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SWE - 127

Part B

Ans: to the que: NO - 1

(a)

The complexity of an algorithm is a function which measures the time and space used by an algorithm in terms of the input size.

$s(x)$	n	$n \log n$	n^2	n^3	2^n
5	5	15	25	125	32
10	10	40	100	10^3	10^3
100	100	700	10^4	10^6	10^{30}
1000	10^3	10^4	10^8	10^9	10^{300}

$$\therefore O(n) < O(n \log n) < O(n^2) < O(n^3) < O(2^n)$$

Time Space Trade off:

The time-space tradeoff refers to a choice between algorithmic solutions of a data processing problem that allows one to decrease the running time of an algorithmic solution by increasing the space to store the data and vice versa.

Suppose a file of records contains names, social security numbers and much additional information among its fields. Sorting the file alphabetically and trying a binary search is a very efficient way to find the record for a given name. On the other hand, we are only given the social security number of the person. Then we have to do a linear search for the records, which is extremely time-consuming process for a query.

large number of records. There may be several ways to solve this problem. One way is to have another file which is sorted numerically according to social security number. This, however, would double the space required for sorting the data. That is, reducing time complexity, increase space complexity and vice versa. This is time space tradeoff.

Ans : to the que: No - 1

(b)

Initially :

front : 1		London	Berlin	Rome	Paris	
Rear : 4						

(i) Insert "Athens"

front : 1		London	Berlin	Rome	Paris	Athens
Rear : 5						

(ii) Insert "Madrid"

front: 1	Madrid	London	Berlin	Rome	Paris	Athens
Rear: 0						

(iii) Insert "Moscow"

Overflow:

front: 1	Madrid	London	Berlin	Rome	Paris	Athens
Rear: 0						

(iv) Two cities are deleted:

front: 3	Madrid			Rome	Paris	Athens
Rear: 0						

(v) Insert "Oslo".

Front: 3	Madrid	Oslo		Rome	Paris	Athens
Rear: 1						

(vi) Delete six cities:

underflow: [There are only 5 cities in the queue. So

after deleting 5 cities, there will be an underflow.]

Front: -1							
Rear: -1							

Ans : to the que NO-2

The given letters are.

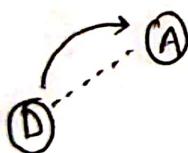
D, A, T, A, S, T, R, U, C, T, U, R, E, S

Now, making a minimum heap.

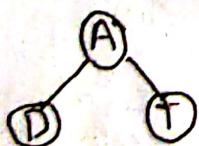
Step 1: Insert D

D

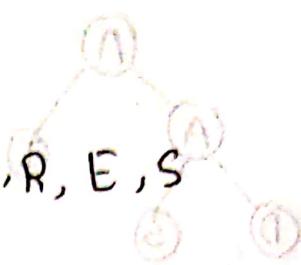
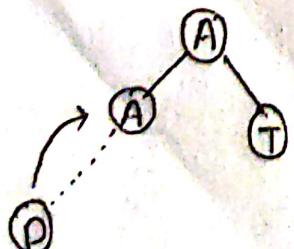
Step 2: Insert A



