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Structures of Programming Language Written Homework

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1.

a) Define the BNF grammar

S -> g' | i'| j'

g' -> A|B|C|D|....|X|Y|Z

i' -> k | k | h

h -> k| h | ε

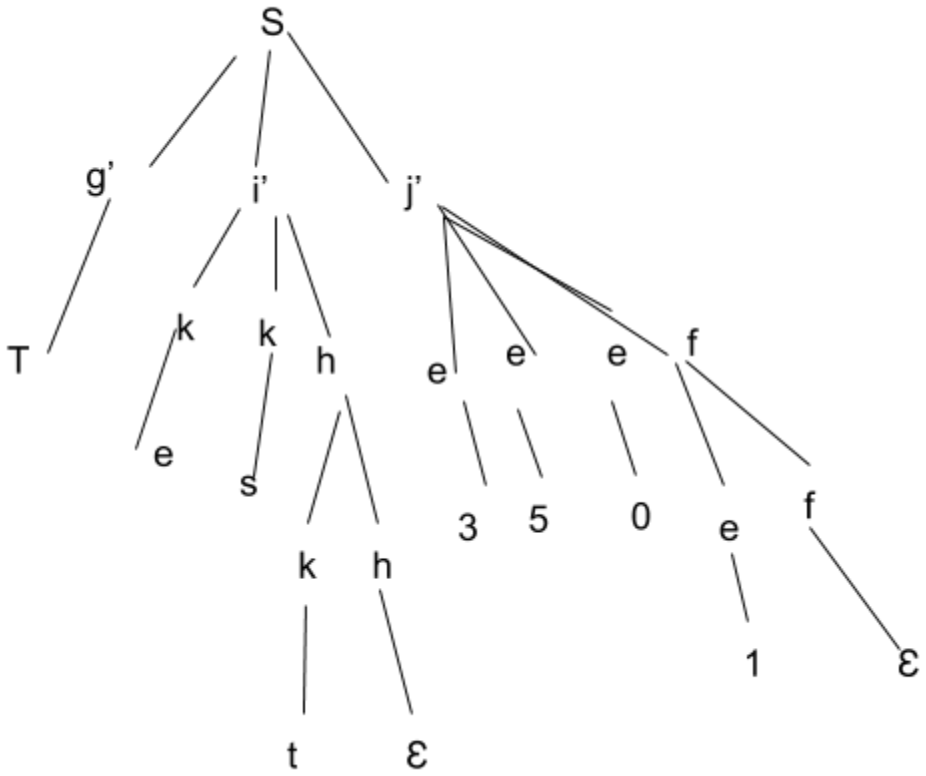
k -> a|b|c|d|e|...|x|y|z

j' -> e | e | e |f

f -> e | f |ε

e -> 0|1|2|3|4|5|6|7|8|9

b) Derivation and Parse Tree



2. Augment the BNF to write an attribute grammar. Assume the only possible variable types are integer and float. Augment according to the given language rules

1. <assign> → <var> = <expr>

   <var>type = int := <expr>type = int

   <var>type = flout := <expr>type = int/float

2. <expr> = <var> + <var>

   <expr>type = int → <var>type = int + <var>type = float/int

   <expr>type = float → <var>type = float + <var>type = int/float

3. <expr> → <var> - <var>

   <expr>type = int → <var>type = int , <var>type = float/int

   <expr>type = float → <var>type = float, <var>type = int/float