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CS 360 - 002
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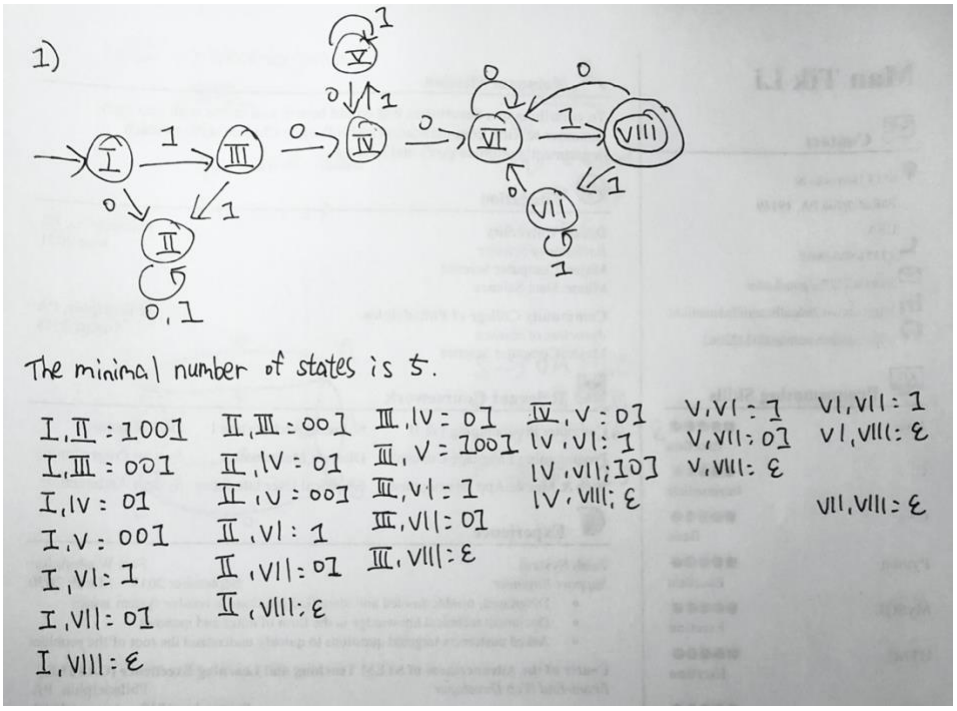
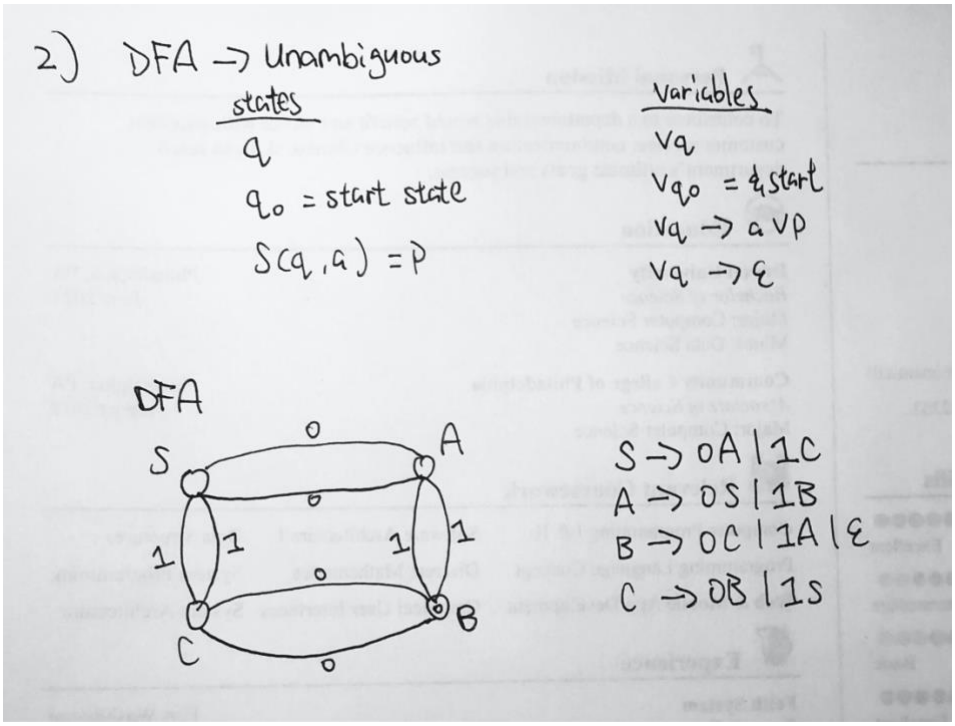
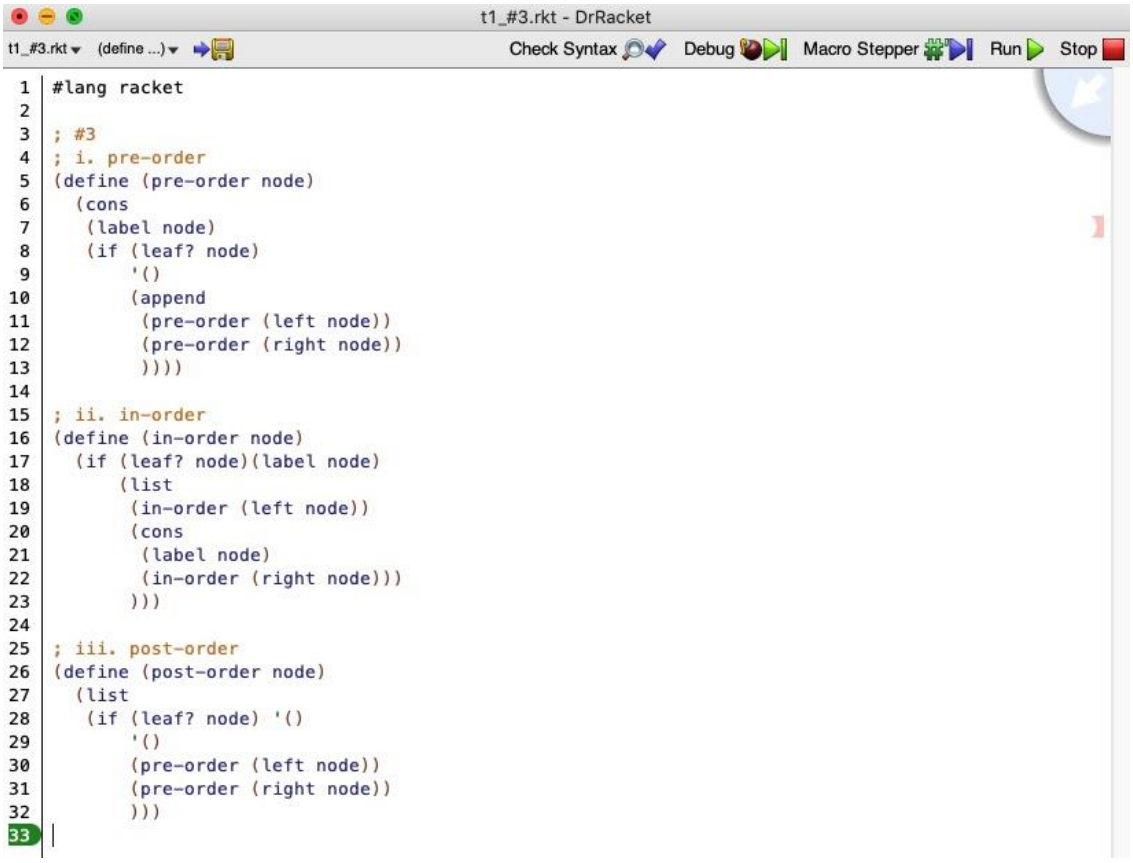
Test 1

