B+ Tree User Manual

CSCI 331

Team 3

a.) Program name: main.cpp

b.) What is the program supposed to do?:

The program is given a file of sorted record keys and puts it through an algorithm that makes a B+ tree out of the keys. This program will also go through with adding and deleting keys from the tree. Otherwise the user can chose not to use a file and start with an empty tree that will either have keys of type integer or string.

c.) location of the program:

/export/home/cs331/cs331128/Desktop/331/project3

flags:

-i <FILENAME>	integers with file
-s <FILENAME>	strings with file
-i	empty tree with integer keys
-s	empty tree with string keys

d.) makefile:

```
CXX = g++
CXXFLAGS = -std=c++x0
        main: main.cpp bPTree.h node.h Queue.h shared.h
        $(CXX)  $(CXXFLAGS) main.cpp -o main
```

e.)test run:

-------------HELP MENU----------------------------

-i <FILENAME>   integers with file
-s <FILENAME>   strings with file

-i   empty tree with integer keys
-s   empty tree with string keys

END HELP FLAG TEST
END HELP FLAG TEST
END HELP FLAG TEST
END HELP FLAG TEST

Enter the number of values per block:
6Number of values per block have been set to: 6
The B+ tree has been created.

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3[]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

11
Key has been added

What would you like to do?

1. Add record

2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

15
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

14
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

43
Key has been added

What would you like to do?

1. Add record
2. Delete record

3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

64
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

33
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

66
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree

4. List values
5. Quit the program
1What is the int key you would like to add:

98
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

54
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[43]
[11 14 15 33] [43 54 64 66 98]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the int key you would like to delete:

11
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[43]
[14 15 33] [43 54 64 66 98]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the int key you would like to delete:

33
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[43]
[14 15 43] [54 64 66 98]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
4

14
15
43
54
64
66
98

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
5

Closing Program...

END EMPTY INT TREE TEST
END EMPTY INT TREE TEST
END EMPTY INT TREE TEST
END EMPTY INT TREE TEST

String file opened successfully

Enter the number of values per block:
6Number of values per block have been set to: 6
Loading keys into the tree...

The B+ tree has been created.

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3[]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

fd
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

kL
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

po
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

MM
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

gh
Key has been added

What would you like to do?

1. Add record

2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

Tr
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

VB
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

ZZ
Key has been added

What would you like to do?

1. Add record
2. Delete record

3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

xz
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[gh]
[MM Tr VB ZZ fd] [gh kL po xz]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the string key you would like to delete:

MM
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program

3
[gh]
[Tr VB ZZ fd] [gh kL po xz]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the string key you would like to delete:

fd
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[gh]
[Tr VB ZZ] [gh kL po xz]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the string key you would like to delete:

ZZ
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[gh]
[Tr VB gh] [kL po xz]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
4

Tr
VB
gh
kL
po
xz

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
5

Closing Program...

END EMPTY STRING TREE TEST
END EMPTY STRING TREE TEST

Integer file opened successfully

Enter the number of values per block:
6Number of values per block have been set to: 6
Loading keys into the tree...

The B+ tree has been created.

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[33 53 69]
[15 22 27] [39 45 49] [57 61 65] [74 78 82 87 91 95]
[10 11 13 14] [15 16 17 19] [22 24 25 26] [27 28 29 32] [33 35 36 37] [39 42 43 44] [45 46 47 48] [49 50 51 52] [53 54 55 56] [57 58 59 60] [61 62 63 64] [65 66 67 68] [69 70 71 72] [74 75 76 77] [78 79 80 81] [82 83 84 85] [87 88 89 90] [91 92 93 94] [95 97 98]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the int key you would like to delete:

82
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[33 53 69]
[15 22 27] [39 45 49] [57 61 65] [74 78 82 87 91 95]
[10 11 13 14] [15 16 17 19] [22 24 25 26] [27 28 29 32] [33 35 36 37] [39 42 43 44] [45 46 47 48] [49 50 51 52] [53 54 55 56] [57 58 59 60] [61 62 63 64] [65 66 67 68] [69 70 71 72] [74 75 76 77] [78 79 80 81] [83 84 85] [87 88 89 90] [91 92 93 94] [95 97 98]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the int key you would like to delete:

83
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[33 53 69]
[15 22 27] [39 45 49] [57 61 65] [74 78 87 91 95]
[10 11 13 14] [15 16 17 19] [22 24 25 26] [27 28 29 32] [33 35 36 37] [39 42 43 44] [45 46 47 48] [49 50 51 52] [53 54 55 56] [57 58 59 60] [61 62 63 64] [65 66 67 68] [69 70 71 72] [74 75 76 77] [78 79 80 81 82 84 85] [87 88 89 90] [91 92 93 94] [95 97 98]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the int key you would like to add:

83
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[33 53 69]
[15 22 27] [39 45 49] [57 61 65] [74 78 82 87 91 95]
[10 11 13 14] [15 16 17 19] [22 24 25 26] [27 28 29 32] [33 35 36 37] [39 42 43 44] [45 46 47 48] [49 50 51 52] [53 54 55 56] [57 58 59 60] [61 62 63 64] [65 66 67 68] [69 70 71 72] [74 75 76 77] [78 79 80 81] [82 83 84 85] [87 88 89 90] [91 92 93 94] [95 97 98]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
4

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98

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
5

Closing Program...

END INT INPUT FILE TREE TEST

String file opened successfully

Enter the number of values per block:
6Number of values per block have been set to: 6
Loading keys into the tree...

The B+ tree has been created.

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[IM aU]
[CE EA Gh] [MM Pf Vt] [cY eG jE mj rb vR]
[AB AZ Ar Bh] [CE CY DW Da] [EA Eb FD Gb] [Gh Gs HD Hu] [IM JI JL JW] [MM
MT NM Pa] [Pf Pi QR VZ] [Vt Vy Wi Yq] [aU bW bv cB] [cY dK dT dy] [eG eS gn iq]
[jE ji kp lS] [mj nF ot ra] [rb sK tX tq] [vR wv xx zi zv]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the string key you would like to delete:

Yq
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[IM aU]
[CE EA Gh] [MM Pf Vt] [cY eG jE mj rb vR]
[AB AZ Ar Bh] [CE CY DW Da] [EA Eb FD Gb] [Gh Gs HD Hu] [IM JI JL JW] [MM MT NM Pa] [Pf Pi QR VZ] [Vt Vy Wi] [aU bW bv cB] [cY dK dT dy] [eG eS gn iq] [jE ji kp lS] [mj nF ot ra] [rb sK tX tq] [vR wv xx zi zv]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
2
What is the string key you would like to delete:

zv
Key has been deleted from the tree

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[IM aU]
[CE EA Gh] [MM Pf Vt] [cY eG jE mj rb vR]

[AB AZ Ar Bh] [CE CY DW Da] [EA Eb FD Gb] [Gh Gs HD Hu] [IM JI JL JW] [MM MT NM Pa] [Pf Pi QR VZ] [Vt Vy Wi] [aU bW bv cB] [cY dK dT dy] [eG eS gn iq] [jE ji kp lS] [mj nF ot ra] [rb sK tX tq] [vR wv xx zi]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
1What is the string key you would like to add:

zz
Key has been added

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
3
[IM aU]
[CE EA Gh] [MM Pf Vt] [cY eG jE mj rb vR]
[AB AZ Ar Bh] [CE CY DW Da] [EA Eb FD Gb] [Gh Gs HD Hu] [IM JI JL JW] [MM MT NM Pa] [Pf Pi QR VZ] [Vt Vy Wi] [aU bW bv cB] [cY dK dT dy] [eG eS gn iq] [jE ji kp lS] [mj nF ot ra] [rb sK tX tq] [vR wv xx zi zz]

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
4

AB

AZ
Ar
Bh
CE
CY
DW
Da
EA
Eb
FD
Gb
Gh
Gs
HD
Hu
IM
JI
JL
JW
MM
MT
NM
Pa
Pf
Pi
QR
VZ
Vt
Vy
Wi
aU
bW
bv
cB
cY
dK
dT
dy
eG
eS
gn
iq
jE

ji
kp
lS
mj
nF
ot
ra
rb
sK
tX
tq
vR
wv
xx
zi
zz

What would you like to do?

1. Add record
2. Delete record
3. Show tree
4. List values
5. Quit the program
5

Closing Program...

END STRING INPUT FILE TREE TEST
END STRING INPUT FILE TREE TEST
END STRING INPUT FILE TREE TEST
END STRING INPUT FILE TREE TEST

    f.)known errors:

        none currently.