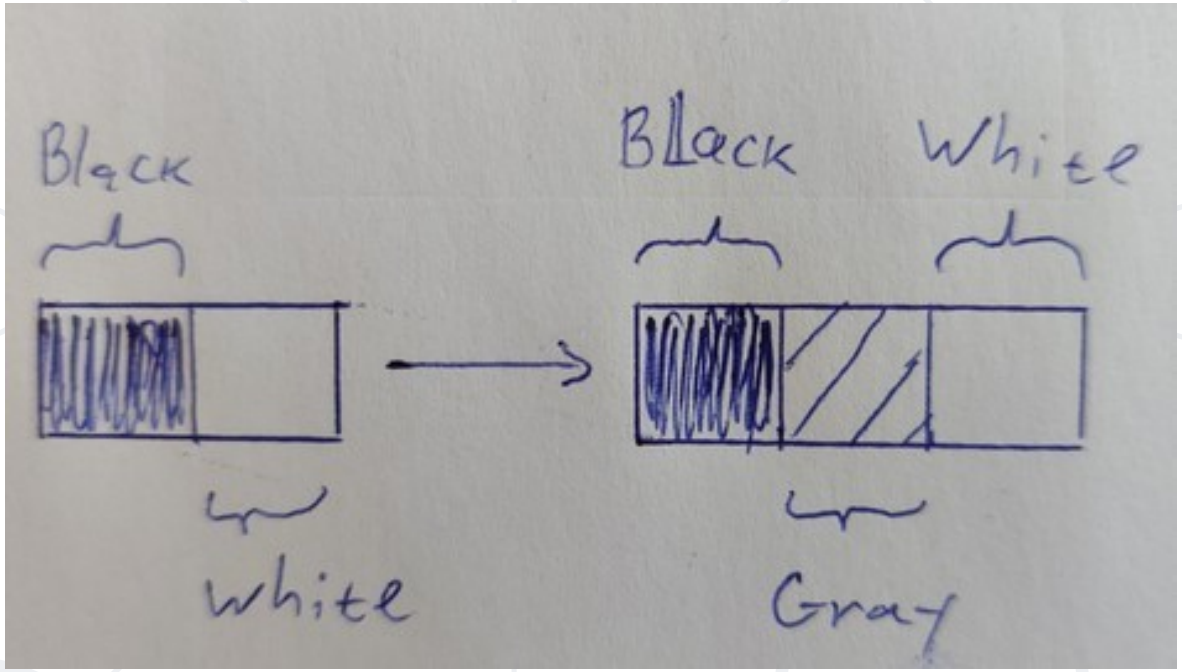
Scaling



Zhivko Petrov

A guy that knows C++

Software University

SoftUni

Software University

https://about.softuni.bg

Have a Question?

Software University

sli.do

#app-dev-cpp

Pixel Structure

- In modern graphics a **Pixel** is often referred to a 24bit/32bit data structure
- An RGB has a **24bit** (3 byte) structure
- RGB does **not support opacity** (transparency)
- .jpg uses 24bit in order to achieve compression

