Homework – 7

1. Use the pumping theorem to show that the following languages are not context-free

a).

Text, letter

Description automatically generated

b).

The intersection of context-free language and regular language is context-free. So if it is context-free, we intersect with and get which should be context-free, but not context-free, a contradiction.

1. Decide whether the following language is context-free or not, and state your reason:

a).

Context-free. Hint: This is the union of , , , each of which is essentially like , which can be generated by similar context-free grammar, e.g., is the concatenation of and , where one can use , while is the one for , and for . Or you can modify the PDA in our slide for it.

b).

Context-free. Hint: This is the union of , , . Each of them, say, , is essentially the same as , which you can use the material in slides for showing the **complement** of is context-free.

c).

Not context-free. This is