1. Show that checking ambiguity of CFGs is undecidable. In other words, given CFG G checking if G is ambiguous is undecidable.

2. Let G_1 and G_2 be two CFGs. Show the the following problems are undecidable.

    (a) is $L(G_1) \cap L(G_2) = \emptyset$?

    (b) is $L(G_1) = L(G_2)$?

    (c) is $L(G_1) = R$ for some regular language R

    (d) is $L(G_1) \subseteq L(G_2)$?

3. One of the following problems is decidable and the other is not. Which is which? Give proof for both.

    (a) Given a CFL L and a regular language R, is $L \subseteq R$?

    (b) Given a CFL L and a regular language R, is $R \subseteq L$?