# Chapter - 17

(1) (a) To insert 'n' elements using Aggregate mth.

Cost of $i^{th}$ operation

Case 1 :- if we don't take need to allocate new memory = O(1)

Case 2 :- if we allocate new memory

$i = 2^k + 1 \quad k = 1, 2 \ldots$

to include the capacity and double the size of array.

∴ we need to allocate new memory.

Copy over $2^k$ numbers from old to new array and insert new number.

Running time $= 2^k + 1$ if $i = 2^k + 1$ case 1

$1$ otherwise case 2

(b) Accounting method.

The operation which cause capacity to include are expensive.

| i | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| t(i) | 1 | 2 | 3 | 1 | 5 |

when size is changed from 4 to 5; the size is doubled and numbers are copied from old to new one.

∴ No. of Consecutive in $t(i) = 2^k + 1 - (2^{k-1} + 1) - 1$

(or) $2^{k-1} - 1$

$$= \frac{2^k + 1}{2^{k-1} + 1} \approx 2 \text{ if } k = \text{large}$$