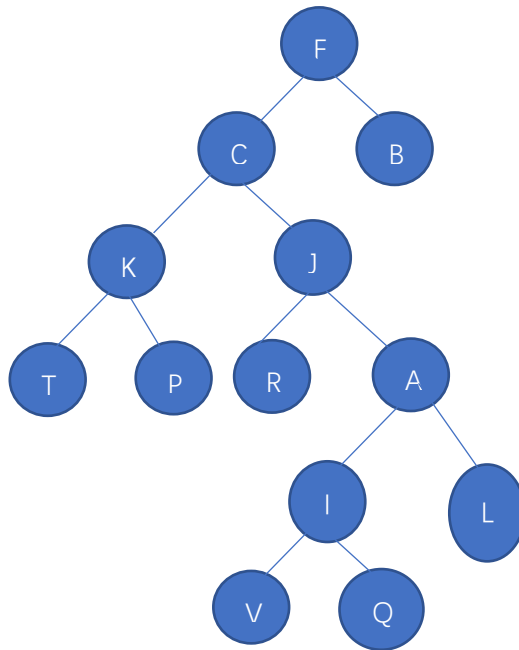


1 .



2.

F0,C1,B2,K3,J4,T7,P8,R9,A10,I21,L22,V43,Q44

explanation: E5 means element E at index 5

3. (1)

doubly linked list: because addFirst of array need $O(n)$ while doubly linked list just need $O(1)$

(2)

doubly linked list: because addbefore\after of array may need $O(n)$ if the position is index0, while doubly linked list just need $O(1)$

(3)

doubly linked list: because removal of array need $O(n)$ if the position is index0 while doubly linked list just need $O(1)$

4. $n=17$,

so it should be

1

2

4

8

2

(1) 10 17

(2) 10 25 40 19 45 16 12 8
15 17

(3) 10 14 13 8
15 25 40 19 45 16 12 9
18 17

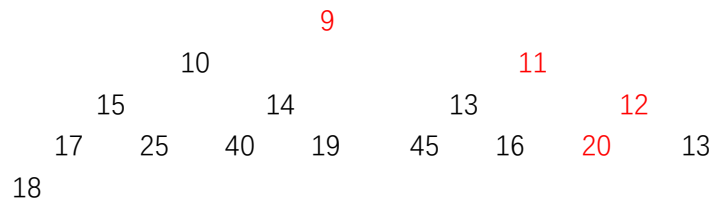
(4) 10 8 9
15 14 13
17 25 40 19 45 16 12 11
18 20

(5)

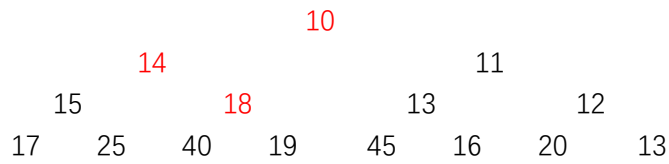
8
10 9
15 14 13 11
17 25 40 19 45 16 12 13
18 20

removeMin

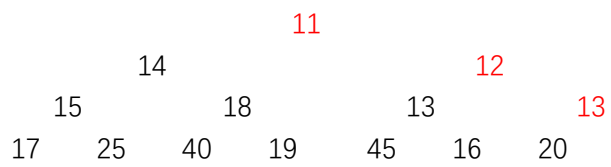
(1) return 8



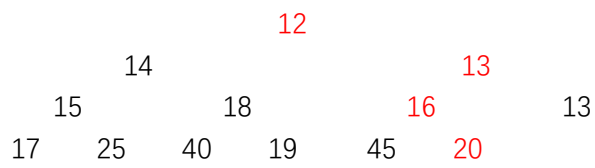
(2) return 9



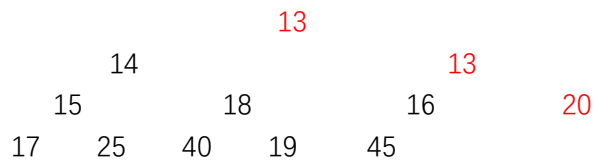
(3) return 10



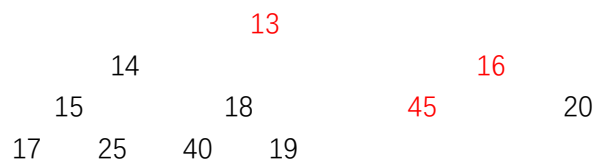
(4) return 11



(5) return 12



(6) return 13



5.

insert 10

10

insert 17

10

17

insert 15

10

17

15

insert 25

10

17

15

25

insert 40

10

17

15

25

40

insert 19

10

17

15

25

40

19

insert 45

10

17

15

25

40

19

45

insert 16

10

16

15

17

40

19

45

25

insert 12

10

12

15

16

40

19

45

25

17

insert 8

8

10

15

16

12

19

45

25

17

40

insert 18

```

      8
    10 15
  16 12 19 45
25 17 40 18
insert 14
      8
    10 14
  16 12 15 45
25 17 40 18 19
insert 13
      8
    10 13
  16 12 14 45
25 17 40 18 19 15
insert 9
      8
    10 9
  16 12 14 13
25 17 40 18 19 15 45
insert 20
      8
    10 9
  16 12 14 13
25 17 40 18 19 15 45 20
insert 11
      8
    10 9
  11 12 14 13
16 17 40 18 19 15 45 20
25
insert 13
      8
    10 9
  11 12 14 13
13 17 40 18 19 15 45 20
25 16

```