First Assignment - BNF

Learning Abstract - What I learned is how to write various rules using BNF. It was difficult because some of them were definitely tricky. Eventually I found my own ways to make the rules

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Task 1 - BNF?

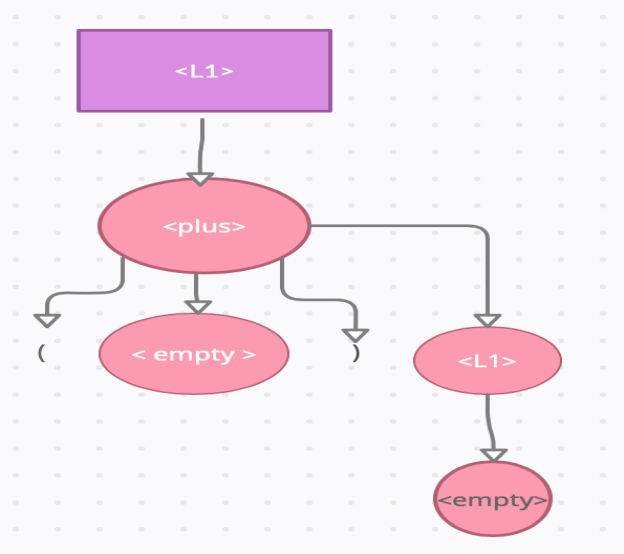
BNF stands for Backus-Naur Form. It is used to write a formal representation of a context-free grammar. This means that it has a set of tokens that are considered to be part of the language being defined and has a set of nonterminal symbols, which are not part of the language being defined, but lead to other nonterminals which will soon lead to tokens. Throughout the BNF, there is a set of productions that you have to follow. After a nonterminal leads you to a token, there will be a set of productions which you can either use right away or it will take you to rewriting rules and you will basically start from the beginning until you reach the result that you want.

Task 2 - BNF Description of L1

< L1> : : = < plus > | < minus > | < empty >
< plus > : : = (+ < plus >) | (+) < minus >| (< empty >) < L1> | < L1>
< minus > : : = (- < minus >) | (-) <minus> | (-) < plus > | < empty > < L1 >

