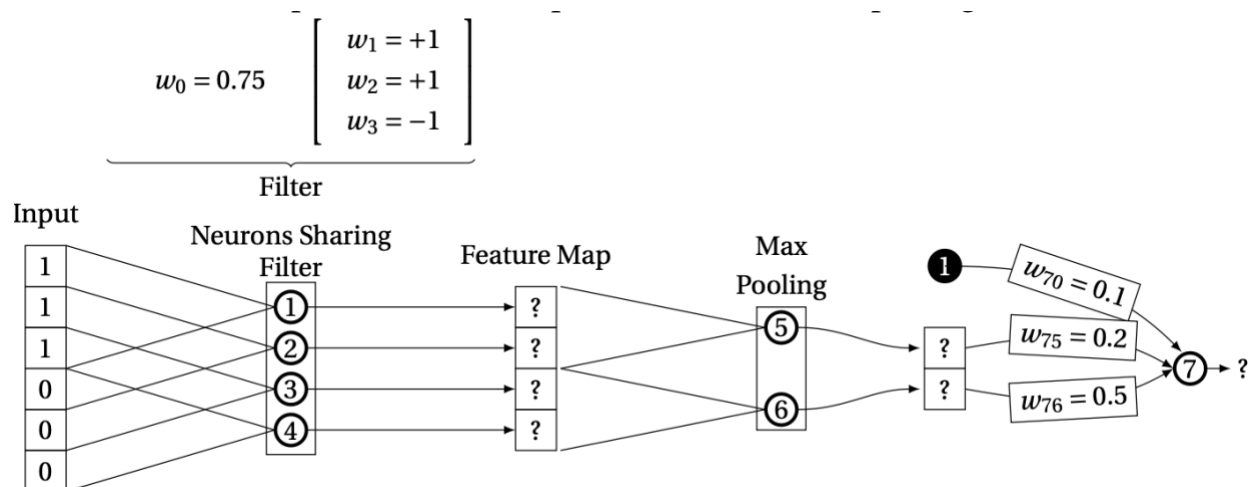


## Assignment 4 - Extra Credit

- The figure below illustrates a layer of a convolutional neural network that is processing a one-dimensional input. For ease of reference each of the neurons in the network has been labeled: 1, 2, 3, 4, 5, 6, 7. The architecture of the network consists of ReLUs that share a filter (Neurons 1, 2, 3, 4), followed by a sub-sampling layer containing two max pooling units (Neurons 5, 6), and then a fully connected layer containing a single ReLU (Neuron 7). The ReLU in the first layer has a 3-by-1 receptive field, and there is a stride of 1 used in this layer. The max pooling units have a receptive field of 2-by-1, and there is no overlap between the receptive fields of the max pooling units.



What value will this network output [show your work — provide the weighted sum ( $z$ ) and activation ( $a$ ) for each neuron]?

- How does the length of the sequence affect RNN performance? Specifically, what challenges do RNNs face as sequence lengths increase in size?