We want to design a neural network that segments an English word into prefixes, root, and suffixes using a BIO labelling scheme.

For example, the word "unprepossessing" has the labelling: ("u", B-pre), ("n", I-pre), ("p", B-pre), ("r", I-pre), ("e", I-pre), ("p", B-root), ("o", I-root), ("s", I-root), ("s", I-root), ("e", I-root), ("s", I-root), ("s", I-root), ("i", B-suf), ("n", I-suf), ("g", I-suf). Note that due to the nature of the application, O will not be used.

Fully specify a neural network to solve this problem. Describe:

- how the inputs and outputs are encoded
- the structure of the network
- the loss function used

Describe the network in enough detail that one could implement it using PyTorch. You may describe it in terms of common abstractions (e.g. "use a standard LSTM cell of such-and-such size") if that's useful.

You do *not* need to define batch sizes, learning rates, and other optimization parameters.

You may assume that the input contains only lowercase Latin letters.

Please work independently. You should turn in a document (`.txt`, `.md`, or `.pdf`) answering the above.