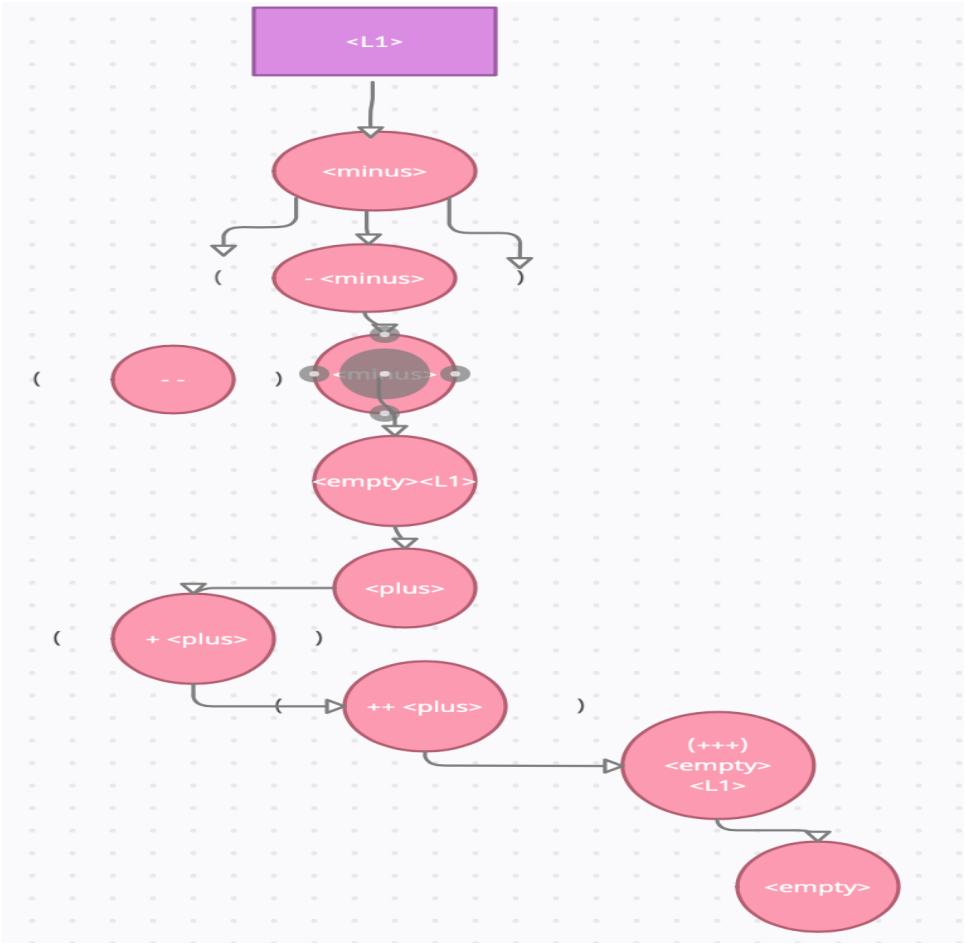
Task 3 - Parse Trees for L1

( )



(--) (+++)

Side note : I tried to make the arrow point to the parenthesis but it just made the image look confusing so I left them out.

