



Calibre D2S R&D C++ Project

Prepared for

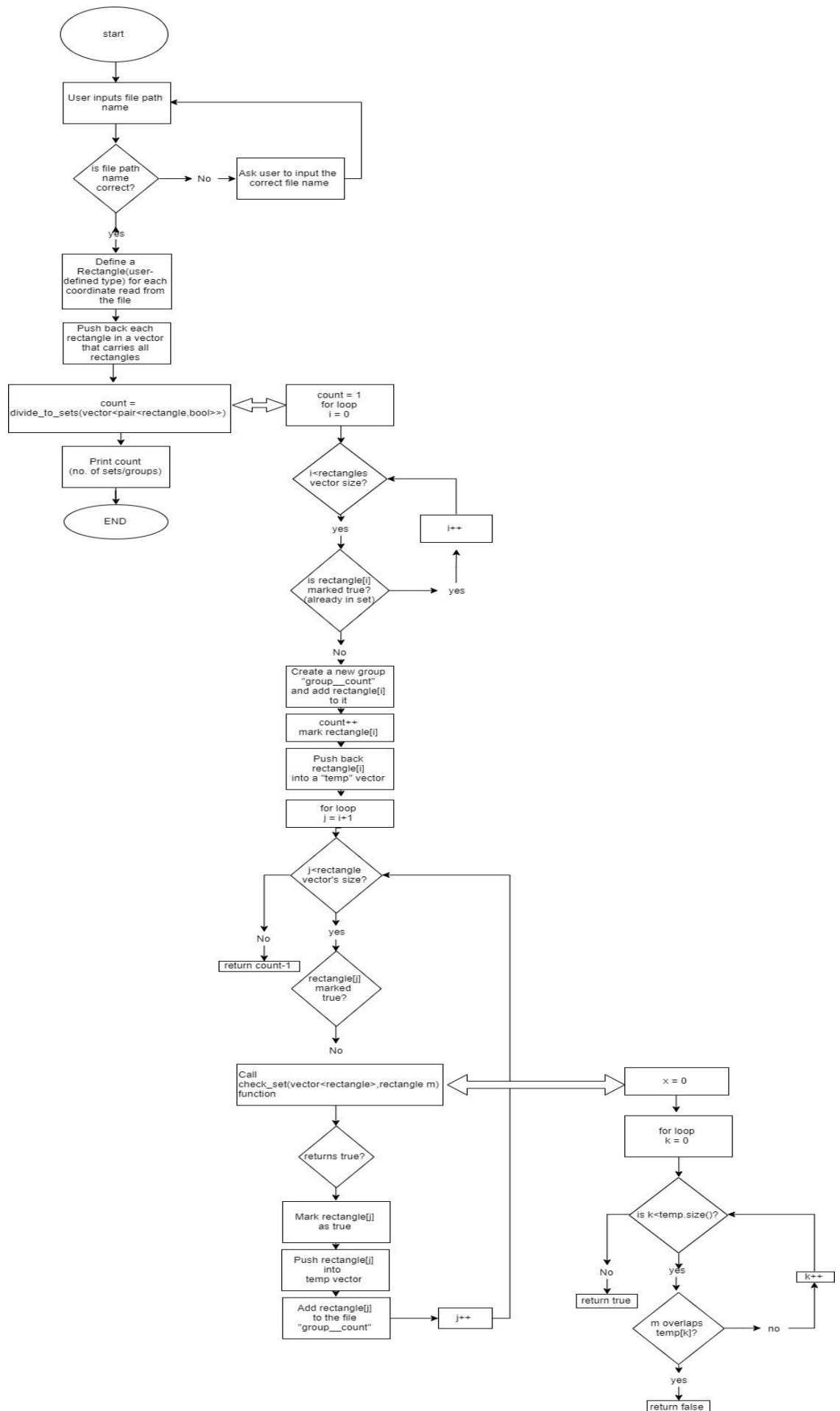
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Prepared by

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November 2019

- **Flowchart**
- **Platform:**
Windows10
Microsoft VS



- **Pseudocode of the algorithm:**

```
Class point {  
    Private:  
        Long x, y;  
    Public:  
        point() {}  
        point(long l, long r) {}  
        void setx (long l) {x=l;}  
        void sety (long r) {y=r;}  
        long getx () {return x;}  
        long gety () {return y;}  
};
```

```
Class rectangle {  
    Private:  
        Point lower_left, upper_right;  
    Public:  
        rectangle() {}  
        rectangle(point x, point y) {}  
        point get_LowerLeft () {return lower_left;}  
        point get_UpperRight () {return upper_right;}  
        void set_LowerLeft (point x) {}  
        void set_UpperRight (point x) {}  
        bool overlap (rectangle r)  
        {  
            if (lower_left.x >= m.upper_right.x || m.lower_left.x >= upper_right.x)  
                return false;  
            if (lower_left.y >= m.upper_right.y || m.lower_left.y >= upper_right.y)  
                return false;  
            return true;  
        }  
}
```

```
bool check_set (vector<rectangle> temp, rectangle m)  
{  
    For i = 0:temp.size()  
        If m overlaps with temp[i]  
            return false;  
        i++;  
    return true;  
}
```

```

int divide_into_set (vector<pair<rectangle,bool>>)
{
    Count = 1;
    for i = 0:rectangle.size()-1
    {
        Open file;
        vector<rectangle> temp;

        if rectangles[i].second = false:
            Create new file with the name "group__Count" and write rectangles[i] in it;
            temp.push_back(rectangle[i].first);
            rectangles[i].second = true; //Mark it
            Count++;

            for j = 0:rectangles.size():
                if rectangles[j].second = false;
                    if(check_set(temp, rectangles[j].first)):
                        Write rectangles[j] in the file "group__Count";
                        temp.push_back(rectangles[j].first);
                        rectangles[j] = true; //Mark it

            i++;
            Close file;
    }
    if rectangles[rectangles.size()-1].second = false
        Create new file with the name "group__Count" and write rectangles[rectangles.size()-1] in it;
        Close file;
    return Count;
}