Step 3: Insert T



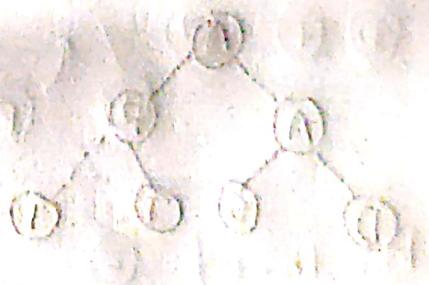
Step 4: Insert A



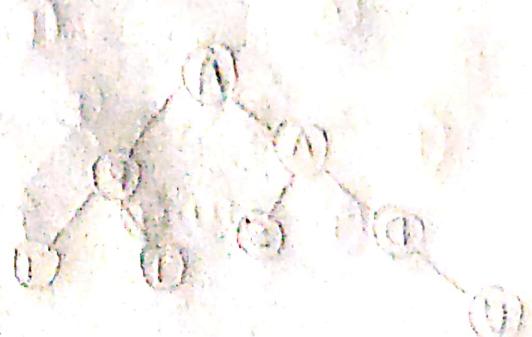
① breadth first search



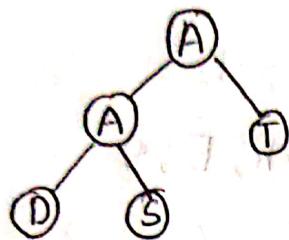
② breadth first search



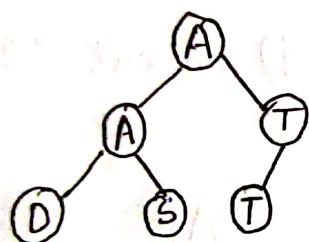
③ breadth first search



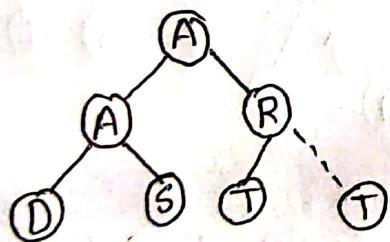
Step 5: Insert S



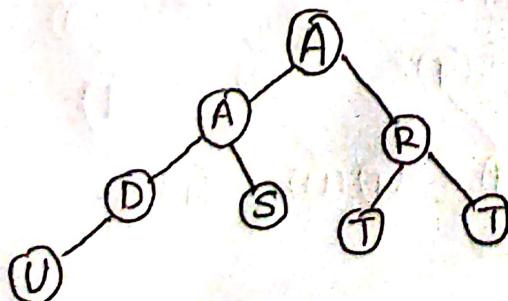
Step 6: Insert T



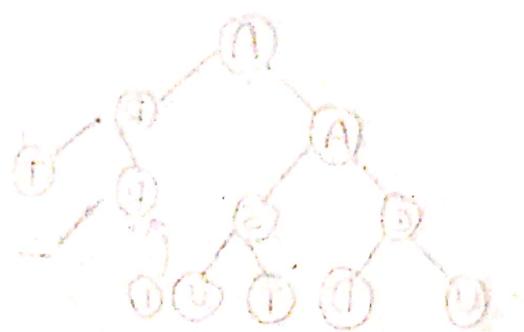
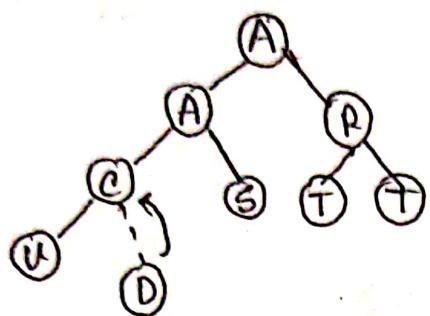
Step 7: Insert R



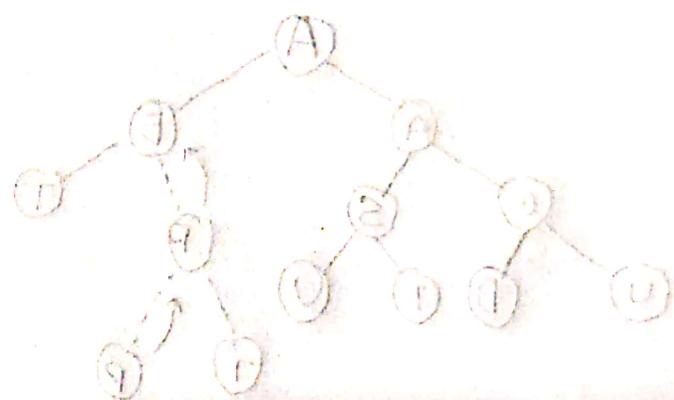
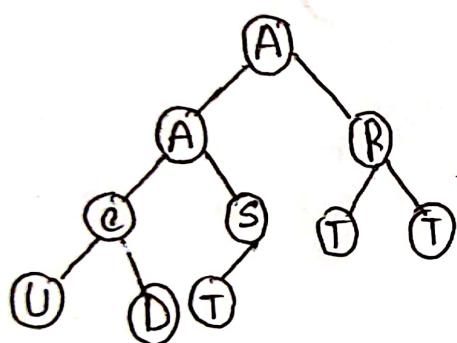
Step 8: Insert U



