

Cover Page

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Section: 2023 Fall Term (1) Algorithms I CSCI 700 231[25504] (Queens College)

Project#: 4

Project Name: Quadtree representation of binary images (C++)

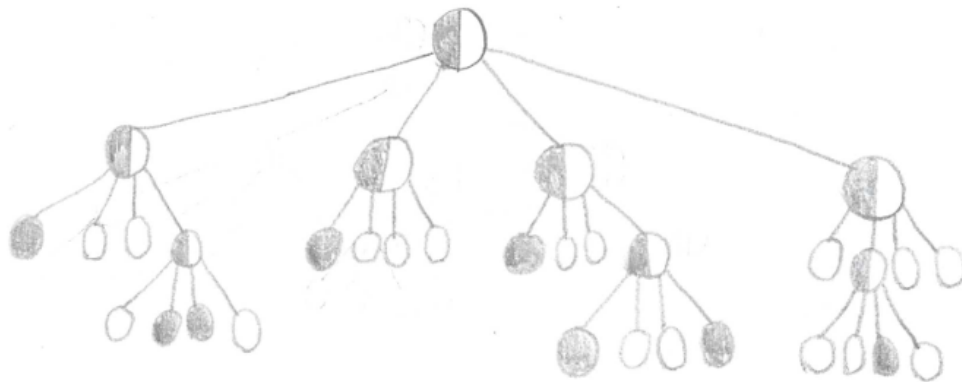
Due Date: 10/12/2023 Thursday before midnight

Algorithm Steps:

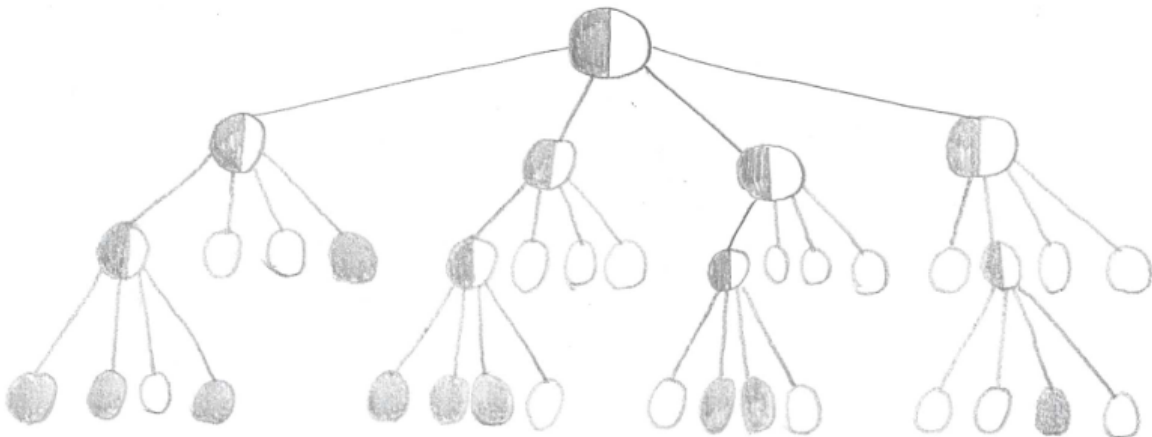
step 0: inFile, outFile1, outFile2, debugFile open from argv []
step 1: numRows, numCols, minVal, maxVal read from inFile
step 2: power2Size computePower2(numRows, numCols, debugFile)
 outFile2 output power2Size to outFile2 with caption
step 3: imgAry dynamically allocate the array size of power2Size by power2Size
step 4: zero2DAry (imgAry)
step 5: newImgAry dynamically allocate the array size of power2Size by power2Size
step 6: zero2DAry (newImgAry)
step 7: loadImage (inFile, imgAry)
step 8: QtRoot BuildQuadTree (imgAry, 0, 0, power2Size, debugFile)
step 9: preOrder (QtRoot, outFile1)
step 10: postOrder (QtRoot, outFile1)
step 11: debugFile "calling getLeaf (..) to recreate the image from quadtree"
step 12: getLeaf (QtRoot, newImgAry, debugFile)
step 13: outFile2 output imgAry with caption
 outFile2 " Here is the recreated image"
 outFile2 numRows, numCols, minVal, maxVal
 outFile2 output newImgAry
step 14: close all files

Illustration

****Illustration of img1****

[illegible]

****Illustration of img2****

[illegible]

Source Code

```
#include <iostream>
#include <fstream>

using namespace std;

class QtNode {
public:
    int color;
    int upperR;
    int upperC;
    int size;
    QtNode* NW = NULL;
    QtNode* NE = NULL;
```

```

QtNode* SW = NULL;
QtNode* SE = NULL;
QtNode(int color, int upperR, int upperC, int size, QtNode* NW, QtNode* NE, QtNode* SW, QtNode* SE) {
    this->color = color;
    this->upperR = upperR;
    this->upperC = upperC;
    this->size = size;
    this->NW = NW;
    this->NE = NE;
    this->SW = SW;
    this->SE = SE;
}
};
void printQtNode(QtNode* qtNode, ofstream& debugFile);

