

ADS Lab-3 Write-up (Disjoint Sets)

```

class Islands {
    int parent[100];
    int count;

    public int findparent(int x) {
        if (parent[x] == x)
            return x;
        else
            return parent[x] = findparent(parent[x]);
    }

    public void makeunion(int x, int y) {
        int xroot = findparent(x);
        int yroot = findparent(y);
        if (xroot != yroot) {
            parent[xroot] = yroot;
            count--;
        }
    }

    public void countset(int n) {
        count = n;
    }

    public int returncount() {
        return count;
    }
};

```

```

int noOfIslands (vector<vector<int>> matrix) {
    int count = 0;
    int a = matrix.size();
    int b = matrix[0].size();
    for (int i = 0; i < a; i++) {
        for (int j = 0; j < b; j++) {
            if (matrix[i][j] != 0)
                count++;
        }
    }
}

```

Islands il = new Islands (a*b);

il.set (count);

```

for (int i = 0; i < a; i++) {

```

```

    for (int j = 0; j < b; j++) {

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        if (matrix[i][j] != 0) {

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            if (i > 0 && matrix[i-1][j] != 0) {

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                il.makeunion (b*i+j, b*(i-1)+j);

```

```

            if (i < a-1 && matrix[i+1][j] != 0) {

```

```

                il.makeunion (b*i+j, b*(i+1)+j);

```

```

            if (j > 0 && matrix[i][j-1] != 0)

```

```

                il.makeunion (b*i+j, b*i+(j-1));

```

```

            if (j < b-1 && matrix[i][j+1] != 0)

```

```

                il.makeunion (b*i+j, b*i+(j+1));

```

```

            if (i > 0 && j > 0 && matrix[i-1][j-1] != 0)

```

```

                il.makeunion (b*i+j, b*(i-1)+(j-1));

```

```

            if (i > 0 && j < b-1 && matrix[i-1][j+1] != 0)

```

```

                il.makeunion (b*i+j, b*(i-1)+(j+1));

```

if ($i < a-1$ && $j > 0$ && $\text{matrix}[i+1][j-1] != 0$)

ii. makeunion ($b*i+j$, $b*(i+1)+(j-1)$);

if ($i < a-1$ && $j < b-1$ && $\text{matrix}[i+1][j+1] != 0$)

ii. makeunion ($b*i+j$, $b*(i+1)+(j+1)$);

}

{

return ilcount;

}