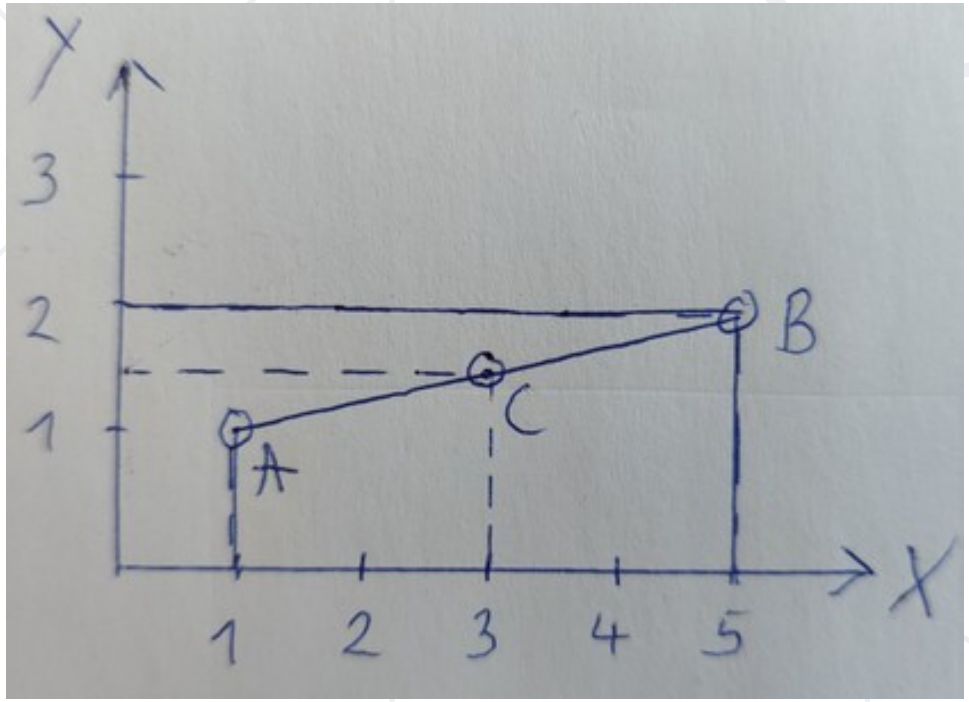
```
struct RGB {
    uint8_t r;
    uint8_t g;
    uint8_t b;
};
```

Scaling

- If an image is drawn with its original dimension – **no scaling is applied**
- If an image is drawn smaller than its original size – **downscaling** is applied
- If an image is drawn bigger than its original size – **upscaling** is applied
- **Upscaling** should usually be avoided at **large scales**