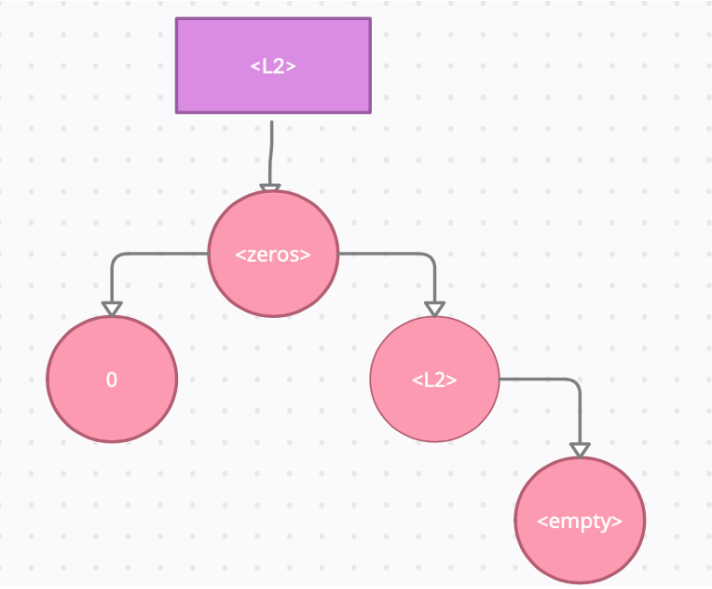


Task 4 - BNF Description of L2

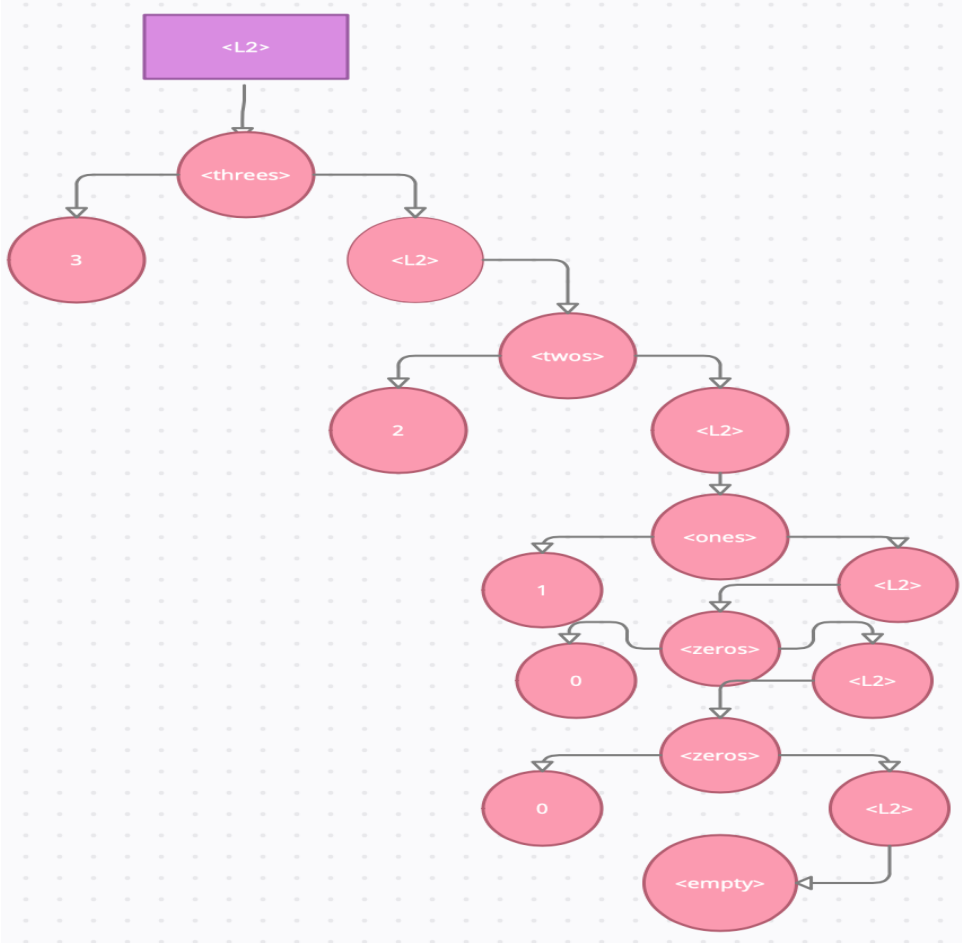
< L2 > : : = (< zeros > | < ones > | < twos > | < threes > | < empty >)
< zeros > : : = 0 <L2>
< ones > : : = 1 <L2>
< twos > : : = 2 <L2>
< threes > : : = 3 <L2>

