Lab Tasks

Task 1: Use the same input and weight matrices (as discussed in class) to make your own RNN architecture. Write the code from scratch for at least one forward iteration.

Sentence:
"I like to eat pizza."

Vocabulary: POS Tags
"I" - Pronoun
"like" - Verb
"to" - Preposition
"eat" - Verb
"pizza" - Noun

$$
\begin{aligned}
\boldsymbol{a}^{(t)} &= \boldsymbol{b} + \boldsymbol{W}\boldsymbol{h}^{(t-1)} + \boldsymbol{U}\boldsymbol{x}^{(t)} \\
\boldsymbol{h}^{(t)} &= \tanh(\boldsymbol{a}^{(t)}) \\
\boldsymbol{o}^{(t)} &= \boldsymbol{c} + \boldsymbol{V}\boldsymbol{h}^{(t)} \\
\hat{\boldsymbol{y}}^{(t)} &= \operatorname{softmax}(\boldsymbol{o}^{(t)})
\end{aligned}
$$

U = [[0.4, -0.3, 0.1, -0.2, 0.5],
[0.1, -0.2, 0.3, 0.2, -0.4],
[0.2, -0.1, 0.5, 0.4, -0.3]]

V = [[0.2, 0.6, -0.1],
[0.3, -0.2, 0.4],
[-0.4, 0.1, 0.5],
[0.1, 0.2, 0.3]]

W = [[0.2, -0.1, 0.3],
[-0.1, 0.4, -0.2],
[0.4, -0.3, 0.5]]
h_0 = [0.1, -0.1, 0.2]
For the simplicity all biases are 0.

Task 2: Write a code from scratch for text classification for only one forward pass using RNN. Use all the steps as discussed in class. (e.g. Tokenization, Padding)
texts = ["I love this product", "This is terrible", "Awesome!", "Waste of money"]
labels = [1, 0, 1, 0] # 1 for positive, 0 for negative