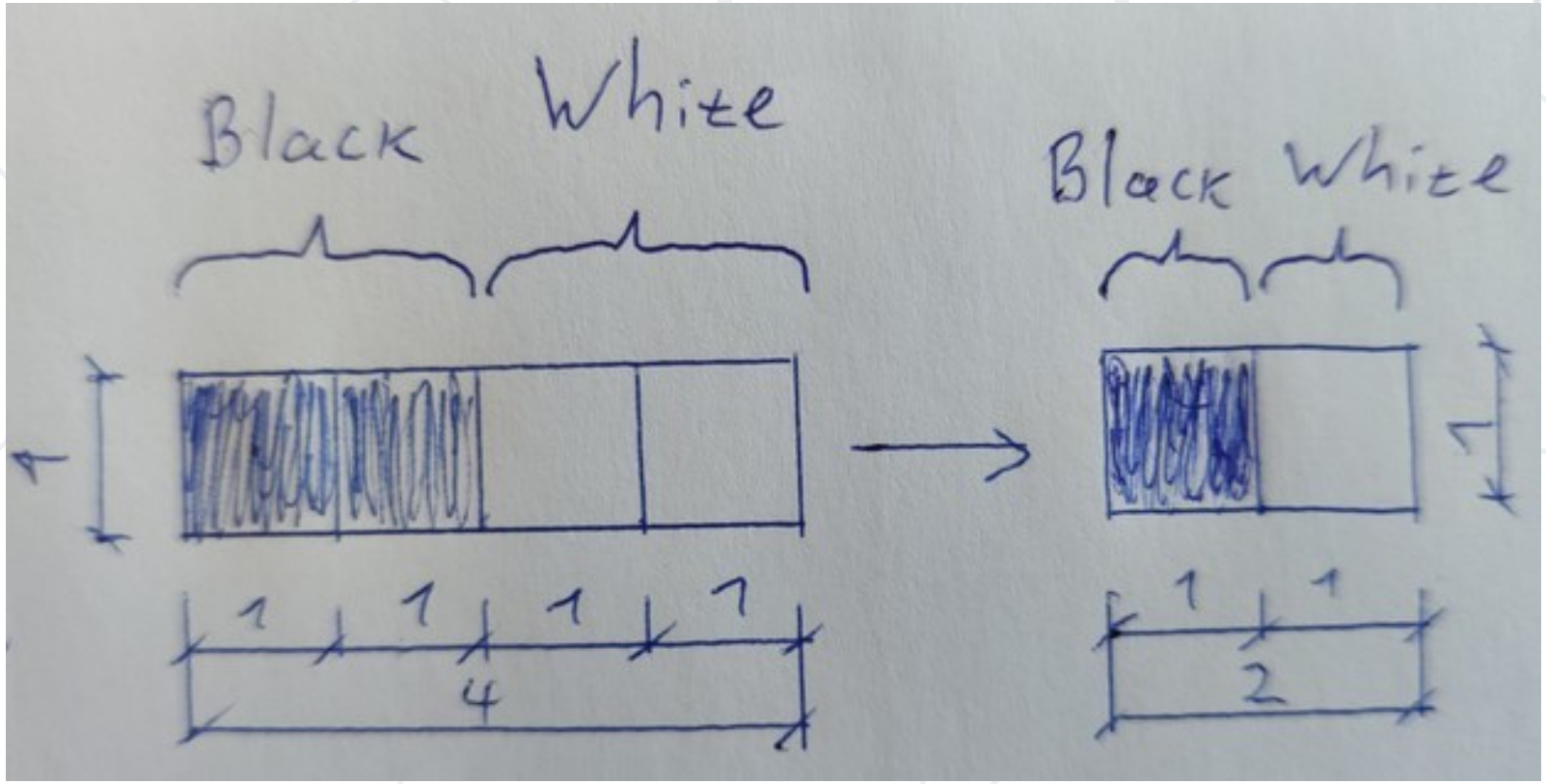
Linear Interpolation

- There are different strategies/algorithms how to achieve scaling
- The most common used for **run-time** rendering is using **Linear Interpolation**
- It gives an **good** (not best) quality but is **quite fast**