Task 5 - Parse Trees For L2

0



32100

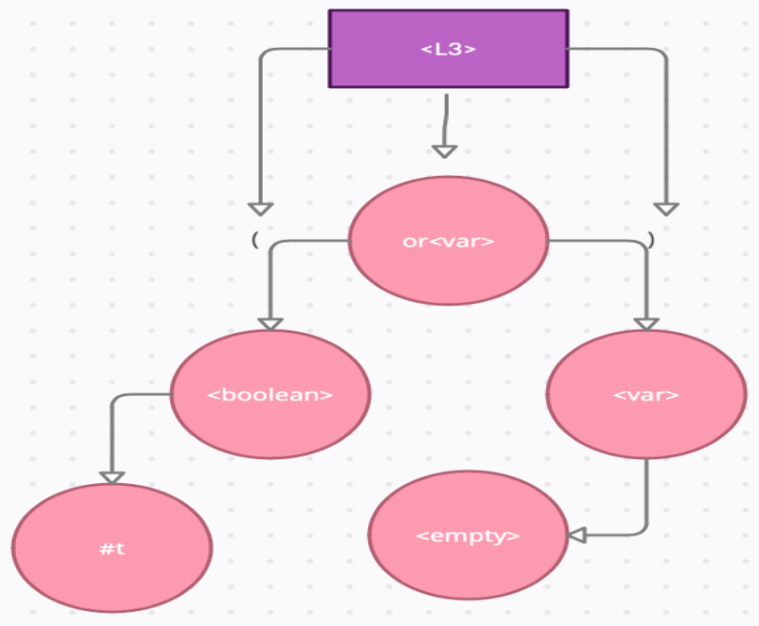


Task 6 - BNF Description of L3

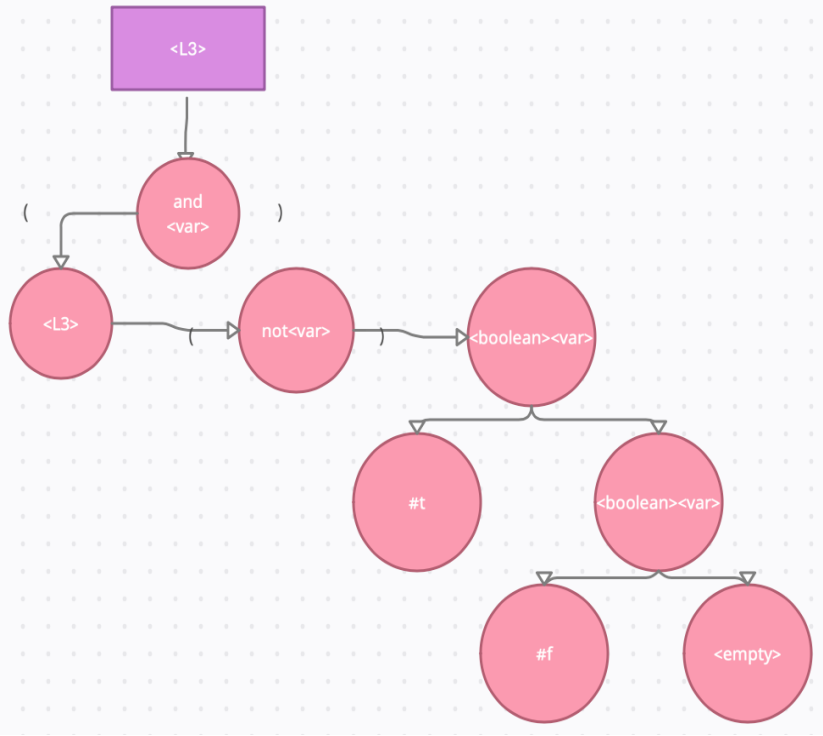
< L3 > : : ((and < var >) | (or < var >) | (not < var >) | < empty >)
< var > : : = < boolean > < var > | < L3 > < var > | < empty >
< boolean > : : = < #t > | < #f >

Task 7 - Parse Trees for L3

(or #t)



(and (not #t) #f)



Task 8 - BNF Description of L4

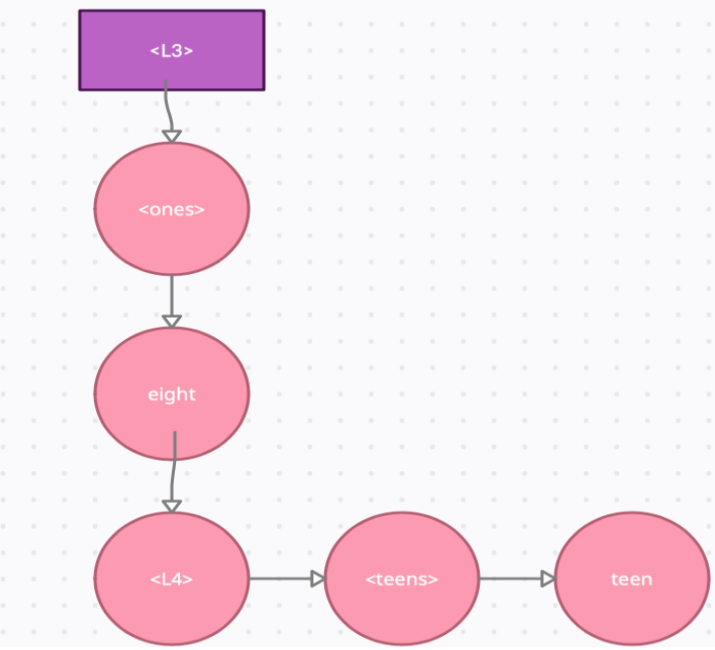
<L4> : : = (<ones> | <teens> | <tens> | hundred <L4>) | <empty> <L4> | <empty>

<ones> : : = one <L4>| two <L4> | three <L4> | four <L4> | five <L4> | six <L4> | seven <L4> | eight <L4> | nine <L4>
<teens> : : = eleven<L4> | twelve<L4> | thirteen <L4> | teen <L4>
<tens> : : = ten | twenty<L4> | thirty<L4> | fifty<L4> | <ty> <L4>

