Homework #4 *due 22 November , 2022*

 (1) (a) Consider a calculator that uses floating point decimal numbers with + and - signs as inputs and can do the four operations +, -, *, / as well as parentheses for forced priority. Describe a CFG that can express any computable arithmetic term that such a calculator (with unlimited memory to allow for expressions of any length) can accept.

(b) Draw the parse tree for the expression (0.23 / (5+3.1) - 20) *2 according to your CFG

(2) Write down a *CFG* that can generate any Boolean expression using the *3* logical operators $\wedge$ *(AND)* $\vee$ *(OR)* and ¬ *(NOT)* operating on *Boolean* variables *x, y* , *z* and constants *T (True)* and *F (False).* An example for such an expression *E* is :

 E = x $\vee$ *y* $\wedge$ *(T* $\wedge$ *¬ z)*

(3) From the main text

Exercises 5.1.2 (b), (c) , 5.1.3, 5.1.4 , 5.1.7