```

```

class QuadTree {
public:
    QtNode* QtRoot;
    int numRows, numCols, minVal, maxVal;
    int** imgAry;
    int** newImgAry;
    QuadTree(){}
};

```

```

int computerPower2(int numRows, int numCols, ofstream& debugFile);
void zero2DAry(int** ary, int aryLength);
void loadImage(ifstream& inFile, int** imgAry, int imgR, int imgC);
QtNode* buildQuadTree(int** imgAry, int upR, int upC, int size, ofstream& debugFile);
int addKidsColor(QtNode node);
bool isLeaf(QtNode* node);
void preOrder(QtNode* QtRoot, ofstream& outFile1);
void postOrder(QtNode* QtRoot, ofstream& outFile1);
void getLeaf(QtNode* QtRoot, int** newImgAry, ofstream& debugFile);
void fillnewImgAry(QtNode* QtRoot, int** newImgAry, ofstream& debugFile);

```

```

ifstream inFile;
ofstream outFile1, outFile2, debugFile;
QuadTree myQT = QuadTree();

```

```

int main(int argc, const char* argv[])
{
    inFile.open(argv[1]);
    outFile1.open(argv[2]);
    outFile2.open(argv[3]);
    debugFile.open(argv[4]);

```

```

    inFile >> myQT.numRows >> myQT.numCols >> myQT.minVal >> myQT.maxVal;
    int power2Size = computerPower2(myQT.numRows, myQT.numCols, debugFile);
    outFile2 << "power2Size = " << power2Size << endl;

```

```

    myQT.imgAry = new int*[power2Size];
    for (int i = 0; i < power2Size; i++) {
        myQT.imgAry[i] = new int[power2Size];
    }
    zero2DAry(myQT.imgAry, power2Size);

```

```

    myQT.newImgAry = new int* [power2Size];
    for (int i = 0; i < power2Size; i++) {
        myQT.newImgAry[i] = new int[power2Size];
    }
    zero2DAry(myQT.newImgAry, power2Size);

```

```

loadImage(inFile, myQT.imgAry, myQT.numRows, myQT.numCols);

myQT.QtRoot = buildQuadTree(myQT.imgAry, 0, 0, power2Size, debugFile);
outFile1 << "***Below is preOrder**\n";
preOrder(myQT.QtRoot, outFile1);
outFile1 << "\n***Below is postOrder**\n";
postOrder(myQT.QtRoot, outFile1);
debugFile << "Calling getLeaf() method to recreate the image from quadtree!\n";
getLeaf(myQT.QtRoot, myQT.newImgAry, debugFile);

outFile2 << "***Below is imgAry***\n";
for (int i = 0; i < power2Size; i++)
{
    for (int j = 0; j < power2Size; j++) {
        outFile2 << myQT.imgAry[i][j] << " ";
    }
    outFile2 << endl;
}

outFile2 << "***Here is the recreated image***\n";
outFile2 << myQT.numRows << " " << myQT.numCols << " " << myQT.minVal << " " << myQT.maxVal << endl;
for (int i = 0; i < myQT.numRows; i++)
{
    for (int j = 0; j < myQT.numCols; j++) {
        outFile2 << myQT.newImgAry[i][j] << " ";
    }
    outFile2 << endl;
}

inFile.close();
outFile1.close();
outFile2.close();
debugFile.close();
}

void printQtNode(QtNode* node, ofstream& outFile) {
    debugFile << "Entering printQtNode method!\n";
    if (node->color == 5) {
        int nwColor = -1, neColor = -1, swColor = -1, seColor = -1;
        if (node->NW != NULL) { nwColor = node->NW->color; }
        if (node->NE != NULL) { neColor = node->NE->color; }
        if (node->SW != NULL) { swColor = node->SW->color; }
        if (node->SE != NULL) { seColor = node->SE->color; }
        outFile << node->color << " " << node->upperR << " " << node->upperC << " " << node->size << " "
            << nwColor << " " << neColor << " " << swColor << " " << seColor << endl;
    }
    else {
        outFile << node->color << " " << node->upperR << " " << node->upperC << " " << node->size << " " << -1, -1, -1, -1 << endl;
    }
    debugFile << "Leaving printQtNode method!\n";
}

int computerPower2(int numRows, int numCols, ofstream& debugFile) {
    debugFile << "Entering computerPower2 method!\n";
    int size = max(numRows, numCols);
    int power2 = 2;
    while (size > power2) {
        power2 *= 2;
    }
    debugFile << "Leaving computerPower2 method, power2 is " << power2 << endl;
    return power2;
}