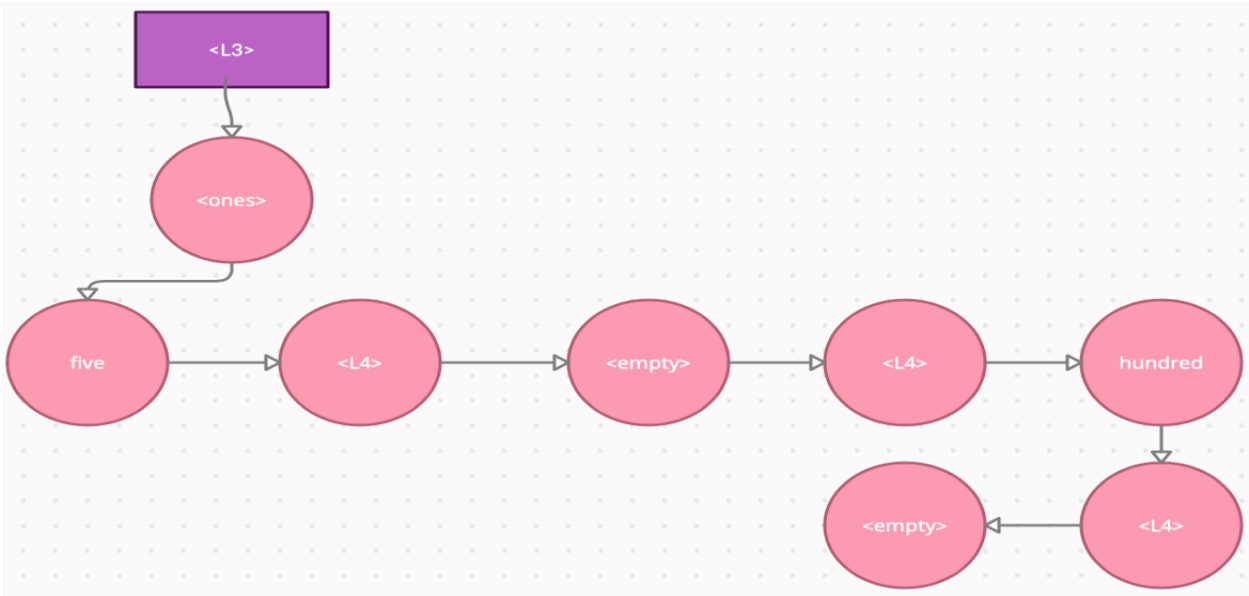
Task 9 - Parse Trees For L4

Forgot to change some of the problems to L4!

