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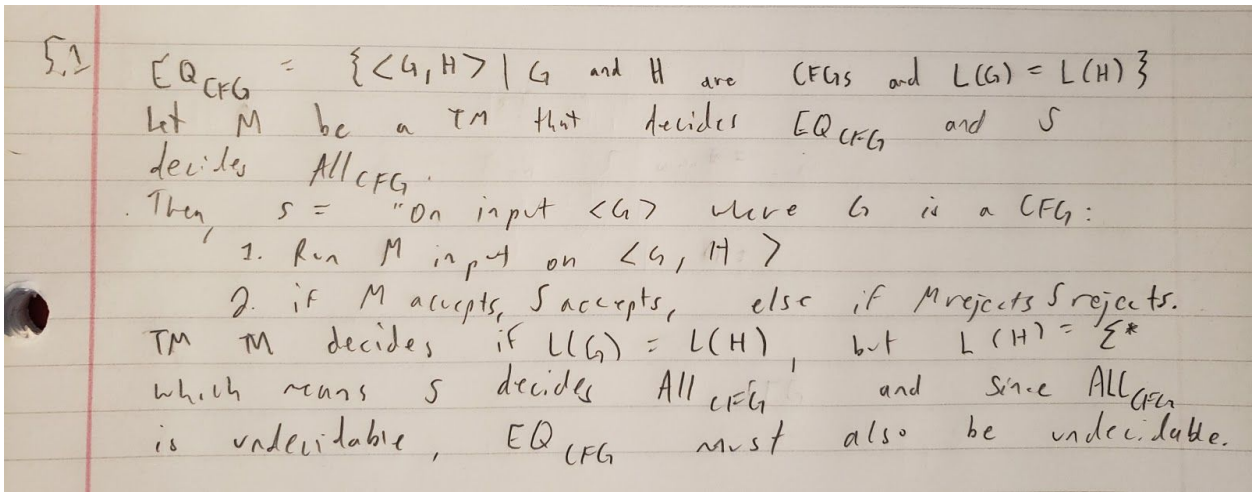
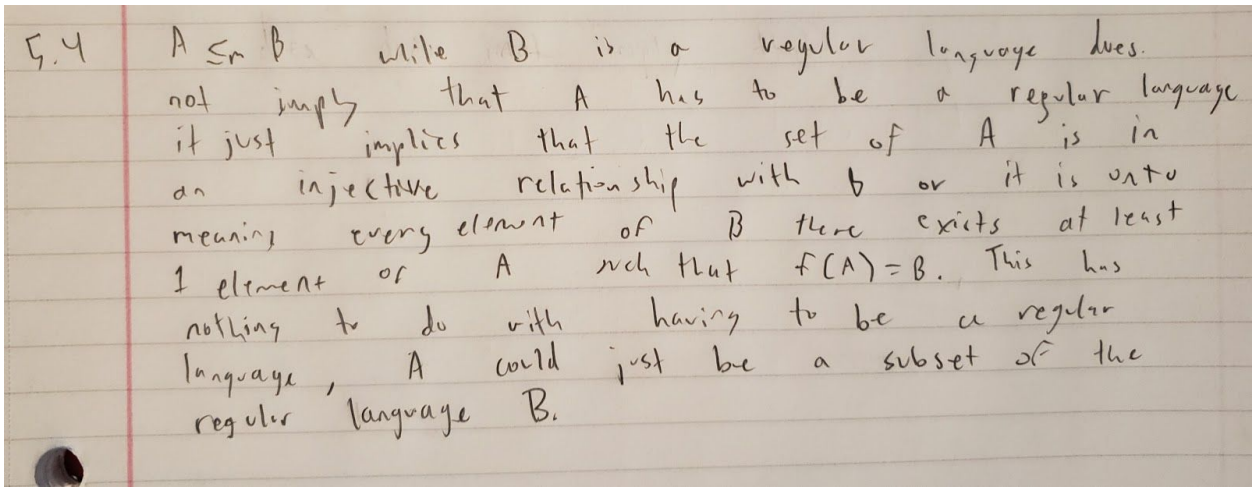
HW4 - CH. 5
11/19/2020

5.1


5.1 $EQ_{CFG} = \{\langle G, H\rangle \mid G \text{ and } H \text{ are CFGs and } L(G) = L(H)\}$
Let M be a TM that decides EQ_{CFG} and S decides All_{CFG}.
Then, S = "On input $\langle G\rangle$ where G is a CFG:
1. Run M input on $\langle G, H\rangle$
2. if M accepts, S accepts, else if M rejects S rejects.
TM M decides if $L(G) = L(H)$, but $L(H) = \Sigma^*$ which means S decides All_{CFG} and since ALL_{CFG} is undecidable, EQ_{CFG} must also be undecidable.

5.4


5.4 $A \leq_m B$ while B is a regular language does not imply that A has to be a regular language it just implies that the set of A is in an injective relationship with B or it is onto meaning every element of B there exists at least 1 element of A such that $f(A) = B$. This has nothing to do with having to be a regular language, A could just be a subset of the regular language B.