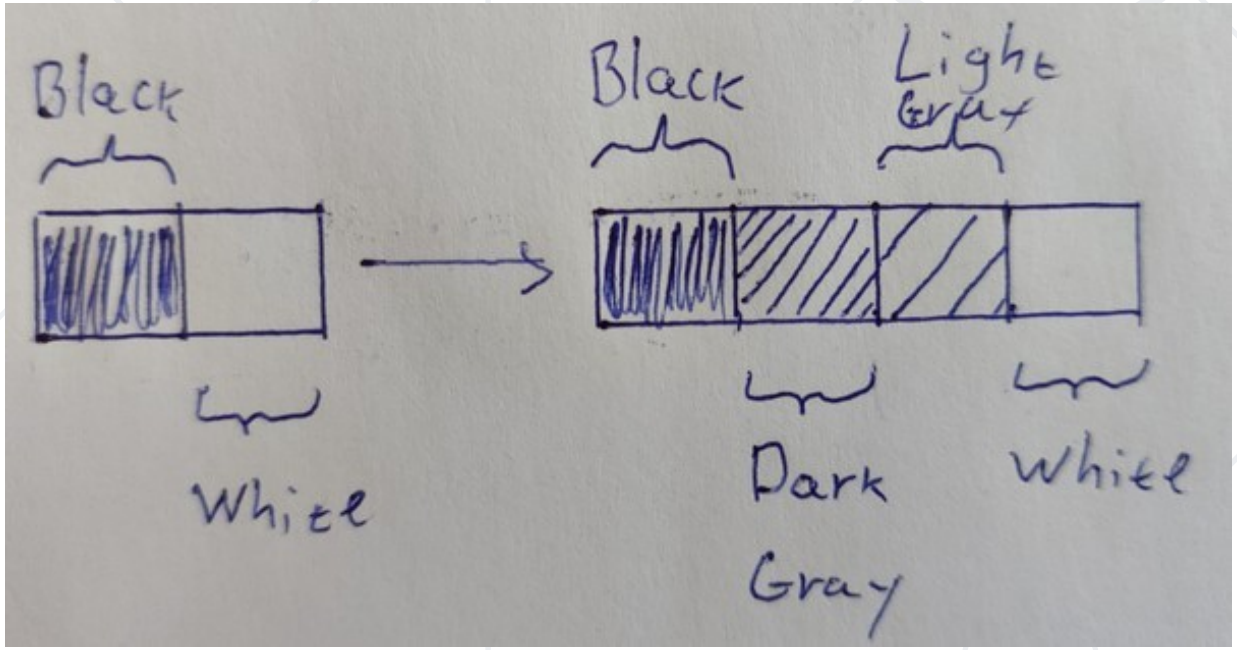
Downscaling

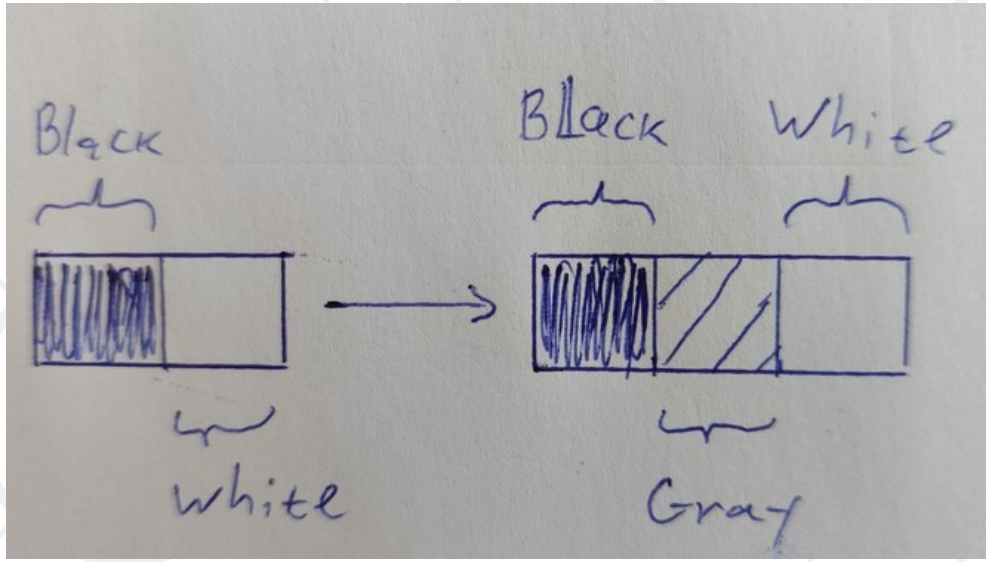
- Linear Interpolation is applied from the **source** pixels to achieve the **smaller** number of **destination** pixels



Upscaling

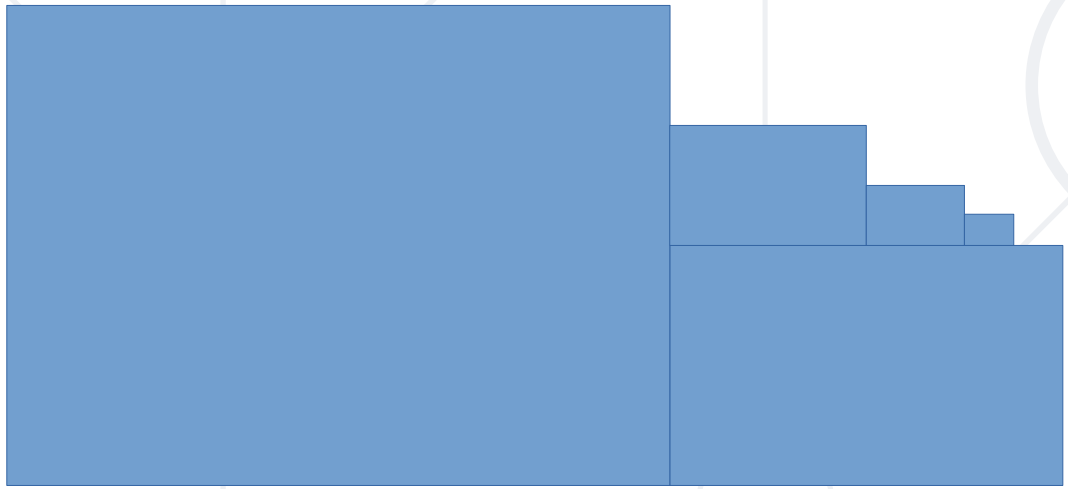
- Linear Interpolation is applied from the **source** pixels to achieve the **bigger** number of **destination** pixels
- Upscaling results in artificial pixels being created leading to undesired artifacts - **pixelation**



