

Data Structures and Algorithms Lab

Instructions

Work on this lab individually. *Write main function first and keep on testing the functionality of each function once created.*

Program the following tasks in your **C++** compiler and then compile and execute them.

Email your solution (.cpp) file only to the following respective recipient till **Friday, April 23, 2021**.

DO NOT compress/zip your solution.

The email must be sent from your **official PUCIT email id**, otherwise it will **NOT BE ACCEPTED** and will be marked **ZERO**.

The subject of the email should be the exact name of the lab i.e. **Lab 08. 2 MARKS** will be **DEDUCTED**, otherwise.

Degree	Recipient Email	Subject of Email
BSIT Morning	dsaubt01@gmail.com	Lab 08
BSIT Afternoon	dsaubt02@gmail.com	

What you have to do

A computer graphics image is composed of **rectangular points or pixels** on the computer screen. In a **black-and-white** picture, we can use **0** to represent **white** and **1** to represent **black**. We can store a representation of the picture in a **2-D** array of **Boolean** values.

Two **black** pixels are part of the same object if we can get from one to the other with **horizontal or vertical** moves. For example, the following **2-D** array contains **3** objects:

1	1	0	1	0
1	0	1	1	0
1	0	1	1	0
0	1	1	0	0
0	0	0	1	1

Given the coordinates of a **black pixel**, design and implement a **recursive function to erase (or white-out)** the object to which the pixel belongs. The prototype of your function should be:

void eraseObject (int ar, int r, int c, int i, int j)**

where, **ar** is the integer array containing the pixels of the picture, **r** and **c** are the dimensions of **pic** array, and **i** and **j** are coordinates of a pixel in the given picture.

For example, if we make the function call **eraseObject (pic, 5, 5, 2, 3)** on the above picture, then the whole object containing the **black pixel** at **index (2, 3)** should be **erased** i.e. the resulting pic array should look like:

1	1	0	0	0
1	0	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	1	1

You have to complete the implementation of **eraseObject** function exist in a **Source.cpp** file provided in this lab's folder that will read an **image** data from a file **input.txt** and perform the above mentioned task. The input file is in the following format:

Line 1: two numbers separated by space indicates the **size** of the **image** in **row** and **column** format.

Line 2: two numbers separated by space indicates the **index** of a **black** pixel in **row** and **column** format.

Line 3: The **image** data started. Each pixel position is separated with a space.

Input.txt

```
5 5
2 3
1 1 0 1 0
1 0 1 1 0
1 0 1 1 0
0 1 1 0 0
0 0 0 1 1
```

Output

```
1 1 0 0 0
1 0 0 0 0
1 0 0 0 0
0 0 0 0 0
0 0 0 1 1
```