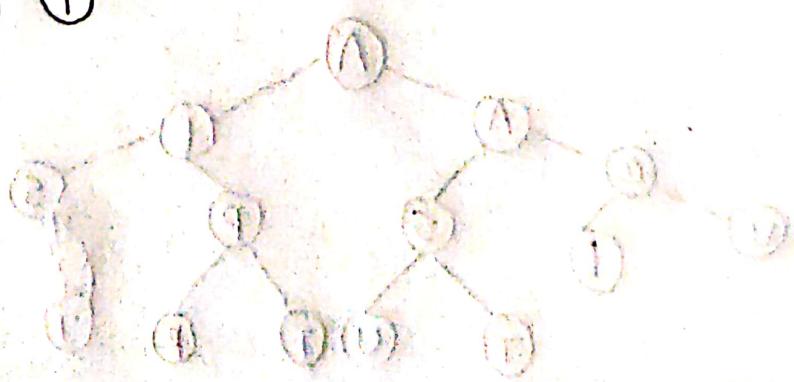
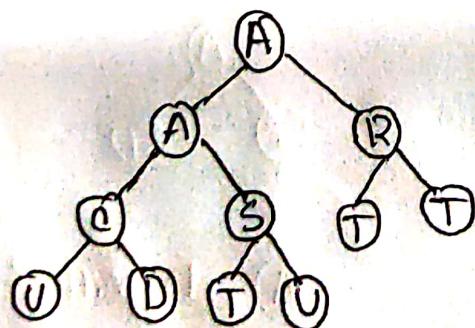
Step 9 : Insert ②



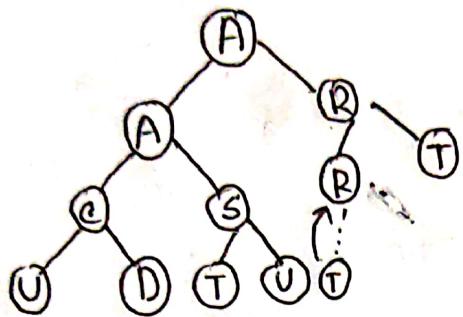
Step 10 : Insert ①



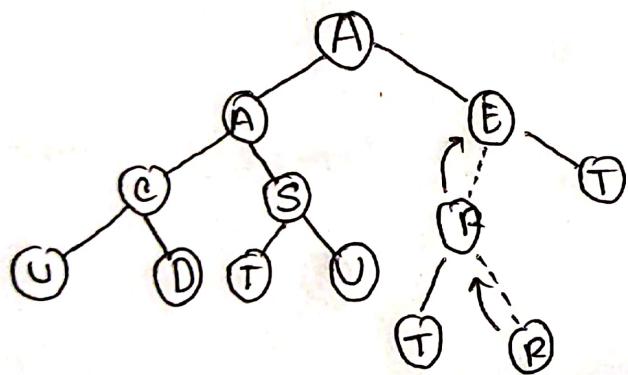
Step 11 : Insert ③



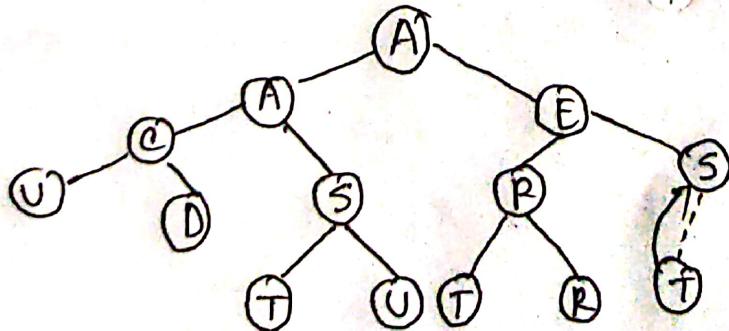
Step 12: Insert R



Step 13: Insert E



Step 14: Insert S



so, the final minimum heap after inserting all the letters in.