```

```

int main ()
{
    long x1,y1,x2,y2;
    char done = 'N', string file_path;
    vector<pair<rectangle,bool>> rectangles;
    do{
        prompt user to enter file path;
        check if file is not found → prompt user to enter the correct path;
        open file;
        while(file >> x1 >> y1 >> x2 >> y2)
            point l1 (x1,y1); point r1 (x2,y2);
            rectangle(l1,r1);
            rectangles.push_back(rectangle);
        close file;
        print number of inputs = rectangles.size();
        int count = divide_into_sets (rectangles);
        print number of outputs = count;
        ask user if he wishes to continue press c/C, if he wishes to exit press any key
        while(done=='c' || done=='C');
    }
    return 0;
}

```

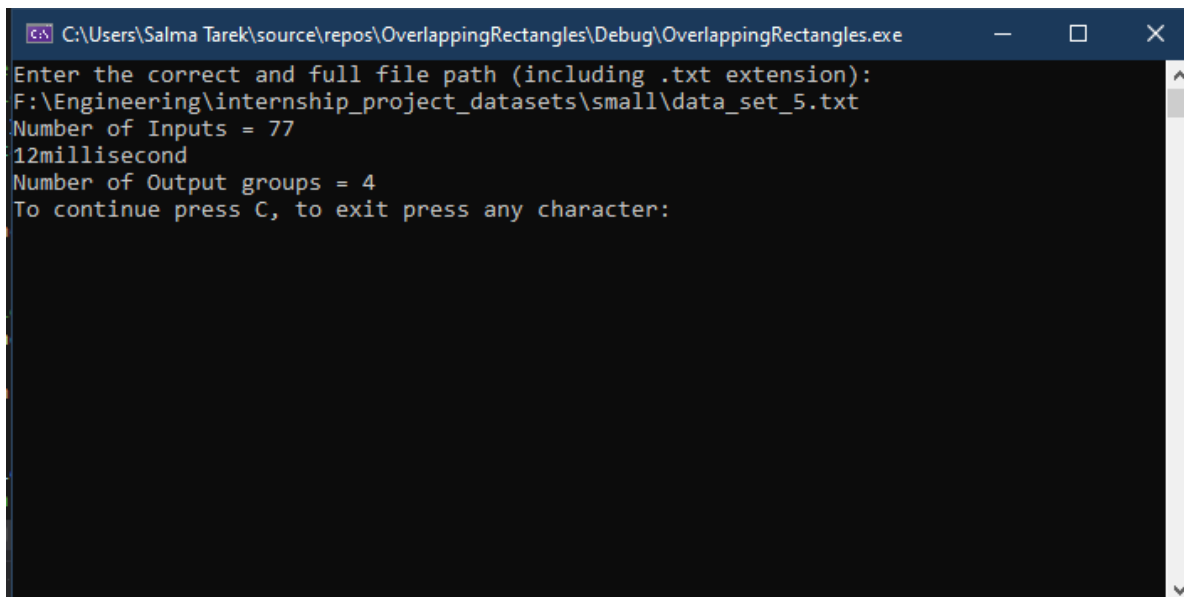
- **Table of data sets:**

Data Set	No. of Inputs	No. of Outputs	Running Time (sec)	Memory Used
data_set_1	5	1	0.001	63Kb
data_set_2	7	2	0.001	63Kb
data_set_3	20	3	0.003	63.4Kb
data_set_4	39	4	0.007	63.7Kb
data_set_5	77	5	0.014	64.7Kb
data_set_6	136	5	0.024	65.4Kb
data_set_7	216	6	0.034	69.1Kb
data_set_8	460	12	0.05	72Kb
data_set_9	741	7	0.09	83.7Kb
data_set_10	981	7	0.1	83.7Kb
data_set_11	5793	7	2	221Kb
data_set_12	6775	7	2.9	221Kb
data_set_13	7538	7	3.7	221Kb
data_set_14	8774	7	5.7	300Kb
data_set_15	9188	7	7.1	300Kb

