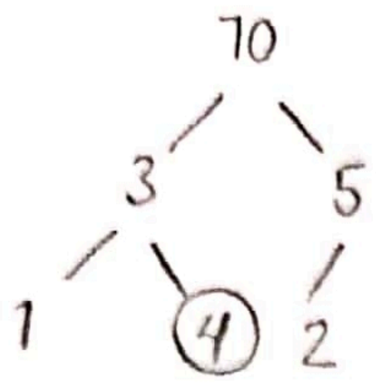
HW2

①

A) False



4 فرزند 3 است و این باعث می‌شود که max - heap نباشد.

B) True

با استفاده از heap، می‌توان Priority queue را پیاده‌سازی کرد.
به این صورت که همان‌طور که در heap، اولویت عناصر مهم است، در queue نیز مهم می‌باشد.

C) False

linked-list یک مجموعه است و نمی‌توان آن را list نامید.
به علاوه در linked list عمل insertion و deletion از ابتدای آن صورت می‌گیرد.

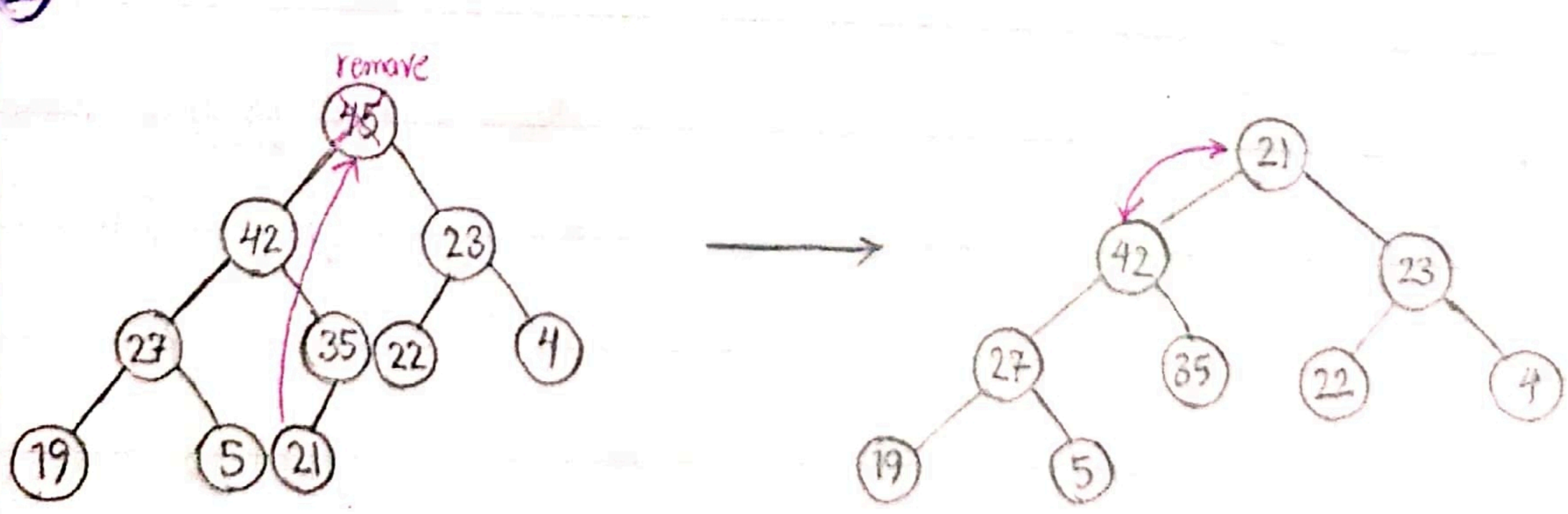
D) False

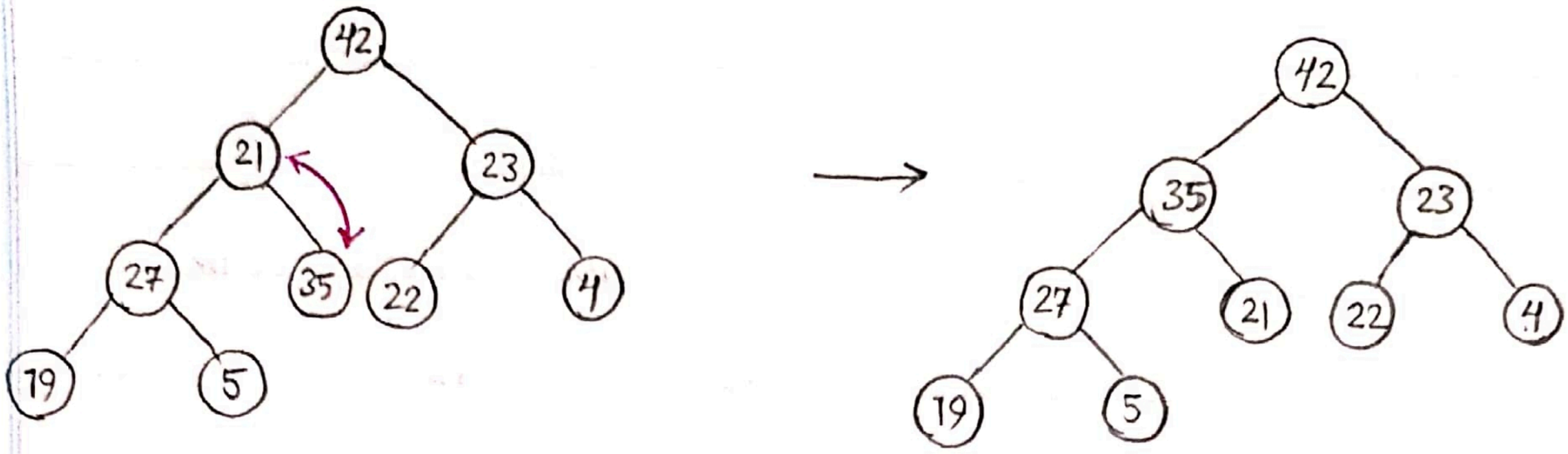
insert : O(logn)

find max : O(1)

find min : O(n)

②





③

① Define a class stack with a variable s=0.

