

30-09-2020

AKSHAY MITTAR

IBM18CS010

classmate

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ADS LAB WEEK 2

Skip List

Algorithms: / Pseudo Code

Deciding level. \Rightarrow

lvl = 1

while $\text{rand}() < p \ \&\& \text{lvl} < n$

lvl += 1

return lvl

$n = \text{max no. of level}$

$p = \frac{\text{Nodes} \& \text{pointers}}{\text{Nodes}}$

Insertion
 \Rightarrow

$x = \text{list} \rightarrow \text{header}$

for ($i = \text{list} \rightarrow \text{level}; i >= 0; --i$)

while ($x \rightarrow \text{forward}[i] \rightarrow \text{key}$) $\text{forward}[i]$

$\text{update}[i] = x$

$x = x \rightarrow \text{forward}[0]$

$\text{lvl} = \text{decide level}()$

if ($\text{lvl} > \text{list} \rightarrow \text{level}$)

for ($i = \text{list} \rightarrow \text{level} + 1; i >= \text{lvl}$)

$\text{update}[i] = \text{list} \rightarrow \text{header}$

$\text{list} \rightarrow \text{level} = \text{lvl}$

$x = \text{node}(\text{lvl}, \text{searchkey}, \text{value})$

for ($i = 0; i < \text{level}; i++$)

$x \rightarrow \text{forward}[i] = \text{update}[i] \rightarrow \text{forward}[i]$

$\text{update}[i] \rightarrow \text{forward}[i] = x$

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Delete:

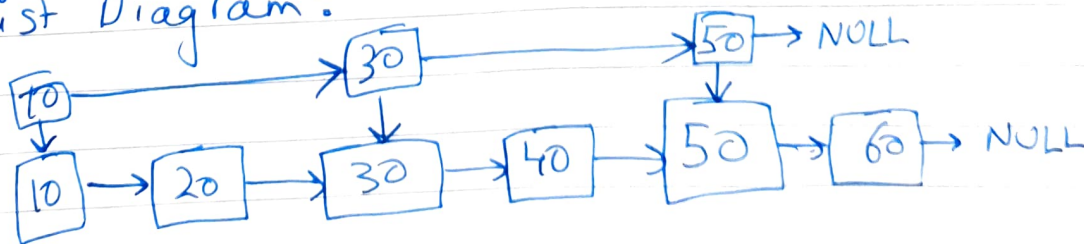
 $x = \text{list} \rightarrow \text{header}$ ~~for~~ for ($i = \text{list} \rightarrow \text{level}$; $i \geq 0$; $i--$)while ($x \rightarrow \text{forward}[i] \rightarrow \text{key}$) forward $[i]$ update $[i] = x$ $x = x \rightarrow \text{forward}[0]$ if $x \rightarrow \text{key} = \text{search}$ thenfor $i = 0$; $i \leq \text{list} \rightarrow \text{level}$ if ($\text{update}[i] \rightarrow \text{forward}[i] \neq x$) break;update $[i] \rightarrow \text{forward}[i] = x \rightarrow \text{forward}[i]$ free(x)while ($\text{list} \rightarrow \text{level} > 0$) && $\text{list} \rightarrow \text{header}$ $\rightarrow \text{forward}[\text{list} \rightarrow \text{level}]$ $= \text{NIL}$ $\text{list} \rightarrow \text{level} = \text{list} \rightarrow \text{level} - 1$

Search:

 $x = \text{list} \rightarrow \text{header}$ while ($x \rightarrow \text{forward}[i] \rightarrow \text{key}$) forward $[i]$ $x = x \rightarrow \text{forward}[0]$ if ($x \rightarrow \text{key} = \text{search key}$) return $x \rightarrow \text{value}$

else return false (or -999)

Skip list Diagram:



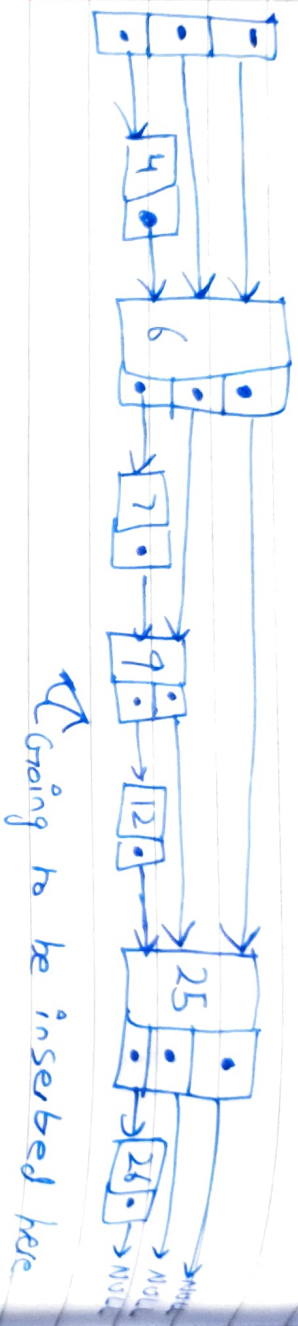
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Diagram 3 Insertion

Inserting 10



Deletion

Delete 9

