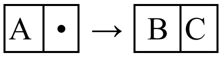
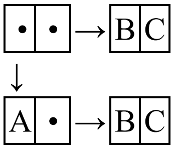
Problem 4: Cons Cell Representations

a. Draw the list structure created by evaluating (cons 'A (cons 'B 'C)).

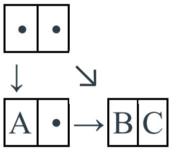


b. Write a pure Racket expression that will result in this representation, with no sharing of the (B . C) cell. Explain why your expression produces this structure.



The pure Racket expression: (cons (cons ‘A (cons ‘B ‘C)) (cons ‘B ‘C))
Because there is a cons cell, and the car of cell point to the car ‘A of a new cons cell. Then there are two cdr cell of cons cells with the same parts is that each evaluation of (cons ‘B ‘C).

c. Write a pure Racket expression that will result in this representation, with sharing of the (B . C) cell. Explain why your expression produces this structure.



The pure Racket expression: ((lambda (x) (cons x (cdr x))) (cons 'A (cons 'B 'C)))
Because ‘B and ‘C are sharing that we need to use lambda function, which means the cdr of two cons are share the same cons cdr cell that in lambda function “cdr x” of (cons x (cdr x)) is points to same (cons ‘B ‘C).