② Implement the function push() which receives an integer as a parameter. Increment the s and push the pair of s and element in the priority queue.

③ Implement function top() and return the element stored in top.

④ Implement function isEmpty(), which returns a boolean. if the priority queue is empty, it returns true. Else returns false.

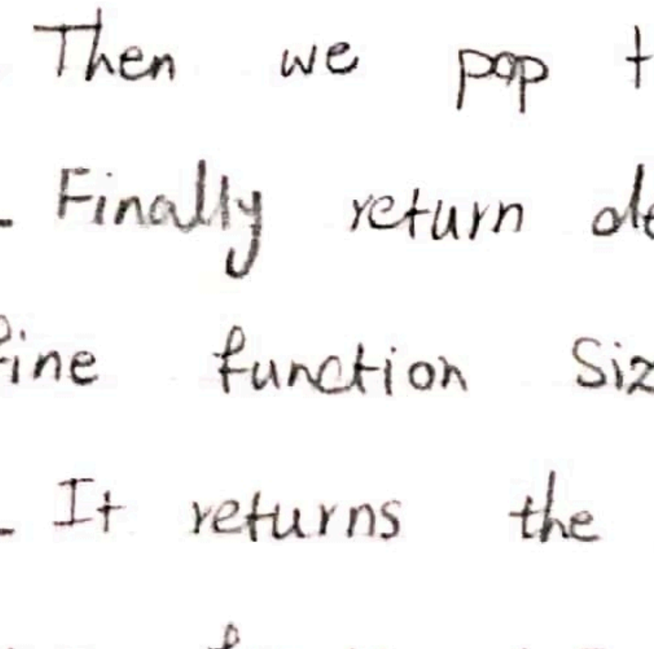
⑤ Implement function pop() and check if the priority queue is empty, prints "Can't pop, stack is empty". Else decrement the s and pop the top of the priority queue.

⑥ In the end, traverse the stack and while stack is not empty print the top and pop the top.

