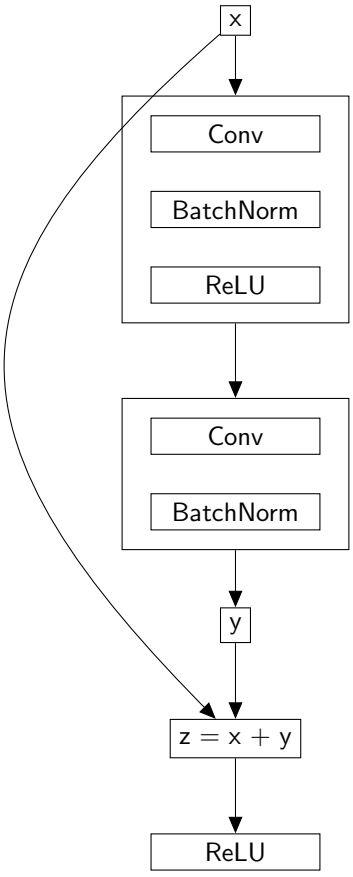
1 Residual connections

```
def forward(self, x):
  result = f(x)
  return g(result + x)
```

Important notes:

- In general it should be possible for elements of x/result to have positive and negative values.
  Imagine for example that both result and x are constrained to be positive. Then the norm of the output is increasing - can be unstable.
- g - in our case ReLU



2 UNet

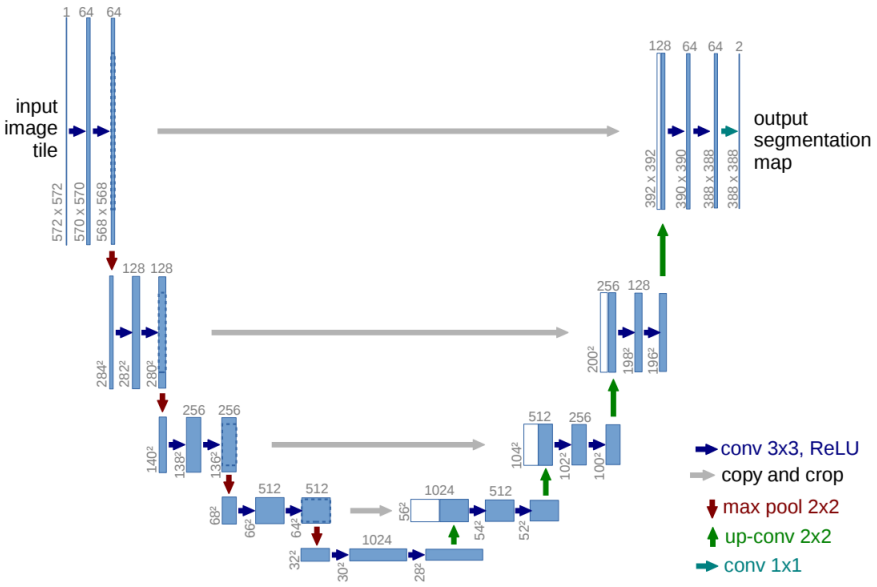
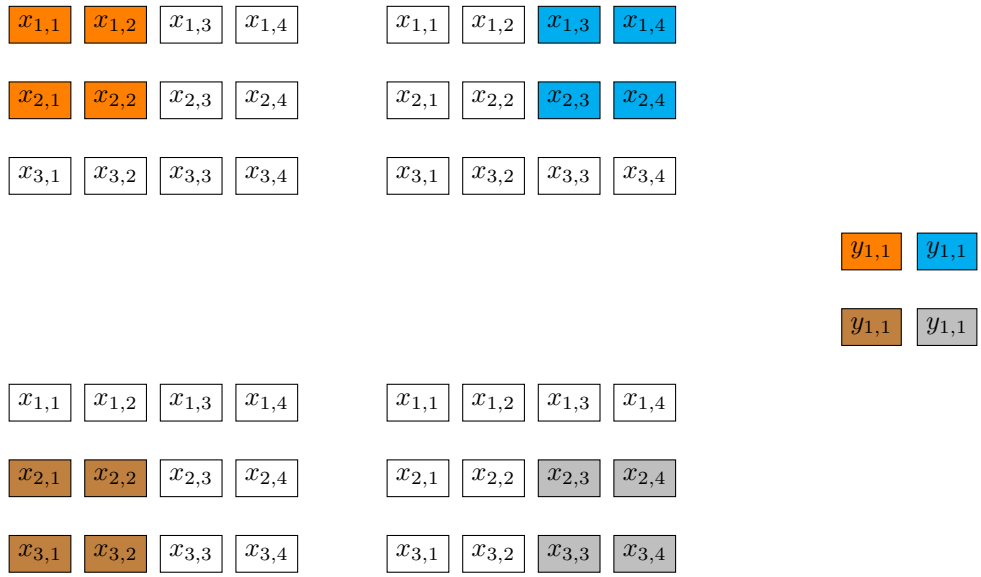


Fig. 1. U-net architecture (example for 32x32 pixels in the lowest resolution). Each blue box corresponds to a multi-channel feature map. The number of channels is denoted on top of the box. The x-y-size is provided at the lower left edge of the box. White boxes represent copied feature maps. The arrows denote the different operations.

Figure 1: Figure taken from Ronneberger et.al. U-Net: Convolutional Networks for Biomedical Image Segmentation

2.1 ConvTranspose

Standard : Gather with weights



Transpose: scatter with weights