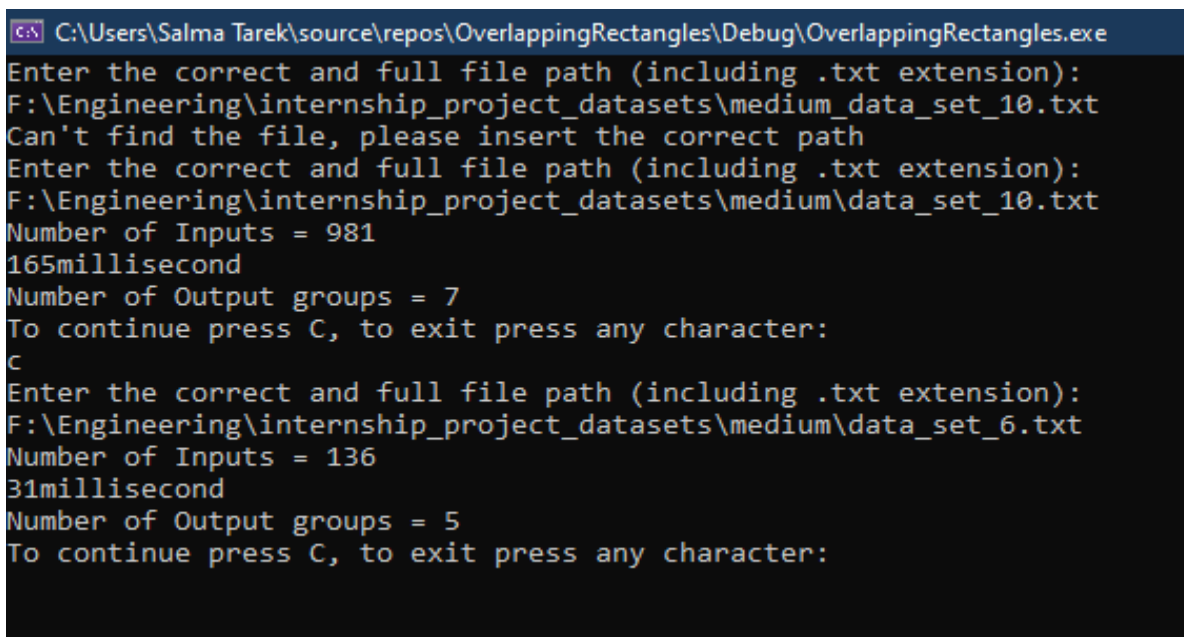
- **Testing methodology:**

- Tested the first three data sets manually
- Tested two rectangles overlapping completely (same coordinates) → overlapping
- Tested two rectangles overlapping partially → overlapping
- Tested two rectangles touching vertically (one next to the other) → not overlapping
Rectangle 1: 5 3 10 13
Rectangle 2: 10 3 15 13
- Tested two rectangles touching horizontally (one above the other) → not overlapping
Rectangle 1: 5 3 10 13
Rectangle 2: 5 13 10 23
- Tested three rectangles 1,2, and 3; 1 overlapping with 2, 2 overlapping with 3 → the output is two groups. Group_1 = (1 and 3), Group_2 = (2)

- **Screenshots:**



```
C:\Users\Salma Tarek\source\repos\OverlappingRectangles\Debug\OverlappingRectangles.exe
Enter the correct and full file path (including .txt extension):
F:\Engineering\internship_project_datasets\small\data_set_5.txt
Number of Inputs = 77
12millisecond
Number of Output groups = 4
To continue press C, to exit press any character:
```



```
C:\Users\Salma Tarek\source\repos\OverlappingRectangles\Debug\OverlappingRectangles.exe
Enter the correct and full file path (including .txt extension):
F:\Engineering\internship_project_datasets\medium_data_set_10.txt
Can't find the file, please insert the correct path
Enter the correct and full file path (including .txt extension):
F:\Engineering\internship_project_datasets\medium\data_set_10.txt
Number of Inputs = 981
165millisecond
Number of Output groups = 7
To continue press C, to exit press any character:
c
Enter the correct and full file path (including .txt extension):
F:\Engineering\internship_project_datasets\medium\data_set_6.txt
Number of Inputs = 136
31millisecond
Number of Output groups = 5
To continue press C, to exit press any character:
```

```
C:\Users\Salma Tarek\source\repos\OverlappingRectangles\Debug\OverlappingRectangles.exe
Enter the correct and full file path (including .txt extension):
F:\Engineering\internship_project_datasets\large\data_set_14.txt
Number of Inputs = 8774
7248millisecond
Number of Output groups = 7
To continue press C, to exit press any character:
```

Trying to insert a file that contains characters:

```
C:\Users\Salma Tarek\source\repos\OverlappingRectangles\Debug\OverlappingRectangles.exe
Enter the correct and full file path (including .txt extension):
F:\Engineering\test.txt
Wrong file format!
Enter the correct and full file path (including .txt extension):
```

Notice that:

I wasn't able to process data_set_16; I can't seem to find the exact reason, but it took forever to load it on visual studio (just to read it), while on eclipse and codeblocks, it was actually processed (read) but still it was too heavy on the algorithm so I wasn't able to divide it into groups.