④

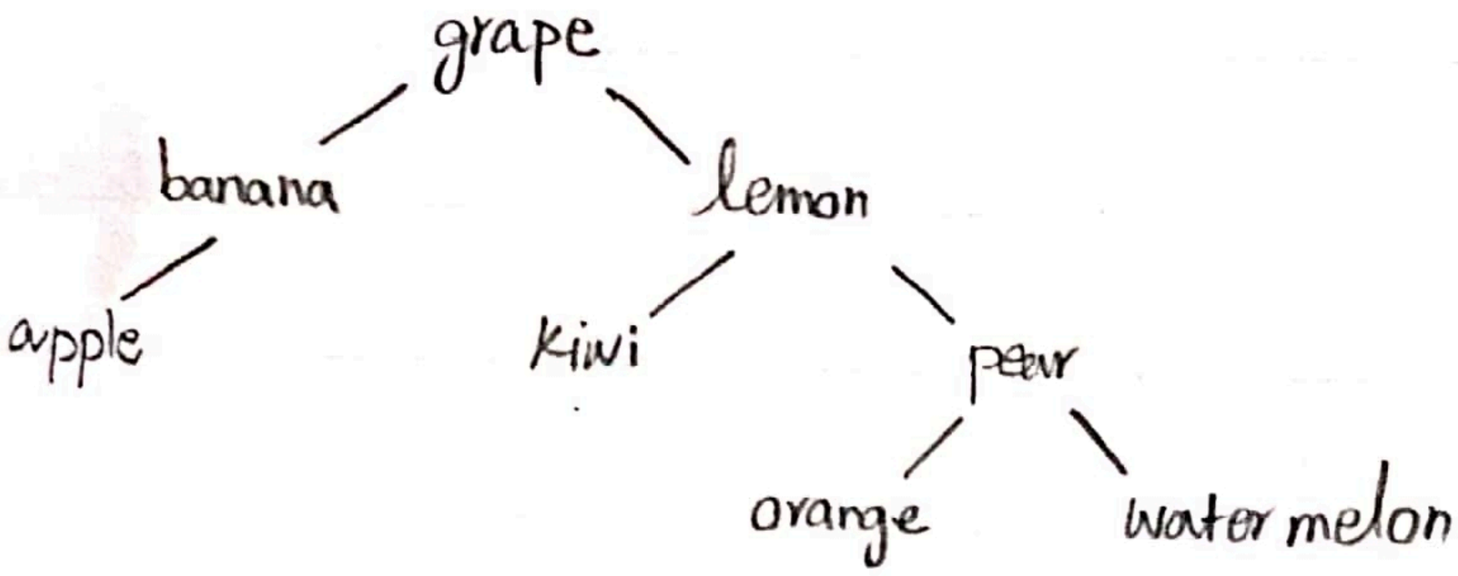
1. Define two stacks , stack1 and stack 2.
2. Define function Enque with an integer as a parameter like:
   - while stack1 is not empty, push stack1.pop() in stack 2
   - Then push the new element in stack1.
   - Finally, we want to reverse the stack to follow the queue order . So while stack2 is not empty, push stack2.pop() in stack 1
3. Define Dequeue like this:
   - create an integer del which contains stack1.peek()
   - Then we pop the last element with stack1.pop()
   - Finally return del as a deleted value.
4. Define function Size :
   - It returns the sum of stack1 and stack2 sizes.
5. Define function isEmpty: (boolean)
   - It returns true, if Size = 0 , else it returns false

