

# Deletion

Case-1

leaf

Case-2

Parent with

Sol: Break link

from

Parent

single child

So-child takes

26

30

Over

10

30

3

20

## Case: 3: Parent with both subtree

10

Sol – inorder next takes over

1 5 6 10 20 30 32

3 4 3 5 4 0 5 0

1st right & Extrem  
left

20

So

32

20

35

34

Tree -

Implementation →

Static array: 0th is  
root

8 8 % %

%

ith 2:11 left  
child

$21+2$  ki

light child

z

3

S

$P=1$

10 5 8 15 11 20

Oth

$21+1=3$

$2i+2=4$

15

5

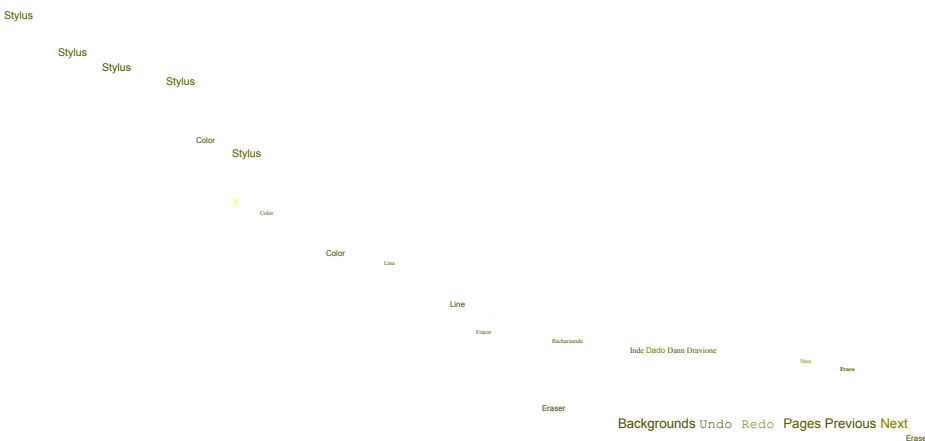
to

20

the: simple

to code & use

-veo Static



Data

& © DLL: Oynamic!

Detol

-

He

(One One  
can

g  
s  
s

One can  
only gote go top  
to bottom Sol:  
Sol: Recursion

1000

25

500

2000

10

Board Web Documents Show Desktop Open Board →

Board Web Documents Show Desktop Open Board →

the:  
Dynamic

the  
How  
Dynamic  
2000

3-  
3 → Dynamic → Tree  
node

50

100%

L

101

R

the : Both way  
Traversal

-ne: Too

Compl  
ex

DataStructures - NetBe  
View Navigate S

vaTestSynchronized  
Source

10

History

DataStructures - NetBeans IDE 8.2

View Navigate Source Refactor Run Debug Profile Team Tools Window Help

<default confi...TB

Q-Search (Ctrl+I)

VaTestSynchronizedBlock1.java RunnableExample.java ThreadJoin.java ThreadPriority.java \* ThreadSleep.java ThreadSync.java SortingDemo.java Search Demo.java Treemain.java

Source History

\* 1

class Node

1

cl

2

{

2



3

**int key;**

3

4

4

LO

5

16

16

17

{

17

18

**key**

18

19

19

20

}

20

21

}

21

}

22

22

23

p

**Node left, right;**

**public Node(int item)**

**left = right = null;**

**public class Treemain {**

**private Node root;**

**= item;**

Output

key

left

"right

Output

33°C  
Haze

33°C  
Haze

○ Search

◦

X



\* Toot

```
{root=n;} /
```

50

```
else
```

```
{
```

```
if(n.key<r.key)
```

```
{
```

```
if(r.left==null)
```

```
else
```

```
}
```

```
else
```

```
r.left=n;
```

```
insert(r.left,n);
```

insert (Ø (n)

root

50

insert)

insert (or, 9")

La insert (2" )

41

Output

33°C  
Haze

Search

E

⌵

⌵

⌵

28:37/1:13 INS

ENG  
IN

11:31  
18-11-2022

D

X

DataStructures - NetBeans IDE 8.2

File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help  
Navigator  
Services Files Projects  
<default confi...

...vaTestSynchronizedBlock1.java × RunnableExample.java ThreadJoin.java ThreadPriority.java ThreadSleep.java ThreadSync.java  
Source History

34

35

36

37

38

```
if(n.key<r.key)
{
    if(r.left==null)
```

```

    insert(r.left,n);
    r.left=n;
else
39
40
    }
41
else
42
43
44
45
    else
46
    if(r.right==null)
        r.right=n;

    insert(r.right,n);
47

Output
33°C
Haze
}
```

So

100

🔍 Search (Ctrl+I)

SortingDemo.java x Search Demo.java Treemain.java \*

U

insert (😊 R") insert CS

binsert (

Search

ENG

IN

47:10

11:36

18-11-2022

INS

D

Void Inorder Noder)

if (r!=  
null)



```
L 2 inorder (r.  
left) ; P  
5.0.pm (r.data);  
R2 inorder (r.  
right);
```



Treemain.java x

51  
52  
53  
54  
55

45

O L O L O L O

So

57

58

59

61

62

63

Output  
33°C  
Haze

Output  
33°C  
Haze

```
public void counter(Node r)
{
    if(r!=null)
```

Search

510205070

ENG  
IN

Q

616

11:50



Haze

33°C  
Haze

Output

33°C  
Haze

QSearch (Ctrl+I)

SearchDemo.java Treemain.java >

```
public void counter(Node r)
```

```
    if(r!=null)
```

```
        counter(r.left);
```

```
    // if(r.left==null && r.right==null)
```

```
        Treemain.c++;
```

```
        counter(r.right); •
```

20

15

30

C=x42

3456

Search

Search



# Types

UNWEIGHTED

$G$

UNDIRECTED

DIRECTED

WEIGHTED

$V_i$

Basic: Shows  
conn,

anything  
that

Can be used to  
take decision.

