1. Recall from the lecture on SOMs that we can determine the winning neuron for a certain input instance $X = (x_1, x_2, ..., x_n)$ by determining the neuron whose weights $W = (w_1, w_2, ..., w_n)$ have the smallest Euclidean distance to this input. Assume that we have a SOM based on a 1-d lattice composed of three neurons:

The weights of neurons $n_1$, $n_2$ and $n_3$ are $W_1 = (0.1, 0.2, 0.3)$, $W_2 = (0.3, 0.4, 0.5)$, $W_3 = (0.7, 0.6, 0.6)$, respectively. Determine the winning neuron for the input $X = (0.1, 0.1, 0.1)$. (0.5%)

2. Explain why SOM’s neurons can be seen as competing and cooperating at the same time. (0.5%)

3. Explain why Perceptrons can be called “linear classifiers”. (1%)