

# 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 numIslands (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++) {
```

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

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

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

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

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

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

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

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

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

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

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

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

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

```
if (i < a-1 && j > 0 && matrix[i+1][j-1] != 0)
    ii. makeunion(n*i+j, n*(i+1)+(j-1));
if (i < a-1 && j < b-1 && matrix[i+1][j+1] != 0)
    ii. makeunion(n*i+j, n*(i+1)+(j+1));
}
}
return il.count;
```