Scor-

$V_2$

Dest

V1

V2

3

V3

\*\*\*

# 1 Accept Source

put source on stack &  
mark it visited 3 Till

Stack not empty

3.1 Search any one

unvisited **Neighbours**

of Stack [tos] mark them

visited & put on stack if no

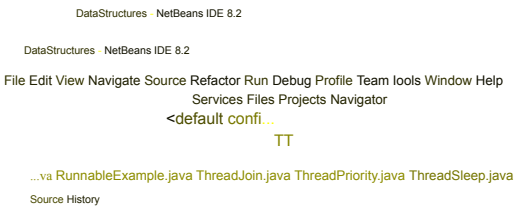


# un visited bound pop

## & go to Step 3

### póp

V2  
source



53

54

55

3

4

5

5

0

5

0

5

L

O

L

O

56

57

[ThreadSync.java](#) [Sorting Demo.java](#) [Search Demo.java](#) [Treemain.java](#) [Graph Demo.java](#) ×

```
public void DFS(int source)
{
    visited[source]=1; L
    System.out.println("V"+source);
    for(int i=0;i<v;i++)

        if(g[source][i]==1 && visited[i]!=1)
            //neighbour and unvisited

{
58
59
60
61
        {
62
            DFS(i);
63
        }
64
    }
65
```

Гол того

Q Search (Ctrl+I)

fli 194.

VoVV2V3

Xot

Q

SOLTY  
n

public boolean DFS\_search(int source,int key)

Search

Search

X

X

X

66:23  
INS

ENG

aX b

16:54

D

IN

18-11-2022

66:23

ENG  
IN

16:54  
18-11-2022

D  
d

84

85

86

87

88

89

```
public void BFS(int source)
{
    int q[]=new int[v]; d
    int front=0,rear=-1;
    Visited[source]=1;
    q[++rear]=source;__enqueue_
    while(front<=rear)//not empty

    int element=q[front++];__dequeue
    System.out.print("V"+element+"-");
```

90

91

{

92

93

94

95

96

{

97

Output

if(g[element][i]==1 && visited[i]!=1)//neighbour and unvisited

93:45

Search

ENG

P

IN

17:15

18-11-2022

D

for(int i=0;i<v;i++)

90

91

92  
93  
94

ThreadJoin.java ThreadPriority.java × ThreadSleep.java ThreadSync.java

```
while(front<=rear)//not empty
{
```

SortingDemo.java

Search Demo.java x Treemain.java Graph Demo.java

R

vo F#

```
int element=q[front++];//dequeue
System.out.print("V"+element+"-");
```

o

x  
l+1)

```
if(g[element][i]==1&& \visited[i]!=1)/neighbour and unvisited
```

```
visited[i]=1;_visited
q[++rear]=i;//enqueue
```

95  
96

```
for(int i=0;i<v;i++)
```

97  
98  
99

```
{
```

100  
101  
102

```
}
```



103

}

Output

2

18

ed

103.8

ENG

IN

17:18

18-11-2022

X  
2

Search

INS

103.8

INS

17:18

D

18-11-2022

DAccept  
source

2

Cost

C Mark all nodes  
 $\leq 00\}$

3 Mark Source

2-, 0f From @Till all  
not in sol/visited

4.1 - Search smallest  
path node

4.2

take it in sol/mark it visited  
4.37 **forward** its **Path** cost to all  
unvisited  
neighbour  
S.

```
Services Files Projects Navigator
DataStructures - NetBeans IDE 8.2
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
<default confi...
...va RunnableExample.java x
Source History
16
17
18
19
ThreadJoin.java ThreadPriority.java ThreadSleep.java ThreadSync.java Sorting Demo.java Search Demo.java Treemain.java Graph Demo.java

void createGraph(int nodes)
{
    v=nodes;
    Scanner in=new Scanner(System.in);
}
```

🔍 Search (Ctrl+F)



22

```
20  g=new int[v][v];
21  visited=new int[v];
22  for(int i=0;i<v;i++)
    12
23  {
24      for(int j=0;j<v;j++) 61236
        (23/0123
25      {
26
27
28
    2
    Vz vo
    System.out.println("Enter value for v"+i+" to v"+j+" (999 for infini
    g[i][j]=in.nextInt());
    VZTZ V2 V3
    V2 Vo
```

}

Output

Search

ENG  
IN

16:24

16:12  
18-11-2022

D  
INS  
INS

(

infini

29:5

INS  
X