```

```

void zero2DAry(int** ary, int aryLength)
{
    for (int i = 0; i < aryLength; i++)
    {
        for (int j = 0; j < aryLength; j++)
        {
            ary[i][j] = 0;
        }
    }
}

void loadImage(ifstream& inFile, int** imgAry, int imgR, int imgC) {
    for (int i = 0; i < imgR; i++) {
        for (int j = 0; j < imgC; j++)
        {
            inFile >> imgAry[i][j];
        }
    }
}

QtNode* buildQuadTree(int** imgAry, int upR, int upC, int size, ofstream& debugFile) {
    debugFile << "Entering buildQuadTree: upR=" << upR << " upC=" << upC << " and size=" << size << endl;
    QtNode* newQtNode = new QtNode(-1, upR, upC, size, NULL, NULL, NULL, NULL);
    int halfSize;
    int sumColor;
    if (size == 1) {
        newQtNode->color = imgAry[upR][upC];
    }
    else {
        halfSize = size / 2;
        newQtNode->NW = buildQuadTree(imgAry, upR, upC, halfSize, debugFile);
        newQtNode->NE = buildQuadTree(imgAry, upR, (upC + halfSize), halfSize, debugFile);
        newQtNode->SW = buildQuadTree(imgAry, (upR + halfSize), upC, halfSize, debugFile);
        newQtNode->SE = buildQuadTree(imgAry, (upR + halfSize), (upC + halfSize), halfSize, debugFile);

        sumColor = addKidsColor(*newQtNode);
        debugFile << "The sumColor is " << sumColor << endl;
        if (sumColor == 0) {
            newQtNode->color = 0;
            delete newQtNode->NW;
            delete newQtNode->NE;
            delete newQtNode->SW;
            delete newQtNode->SE;
            newQtNode->NW = NULL;
            newQtNode->NE = NULL;
            newQtNode->SW = NULL;
            newQtNode->SE = NULL;
        }
        else if (sumColor == 4) {
            newQtNode->color = 1;
            delete newQtNode->NW;
            delete newQtNode->NE;
            delete newQtNode->SW;
            delete newQtNode->SE;
            newQtNode->NW = NULL;
            newQtNode->NE = NULL;
            newQtNode->SW = NULL;
            newQtNode->SE = NULL;
        }
        else {
            newQtNode->color = 5;

```

```

    }
}
printQtNode(newQtNode, debugFile);
debugFile << "Leaving buildQuadTree!\n";
return newQtNode;
}

int addKidsColor(QtNode node) {
    int a = 0, b = 0, c = 0, d = 0;
    if (node.NW != NULL) { a = node.NW->color; }
    if (node.NE != NULL) { b = node.NE->color; }
    if (node.SW != NULL) { c = node.SW->color; }
    if (node.SE != NULL) { d = node.SE->color; }
    return a+b+c+d;
}

bool isLeaf(QtNode* node) {
    if (node->color == 5) {
        return false;
    }
    return true;
}

void preOrder(QtNode* QtRoot, ofstream& outFile1) {
    if (isLeaf(QtRoot)) {
        printQtNode(QtRoot, outFile1);
    }
    else {
        printQtNode(QtRoot, outFile1);
        preOrder(QtRoot->NW, outFile1);
        preOrder(QtRoot->NE, outFile1);
        preOrder(QtRoot->SW, outFile1);
        preOrder(QtRoot->SE, outFile1);
    }
}

void postOrder(QtNode* QtRoot, ofstream& outFile1) {
    if (isLeaf(QtRoot)) {
        printQtNode(QtRoot, outFile1);
    }
    else {
        preOrder(QtRoot->NW, outFile1);
        preOrder(QtRoot->NE, outFile1);
        preOrder(QtRoot->SW, outFile1);
        preOrder(QtRoot->SE, outFile1);
        printQtNode(QtRoot, outFile1);
    }
}

void getLeaf(QtNode* QtRoot, int** newImgAry, ofstream& debugFile) {
    debugFile << "Entering getLeaf method!\n";
    if (isLeaf(QtRoot)) {
        fillnewImgAry(QtRoot, newImgAry, debugFile);
    }
    else {
        getLeaf(QtRoot->NW, newImgAry, debugFile);
        getLeaf(QtRoot->NE, newImgAry, debugFile);
        getLeaf(QtRoot->SW, newImgAry, debugFile);
        getLeaf(QtRoot->SE, newImgAry, debugFile);
    }
    debugFile << "Leaving getLeaf method.\n";
}

```

```
void fillnewImgAry(QtNode* QtRoot, int** newImgAry, ofstream& debugFile) {
    debugFile << "Entering fillnewImgAry method!\n";
    int color, R, C, sz;
    color = QtRoot->color;
    R = QtRoot->upperR;
    C = QtRoot->upperC;
    sz = QtRoot->size;
    for (int i = R; i < R + sz; i++) {
        for (int j = C; j < C + sz; j++) {
            newImgAry[i][j] = color;
        }
    }
    debugFile << "Leaving fillnewImgAry method.\n";
}
```