⑤

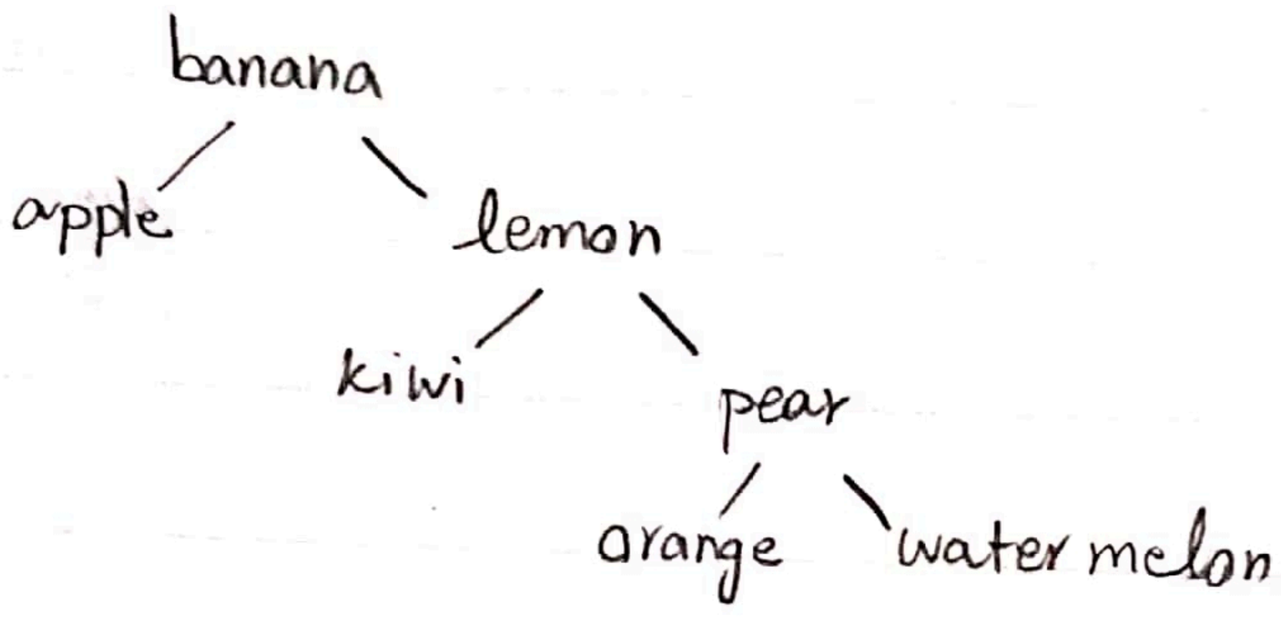


In binary tree, we put the first element (43) as a root , then insert elements step by step. If it is less than its parents, we put it on left node , else we put it on right.

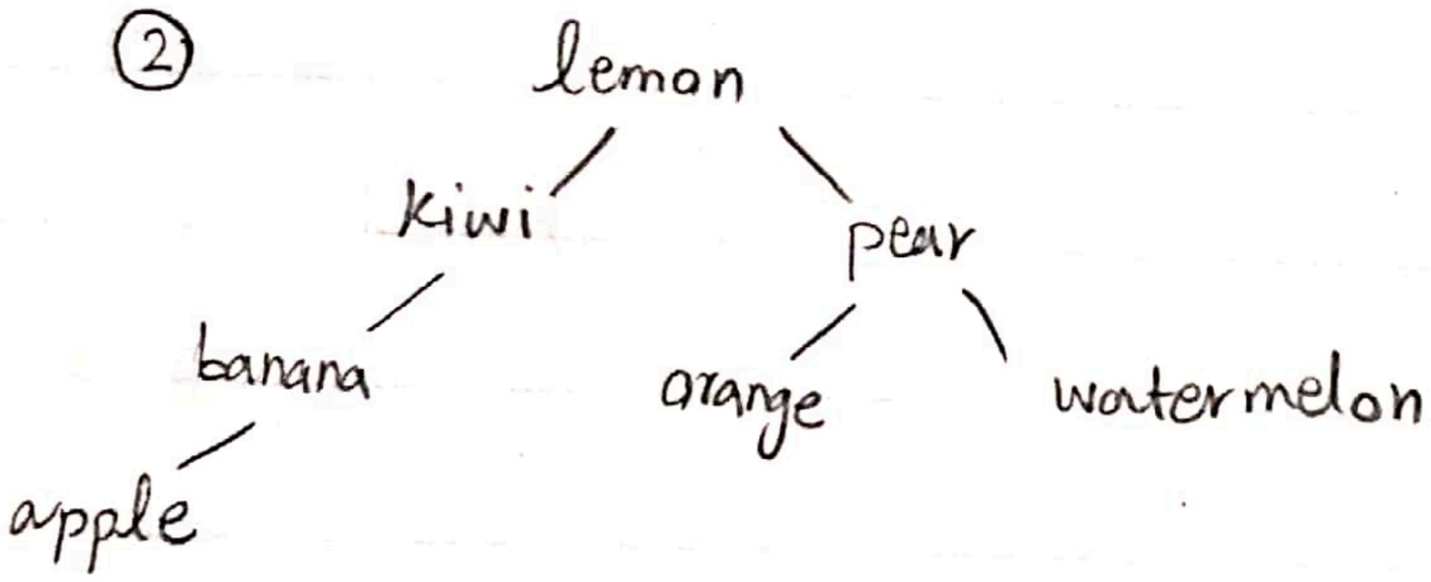
⑥


grape
banana
lemon
apple
kiwi
pear
orange
water melon

⑦


banana
apple
lemon
kiwi
pear
orange
water melon

②


lemon
kiwi
pear
banana
orange
watermelon
apple