B\_TREE\_DELETE\_NONONE (x, k)

*i* = 1

**if** *x.leaf* //cases1

**while** *i* <= *x.n* && *k* > *x.keyi*

*i* = *i* + 1

**if** *k* == *x.keyi*

**for** *j* = *i* + 1 to *x.n*

*x.keyj* - 1 = *x.keyj*

*x.n* = *x.n* - 1

DISK\_WRITE(x)

**else** pinrt"the key does not exist"

**else**

**while** *i* <= *x.n* && *k* > *x.keyi*

*i* = *i* + 1

DISK\_READ(x.ci)

y = x.ci

if i <= x.n

DISK\_READ(x.ci + 1)

z = x.ci + 1

if k = x.keyi  //cases2

   if y.n > t - 1  //cases2a

   k′ = B\_TREE\_SEARCH\_PREDECESSOR(y)

  B\_TREE\_DELETE\_NONONE(y, k′)

  x.keyi = k′

elseif z.n > t - 1 //cases2b

k′ = B\_TREE\_SEARCH\_SUCCESSOR(z)

  B\_TREE\_DELETE\_NONONE(z,k′)

  x.keyi = k′

else

B\_TREE\_MERGE\_CHILD(x, i, y, z)//cases2c

   B\_TREE\_DELETE\_NONONE(y,k)

else //cases3

if i > 1

  DISK\_READ(x.ci - 1)

   p = x.ci - 1

   if y.n == t - 1

  if i > 1 && p.n > t - 1 //cases3a

  B-TREE-SHIFT-TO-RIGHT-CHILD(x,i,p,y)

   elseif i <= x.n && z.n > t - 1//cases3a

  B-TREE-SHIFT-TO-LEFT-CHILD(x,i,y,z)

elseif i>1  //cases3b

  B-TREE-MERGE-CHILD(x,i,p,y)

y = p

   else B-TREE-MERGE-CHILD(x,i,y,z)//cases3b

   B\_TREE\_DELETE\_NONONE(y,k)