Program Output

****outFile1 for img1****

****Below is preOrder****

```
5, 0, 0, 32, 5, 5, 5, 5
5, 0, 0, 16, 1, 0, 0, 5
1, 0, 0, 8, -1, -1, -1, -1
0, 0, 8, 8, -1, -1, -1, -1
0, 8, 0, 8, -1, -1, -1, -1
5, 8, 8, 8, 0, 1, 1, 0
0, 8, 8, 4, -1, -1, -1, -1
1, 8, 12, 4, -1, -1, -1, -1
1, 12, 8, 4, -1, -1, -1, -1
0, 12, 12, 4, -1, -1, -1, -1
5, 0, 16, 16, 1, 0, 0, 0
1, 0, 16, 8, -1, -1, -1, -1
0, 0, 24, 8, -1, -1, -1, -1
0, 8, 16, 8, -1, -1, -1, -1
0, 8, 24, 8, -1, -1, -1, -1
5, 16, 0, 16, 1, 0, 0, 5
1, 16, 0, 8, -1, -1, -1, -1
0, 16, 8, 8, -1, -1, -1, -1
0, 24, 0, 8, -1, -1, -1, -1
5, 24, 8, 8, 1, 0, 0, 1
1, 24, 8, 4, -1, -1, -1, -1
0, 24, 12, 4, -1, -1, -1, -1
0, 28, 8, 4, -1, -1, -1, -1
1, 28, 12, 4, -1, -1, -1, -1
5, 16, 16, 16, 0, 5, 0, 0
0, 16, 16, 8, -1, -1, -1, -1
5, 16, 24, 8, 0, 0, 1, 0
0, 16, 24, 4, -1, -1, -1, -1
0, 16, 28, 4, -1, -1, -1, -1
1, 20, 24, 4, -1, -1, -1, -1
0, 20, 28, 4, -1, -1, -1, -1
0, 24, 16, 8, -1, -1, -1, -1
0, 24, 24, 8, -1, -1, -1, -1
```

****Below is postOrder****

```
5, 0, 0, 16, 1, 0, 0, 5
1, 0, 0, 8, -1, -1, -1, -1
0, 0, 8, 8, -1, -1, -1, -1
0, 8, 0, 8, -1, -1, -1, -1
5, 8, 8, 8, 0, 1, 1, 0
0, 8, 8, 4, -1, -1, -1, -1
1, 8, 12, 4, -1, -1, -1, -1
1, 12, 8, 4, -1, -1, -1, -1
0, 12, 12, 4, -1, -1, -1, -1
5, 0, 16, 16, 1, 0, 0, 0
1, 0, 16, 8, -1, -1, -1, -1
0, 0, 24, 8, -1, -1, -1, -1
0, 8, 16, 8, -1, -1, -1, -1
0, 8, 24, 8, -1, -1, -1, -1
5, 16, 0, 16, 1, 0, 0, 5
1, 16, 0, 8, -1, -1, -1, -1
0, 16, 8, 8, -1, -1, -1, -1
0, 24, 0, 8, -1, -1, -1, -1
5, 24, 8, 8, 1, 0, 0, 1
1, 24, 8, 4, -1, -1, -1, -1
0, 24, 12, 4, -1, -1, -1, -1
0, 28, 8, 4, -1, -1, -1, -1
1, 28, 12, 4, -1, -1, -1, -1
```

[illegible]

[illegible]****debugFile for img1****

Entering computerPower2 method!

Leaving computerPower2 method, power2 is 32

Entering buildQuadTree: upR=0 upC=0 and size=32

Entering buildQuadTree: upR=0 upC=0 and size=16

Entering buildQuadTree: upR=0 upC=0 and size=8

Entering buildQuadTree: upR=0 upC=0 and size=4

Entering buildQuadTree: upR=0 upC=0 and size=2

Entering buildQuadTree: upR=0 upC=0 and size=1

Entering printQtNode method!

1, 0, 0, 1, -1, -1, -1, -1

Leaving printQtNode

Leaving buildQuadTree!

Entering buildQuadTree:

Entering printQtNode method!

1, 0, 1, 1, -1, -1, -1, -1

Leaving printQtNode

Leaving buildQuadTree!

Entering buildQuadTree: upR=

Entering printQtNode method!

$$1, 1, 0, 1, -1, -1, -1, -1$$

Leaving printQtNode

Leaving buildQuadTree!

Entering buildQuadTree: upR=

Entering printQtNode method!

1, 1, 1, 1, -1, -1, -1, -1

Leaving printQtNode

Leaving buildQuadTree!

The sumColor is 4

Entering printQtNo

1, 0, 0, 2, -1, -1, -1, -1

Leaving printQtNode

Leaving buildQuadTree!

Entering buildQuadTree: upR=0 upC=2 and size=2

Entering buildQuadTree: upR=0 upC=2 and size=1

Entering printQtNode method!

1, 0, 2, 1, -1, -1, -1, -1

Leaving printQtNode method!

Leaving buildQuadTree!

Entering buildQuadTree: upR=0 upC=3 and size=1

Entering printQtNode method!

1, 0, 3, 1, -1, -1, -1, -1

Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=1 upC=2 and size=1
 Entering printQtNode method!
 1, 1, 2, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=1 upC=3 and size=1
 Entering printQtNode method!
 1, 1, 3, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 The sumColor is 4
 Entering printQtNode method!
 1, 0, 2, 2, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=2 upC=0 and size=2
 Entering buildQuadTree: upR=2 upC=0 and size=1
 Entering printQtNode method!
 1, 2, 0, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=2 upC=1 and size=1
 Entering printQtNode method!
 1, 2, 1, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=3 upC=0 and size=1
 Entering printQtNode method!
 1, 3, 0, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=3 upC=1 and size=1
 Entering printQtNode method!
 1, 3, 1, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 The sumColor is 4
 Entering printQtNode method!
 1, 2, 0, 2, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=2 upC=2 and size=2
 Entering buildQuadTree: upR=2 upC=2 and size=1
 Entering printQtNode method!
 1, 2, 2, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=2 upC=3 and size=1
 Entering printQtNode method!
 1, 2, 3, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=3 upC=2 and size=1
 Entering printQtNode method!
 1, 3, 2, 1, -1, -1, -1, -1
 Leaving printQtNode method!
 Leaving buildQuadTree!
 Entering buildQuadTree: upR=3 upC=3 and size=1
 Entering printQtNode method!
 1, 3, 3, 1, -1, -1, -1, -1

Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 2, 2, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 0, 0, 4, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=4 and size=4
Entering buildQuadTree: upR=0 upC=4 and size=2
Entering buildQuadTree: upR=0 upC=4 and size=1
Entering printQtNode method!
1, 0, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=5 and size=1
Entering printQtNode method!
1, 0, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=4 and size=1
Entering printQtNode method!
1, 1, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=5 and size=1
Entering printQtNode method!
1, 1, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 0, 4, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=6 and size=2
Entering buildQuadTree: upR=0 upC=6 and size=1
Entering printQtNode method!
1, 0, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=7 and size=1
Entering printQtNode method!
1, 0, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=6 and size=1
Entering printQtNode method!
1, 1, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=7 and size=1
Entering printQtNode method!
1, 1, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!

1, 0, 6, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=4 and size=2
Entering buildQuadTree: upR=2 upC=4 and size=1
Entering printQtNode method!
1, 2, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=5 and size=1
Entering printQtNode method!
1, 2, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=4 and size=1
Entering printQtNode method!
1, 3, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=5 and size=1
Entering printQtNode method!
1, 3, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 2, 4, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=6 and size=2
Entering buildQuadTree: upR=2 upC=6 and size=1
Entering printQtNode method!
1, 2, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=7 and size=1
Entering printQtNode method!
1, 2, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=6 and size=1
Entering printQtNode method!
1, 3, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!

****outFile1 for img2****

****Below is preOrder****

```
5, 0, 0, 32, 5, 5, 5, 5
5, 0, 0, 16, 5, 0, 0, 1
5, 0, 0, 8, 1, 1, 0, 1
1, 0, 0, 4, -1, -1, -1, -1
1, 0, 4, 4, -1, -1, -1, -1
0, 4, 0, 4, -1, -1, -1, -1
1, 4, 4, 4, -1, -1, -1, -1
0, 0, 8, 8, -1, -1, -1, -1
0, 8, 0, 8, -1, -1, -1, -1
1, 8, 8, 8, -1, -1, -1, -1
5, 0, 16, 16, 5, 0, 0, 0
5, 0, 16, 8, 1, 1, 1, 0
1, 0, 16, 4, -1, -1, -1, -1
1, 0, 20, 4, -1, -1, -1, -1
1, 4, 16, 4, -1, -1, -1, -1
0, 4, 20, 4, -1, -1, -1, -1
0, 0, 24, 8, -1, -1, -1, -1
0, 8, 16, 8, -1, -1, -1, -1
0, 8, 24, 8, -1, -1, -1, -1
5, 16, 0, 16, 5, 0, 0, 0
5, 16, 0, 8, 0, 1, 1, 0
0, 16, 0, 4, -1, -1, -1, -1
1, 16, 4, 4, -1, -1, -1, -1
1, 20, 0, 4, -1, -1, -1, -1
0, 20, 4, 4, -1, -1, -1, -1
0, 16, 8, 8, -1, -1, -1, -1
0, 24, 0, 8, -1, -1, -1, -1
0, 24, 8, 8, -1, -1, -1, -1
5, 16, 16, 16, 0, 5, 0, 0
0, 16, 16, 8, -1, -1, -1, -1
5, 16, 24, 8, 0, 0, 1, 0
0, 16, 24, 4, -1, -1, -1, -1
0, 16, 28, 4, -1, -1, -1, -1
1, 20, 24, 4, -1, -1, -1, -1
0, 20, 28, 4, -1, -1, -1, -1
0, 24, 16, 8, -1, -1, -1, -1
0, 24, 24, 8, -1, -1, -1, -1
```

****Below is postOrder****

```
5, 0, 0, 16, 5, 0, 0, 1
5, 0, 0, 8, 1, 1, 0, 1
1, 0, 0, 4, -1, -1, -1, -1
1, 0, 4, 4, -1, -1, -1, -1
0, 4, 0, 4, -1, -1, -1, -1
1, 4, 4, 4, -1, -1, -1, -1
0, 0, 8, 8, -1, -1, -1, -1
0, 8, 0, 8, -1, -1, -1, -1
1, 8, 8, 8, -1, -1, -1, -1
5, 0, 16, 16, 5, 0, 0, 0
5, 0, 16, 8, 1, 1, 1, 0
1, 0, 16, 4, -1, -1, -1, -1
1, 0, 20, 4, -1, -1, -1, -1
1, 4, 16, 4, -1, -1, -1, -1
0, 4, 20, 4, -1, -1, -1, -1
0, 0, 24, 8, -1, -1, -1, -1
0, 8, 16, 8, -1, -1, -1, -1
0, 8, 24, 8, -1, -1, -1, -1
5, 16, 0, 16, 5, 0, 0, 0
5, 16, 0, 8, 0, 1, 1, 0
```

```

0, 16, 0, 4, -1, -1, -1, -1
1, 16, 4, 4, -1, -1, -1, -1
1, 20, 0, 4, -1, -1, -1, -1
0, 20, 4, 4, -1, -1, -1, -1
0, 16, 8, 8, -1, -1, -1, -1
0, 24, 0, 8, -1, -1, -1, -1
0, 24, 8, 8, -1, -1, -1, -1
5, 16, 16, 16, 0, 5, 0, 0
0, 16, 16, 8, -1, -1, -1, -1
5, 16, 24, 8, 0, 0, 1, 0
0, 16, 24, 4, -1, -1, -1, -1
0, 16, 28, 4, -1, -1, -1, -1
1, 20, 24, 4, -1, -1, -1, -1
0, 20, 28, 4, -1, -1, -1, -1
0, 24, 16, 8, -1, -1, -1, -1
0, 24, 24, 8, -1, -1, -1, -1
5, 0, 0, 32, 5, 5, 5, 5