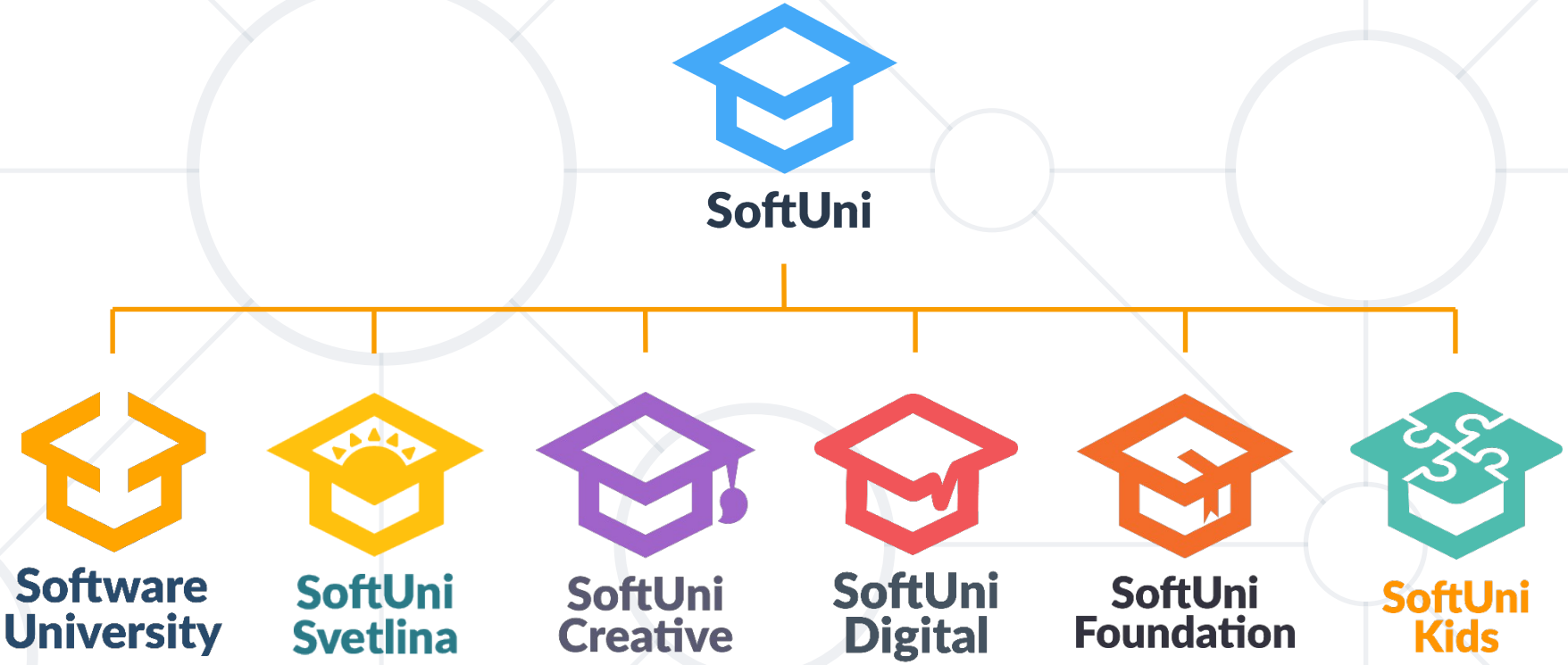


Mipmapping (out of scope)

- AAA applications/games want to achieve the **best performance** while maintaining **good visual aspects**
- Most low-level graphics libraries such as OpenGL, Vulkan, Metal support a technique called **Mipmapping**
- Keep variations of the same texture with various sizes
- The size that is **most closest** to the required asset it used



Questions?



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