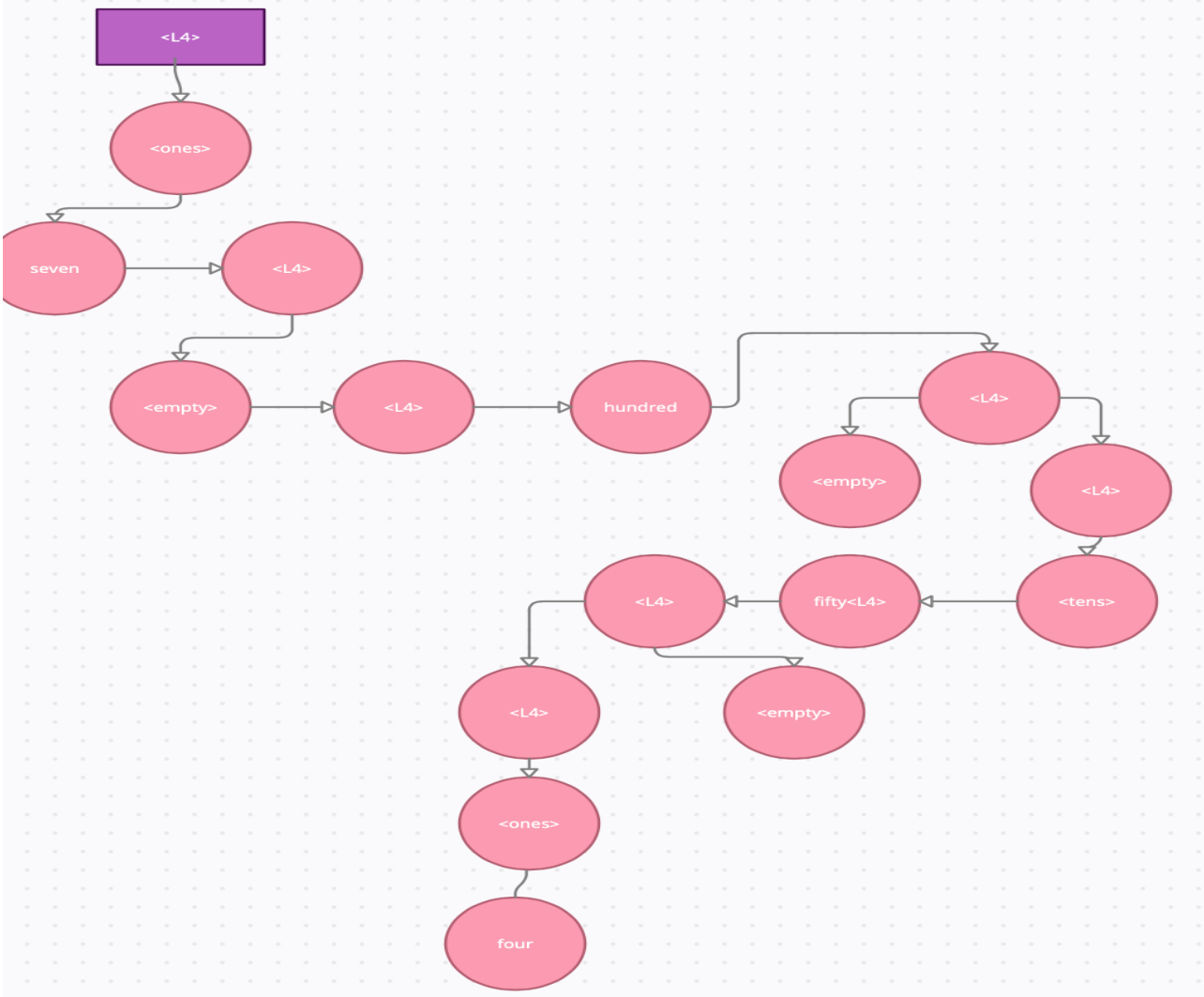
Eighteen



Five hundred



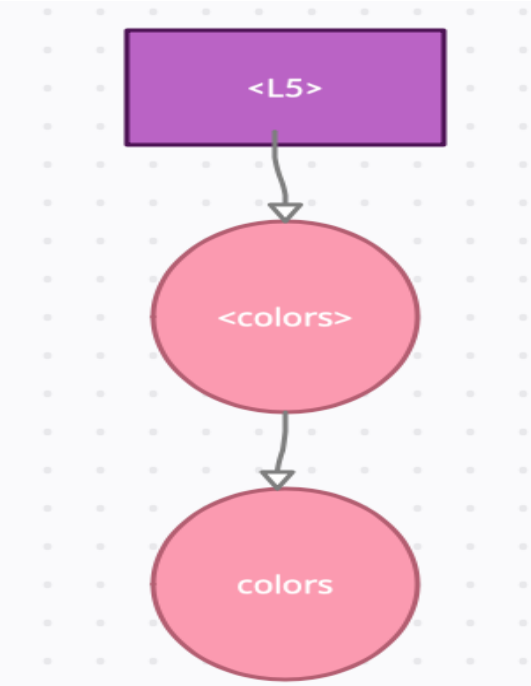
Seven hundred fifty four



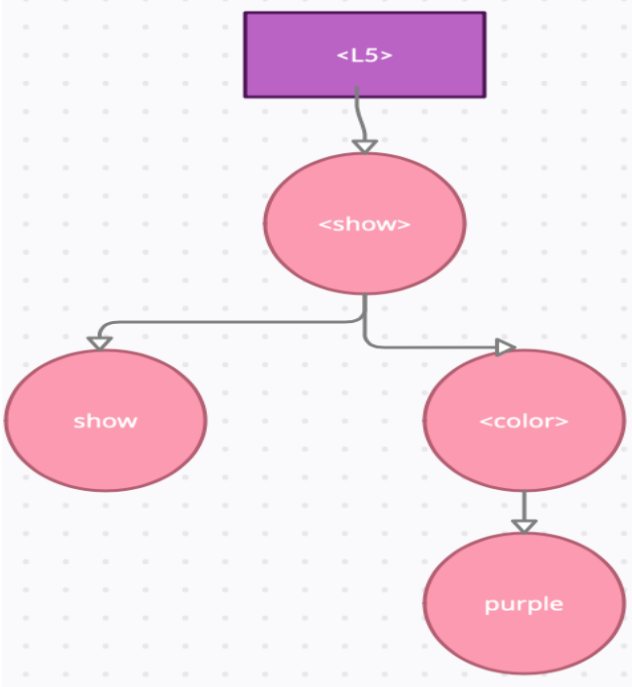
Task 10 - BNF Description of L5

< L5 > : : = (< add > | < describe > | < colors > | < show > | < exit >)
< add > : : = add ((< r > < g > < b >) < color > | add < color >
< describe > : : = describe < hue >