```

****outFile2 for img2****

[illegible]

****debugFile for img2****

```

Entering computerPower2 method!
Leaving computerPower2 method, power2 is 32
Entering buildQuadTree: upR=0 upC=0 and size=32
Entering buildQuadTree: upR=0 upC=0 and size=16
Entering buildQuadTree: upR=0 upC=0 and size=8
Entering buildQuadTree: upR=0 upC=0 and size=4
Entering buildQuadTree: upR=0 upC=0 and size=2
Entering buildQuadTree: upR=0 upC=0 and size=1
Entering printQtNode method!
1, 0, 0, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=1 and size=1
Entering printQtNode method!
1, 0, 1, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=0 and size=1
Entering printQtNode method!
1, 1, 0, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=1 and size=1
Entering printQtNode method!
1, 1, 1, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 0, 0, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=2 and size=2
Entering buildQuadTree: upR=0 upC=2 and size=1
Entering printQtNode method!
1, 0, 2, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=3 and size=1
Entering printQtNode method!
1, 0, 3, 1, -1, -1, -1, -1
Leaving printQtNode method!

```

Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=2 and size=1
Entering printQtNode method!
1, 1, 2, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=3 and size=1
Entering printQtNode method!
1, 1, 3, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 0, 2, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=0 and size=2
Entering buildQuadTree: upR=2 upC=0 and size=1
Entering printQtNode method!
1, 2, 0, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=1 and size=1
Entering printQtNode method!
1, 2, 1, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=0 and size=1
Entering printQtNode method!
1, 3, 0, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=1 and size=1
Entering printQtNode method!
1, 3, 1, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 2, 0, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=2 and size=2
Entering buildQuadTree: upR=2 upC=2 and size=1
Entering printQtNode method!
1, 2, 2, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=3 and size=1
Entering printQtNode method!
1, 2, 3, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=2 and size=1
Entering printQtNode method!
1, 3, 2, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=3 and size=1
Entering printQtNode method!
1, 3, 3, 1, -1, -1, -1, -1
Leaving printQtNode method!

Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 2, 2, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 0, 0, 4, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=4 and size=4
Entering buildQuadTree: upR=0 upC=4 and size=2
Entering buildQuadTree: upR=0 upC=4 and size=1
Entering printQtNode method!
1, 0, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=5 and size=1
Entering printQtNode method!
1, 0, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=4 and size=1
Entering printQtNode method!
1, 1, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=5 and size=1
Entering printQtNode method!
1, 1, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 0, 4, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=6 and size=2
Entering buildQuadTree: upR=0 upC=6 and size=1
Entering printQtNode method!
1, 0, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=7 and size=1
Entering printQtNode method!
1, 0, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=6 and size=1
Entering printQtNode method!
1, 1, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=7 and size=1
Entering printQtNode method!
1, 1, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 0, 6, 2, -1, -1, -1, -1

Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=4 and size=2
Entering buildQuadTree: upR=2 upC=4 and size=1
Entering printQtNode method!
1, 2, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=5 and size=1
Entering printQtNode method!
1, 2, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=4 and size=1
Entering printQtNode method!
1, 3, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=5 and size=1
Entering printQtNode method!
1, 3, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 4
Entering printQtNode method!
1, 2, 4, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=6 and size=2
Entering buildQuadTree: upR=2 upC=6 and size=1
Entering printQtNode method!
1, 2, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=7 and size=1
Entering printQtNode method!
1, 2, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=6 and size=1
Entering printQtNode method!
1, 3, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!