1.



2.



3. 


```
#lang racket

; #3
; i. pre-order
(define (pre-order node)
  (cons
   (label node)
   (if (leaf? node)
       '()
       (append
        (pre-order (left node))
        (pre-order (right node))
        ))))

; ii. in-order
(define (in-order node)
  (if (leaf? node)(label node)
      (list
       (in-order (left node))
       (cons
        (label node)
        (in-order (right node)))
       )))

; iii. post-order
(define (post-order node)
  (list
   (if (leaf? node) '()
       '()
       (pre-order (left node))
       (pre-order (right node))
       )))
```

4. The function decode-1 takes two arguments: remaining bits list and the current position in the tree. While the program keeps moving “down” the tree, a left or a right branch will choose according to whether the next bit in the list is a zero or a one. When it reaches a leaf, it returns the symbol at that leaf as the next symbol in the message by consing it onto the result of decoding.

5. The function simulate is simulate the actions of a DFA. It given a machine description and an input symbol I, function move searches for a transition labeled I from the start state to some new state s. It then returns a new machine with the same transition function and final states, but with s as its “start” state. The main function, simulate, test to see if it is in a final state. If not, it passes the current machine description and the first symbol of input to move, and then calls itself recursively on the new machine and the remainder iof the input The functions cadr and caddr and defined as (lambda (x) (car (cdr x))) and (lambda (x) (car (cdr (cdr x)))), .