< color > : : = color
< colors > : : = colors
< show > : : = show < color >
< exit > : : = Goodbye ...
< r > : : = (0 | (1 | (2 | (3 | (… | (255
< g > : : = 0, | 1 | 2 | 3, | … | 255
< b > : : = 0) | 1) | 2) | 3) | …) | 255)

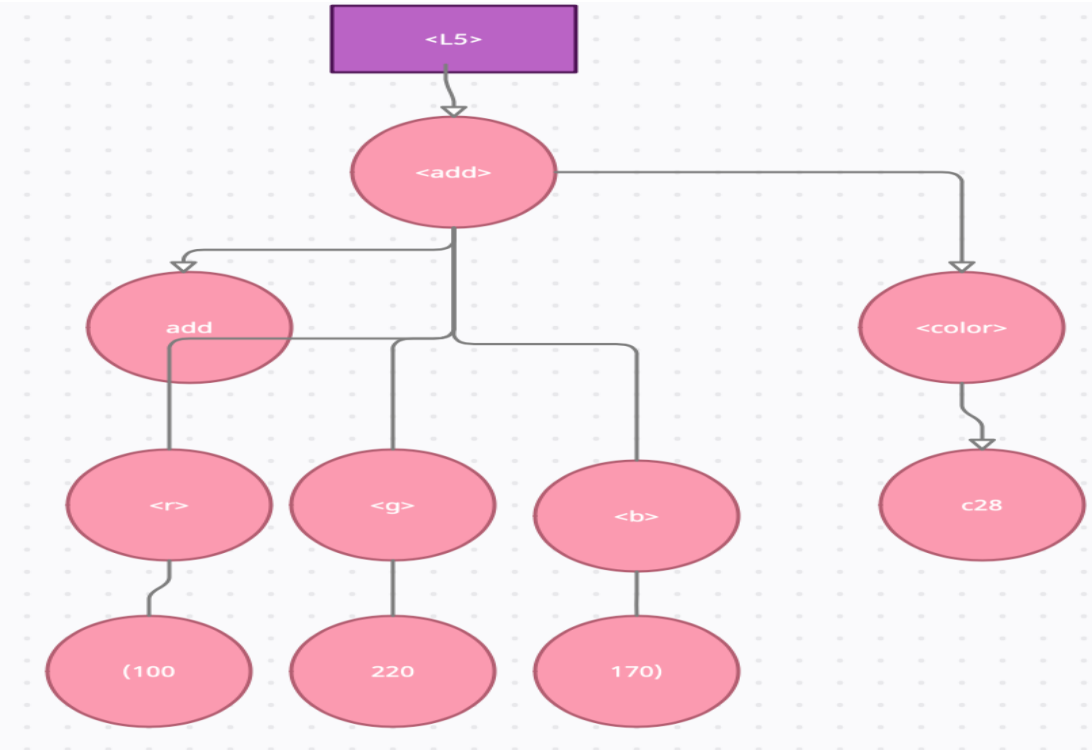
Colors



Show purple



add (100 220 170) c28


<L5>
<add>
add
<color>
<r>
<g>
<b>
c28
(100
220
170)