****outFile1 for img3****

****Below is preOrder****

```
5, 0, 0, 64, 5, 5, 5, 5
5, 0, 0, 32, 0, 5, 5, 5
0, 0, 0, 16, -1, -1, -1, -1
5, 0, 16, 16, 0, 0, 5, 1
0, 0, 16, 8, -1, -1, -1, -1
0, 0, 24, 8, -1, -1, -1, -1
5, 8, 16, 8, 1, 0, 1, 1
1, 8, 16, 4, -1, -1, -1, -1
0, 8, 20, 4, -1, -1, -1, -1
1, 12, 16, 4, -1, -1, -1, -1
1, 12, 20, 4, -1, -1, -1, -1
1, 8, 24, 8, -1, -1, -1, -1
5, 16, 0, 16, 0, 0, 1, 1
0, 16, 0, 8, -1, -1, -1, -1
0, 16, 8, 8, -1, -1, -1, -1
1, 24, 0, 8, -1, -1, -1, -1
1, 24, 8, 8, -1, -1, -1, -1
5, 16, 16, 16, 0, 1, 0, 0
0, 16, 16, 8, -1, -1, -1, -1
1, 16, 24, 8, -1, -1, -1, -1
0, 24, 16, 8, -1, -1, -1, -1
0, 24, 24, 8, -1, -1, -1, -1
5, 0, 32, 32, 5, 5, 0, 5
5, 0, 32, 16, 0, 0, 5, 0
0, 0, 32, 8, -1, -1, -1, -1
0, 0, 40, 8, -1, -1, -1, -1
5, 8, 32, 8, 1, 1, 0, 1
1, 8, 32, 4, -1, -1, -1, -1
1, 8, 36, 4, -1, -1, -1, -1
0, 12, 32, 4, -1, -1, -1, -1
1, 12, 36, 4, -1, -1, -1, -1
0, 8, 40, 8, -1, -1, -1, -1
5, 0, 48, 16, 0, 0, 1, 1
0, 0, 48, 8, -1, -1, -1, -1
0, 0, 56, 8, -1, -1, -1, -1
1, 8, 48, 8, -1, -1, -1, -1
1, 8, 56, 8, -1, -1, -1, -1
0, 16, 32, 16, -1, -1, -1, -1
5, 16, 48, 16, 1, 0, 0, 1
1, 16, 48, 8, -1, -1, -1, -1
0, 16, 56, 8, -1, -1, -1, -1
0, 24, 48, 8, -1, -1, -1, -1
1, 24, 56, 8, -1, -1, -1, -1
5, 32, 0, 32, 0, 5, 0, 0
0, 32, 0, 16, -1, -1, -1, -1
5, 32, 16, 16, 0, 0, 0, 1
0, 32, 16, 8, -1, -1, -1, -1
0, 32, 24, 8, -1, -1, -1, -1
0, 40, 16, 8, -1, -1, -1, -1
1, 40, 24, 8, -1, -1, -1, -1
0, 48, 0, 16, -1, -1, -1, -1
0, 48, 16, 16, -1, -1, -1, -1
5, 32, 32, 32, 5, 0, 0, 0
5, 32, 32, 16, 0, 0, 1, 0
0, 32, 32, 8, -1, -1, -1, -1
0, 32, 40, 8, -1, -1, -1, -1
1, 40, 32, 8, -1, -1, -1, -1
0, 40, 40, 8, -1, -1, -1, -1
0, 32, 48, 16, -1, -1, -1, -1
0, 48, 32, 16, -1, -1, -1, -1
0, 48, 48, 16, -1, -1, -1, -1
```

```

**Below is postOrder**
5, 0, 0, 32, 0, 5, 5, 5
0, 0, 0, 16, -1, -1, -1, -1
5, 0, 16, 16, 0, 0, 5, 1
0, 0, 16, 8, -1, -1, -1, -1
0, 0, 24, 8, -1, -1, -1, -1
5, 8, 16, 8, 1, 0, 1, 1
1, 8, 16, 4, -1, -1, -1, -1
0, 8, 20, 4, -1, -1, -1, -1
1, 12, 16, 4, -1, -1, -1, -1
1, 12, 20, 4, -1, -1, -1, -1
1, 8, 24, 8, -1, -1, -1, -1
5, 16, 0, 16, 0, 0, 1, 1
0, 16, 0, 8, -1, -1, -1, -1
0, 16, 8, 8, -1, -1, -1, -1
1, 24, 0, 8, -1, -1, -1, -1
1, 24, 8, 8, -1, -1, -1, -1
5, 16, 16, 16, 0, 1, 0, 0
0, 16, 16, 8, -1, -1, -1, -1
1, 16, 24, 8, -1, -1, -1, -1
0, 24, 16, 8, -1, -1, -1, -1
0, 24, 24, 8, -1, -1, -1, -1
5, 0, 32, 32, 5, 5, 0, 5
5, 0, 32, 16, 0, 0, 5, 0
0, 0, 32, 8, -1, -1, -1, -1
0, 0, 40, 8, -1, -1, -1, -1
5, 8, 32, 8, 1, 1, 0, 1
1, 8, 32, 4, -1, -1, -1, -1
1, 8, 36, 4, -1, -1, -1, -1
0, 12, 32, 4, -1, -1, -1, -1
1, 12, 36, 4, -1, -1, -1, -1
0, 8, 40, 8, -1, -1, -1, -1
5, 0, 48, 16, 0, 0, 1, 1
0, 0, 48, 8, -1, -1, -1, -1
0, 0, 56, 8, -1, -1, -1, -1
1, 8, 48, 8, -1, -1, -1, -1
1, 8, 56, 8, -1, -1, -1, -1
0, 16, 32, 16, -1, -1, -1, -1
5, 16, 48, 16, 1, 0, 0, 1
1, 16, 48, 8, -1, -1, -1, -1
0, 16, 56, 8, -1, -1, -1, -1
0, 24, 48, 8, -1, -1, -1, -1
1, 24, 56, 8, -1, -1, -1, -1
5, 32, 0, 32, 0, 5, 0, 0
0, 32, 0, 16, -1, -1, -1, -1
5, 32, 16, 16, 0, 0, 0, 1
0, 32, 16, 8, -1, -1, -1, -1
0, 32, 24, 8, -1, -1, -1, -1
0, 40, 16, 8, -1, -1, -1, -1
1, 40, 24, 8, -1, -1, -1, -1
0, 48, 0, 16, -1, -1, -1, -1
0, 48, 16, 16, -1, -1, -1, -1
5, 32, 32, 32, 5, 0, 0, 0
5, 32, 32, 16, 0, 0, 1, 0
0, 32, 32, 8, -1, -1, -1, -1
0, 32, 40, 8, -1, -1, -1, -1
1, 40, 32, 8, -1, -1, -1, -1
0, 40, 40, 8, -1, -1, -1, -1
0, 32, 48, 16, -1, -1, -1, -1
0, 48, 32, 16, -1, -1, -1, -1
0, 48, 48, 16, -1, -1, -1, -1
5, 0, 0, 64, 5, 5, 5, 5

```

[illegible]

[illegible]****debugFile for img3****

```

Entering computerPower2 method!
Leaving computerPower2 method, power2 is 64
Entering buildQuadTree: upR=0 upC=0 and size=64
Entering buildQuadTree: upR=0 upC=0 and size=32
Entering buildQuadTree: upR=0 upC=0 and size=16
Entering buildQuadTree: upR=0 upC=0 and size=8
Entering buildQuadTree: upR=0 upC=0 and size=4
Entering buildQuadTree: upR=0 upC=0 and size=2
Entering buildQuadTree: upR=0 upC=0 and size=1
Entering printQtNode method!
0, 0, 0, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=1 and size=1
Entering printQtNode method!
0, 0, 1, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=0 and size=1
Entering printQtNode method!
0, 1, 0, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=1 and size=1
Entering printQtNode method!
0, 1, 1, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 0
Entering printQtNode method!
0, 0, 0, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=2 and size=2
Entering buildQuadTree: upR=0 upC=2 and size=1
Entering printQtNode method!
0, 0, 2, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=3 and size=1
Entering printQtNode method!
0, 0, 3, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!

```


Entering buildQuadTree: upR=1 upC=2 and size=1
Entering printQtNode method!
0, 1, 2, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=3 and size=1
Entering printQtNode method!
0, 1, 3, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 0
Entering printQtNode method!
0, 0, 2, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=0 and size=2
Entering buildQuadTree: upR=2 upC=0 and size=1
Entering printQtNode method!
0, 2, 0, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=1 and size=1
Entering printQtNode method!
0, 2, 1, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=0 and size=1
Entering printQtNode method!
0, 3, 0, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=1 and size=1
Entering printQtNode method!
0, 3, 1, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 0
Entering printQtNode method!
0, 2, 0, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=2 and size=2
Entering buildQuadTree: upR=2 upC=2 and size=1
Entering printQtNode method!
0, 2, 2, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=3 and size=1
Entering printQtNode method!
0, 2, 3, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=2 and size=1
Entering printQtNode method!
0, 3, 2, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=3 and size=1
Entering printQtNode method!
0, 3, 3, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!

The sumColor is 0
Entering printQtNode method!
0, 2, 2, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 0
Entering printQtNode method!
0, 0, 0, 4, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=4 and size=4
Entering buildQuadTree: upR=0 upC=4 and size=2
Entering buildQuadTree: upR=0 upC=4 and size=1
Entering printQtNode method!
0, 0, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=5 and size=1
Entering printQtNode method!
0, 0, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=4 and size=1
Entering printQtNode method!
0, 1, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=5 and size=1
Entering printQtNode method!
0, 1, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 0
Entering printQtNode method!
0, 0, 4, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=6 and size=2
Entering buildQuadTree: upR=0 upC=6 and size=1
Entering printQtNode method!
0, 0, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=0 upC=7 and size=1
Entering printQtNode method!
0, 0, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=6 and size=1
Entering printQtNode method!
0, 1, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=1 upC=7 and size=1
Entering printQtNode method!
0, 1, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 0
Entering printQtNode method!
0, 0, 6, 2, -1, -1, -1, -1
Leaving printQtNode method!

Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=4 and size=2
Entering buildQuadTree: upR=2 upC=4 and size=1
Entering printQtNode method!
0, 2, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=5 and size=1
Entering printQtNode method!
0, 2, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=4 and size=1
Entering printQtNode method!
0, 3, 4, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=5 and size=1
Entering printQtNode method!
0, 3, 5, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
The sumColor is 0
Entering printQtNode method!
0, 2, 4, 2, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=6 and size=2
Entering buildQuadTree: upR=2 upC=6 and size=1
Entering printQtNode method!
0, 2, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=2 upC=7 and size=1
Entering printQtNode method!
0, 2, 7, 1, -1, -1, -1, -1
Leaving printQtNode method!
Leaving buildQuadTree!
Entering buildQuadTree: upR=3 upC=6 and size=1
Entering printQtNode method!
0, 3, 6, 1, -1, -1, -1, -1
Leaving printQtNode method!