



Spring2023 src test java edu neu coe info6205 union_find UFClient main

WQUPC.java UF_HWQUPC_Test.java UFClient.java

```
    }
    }
    return connections;
}
no usages
public static void main(String[] args)
{
    Scanner s = new Scanner(System.in);
    //System.out.println("Enter values: ");
    int n= s.nextInt();
    int connections = count(n);
    System.out.println("No of connections:"+connections);
}
}
```

UFClient

```
/Library/Java/JavaVirtualMachines/jdk-18.0.2.1.jdk/Contents/Home/bin/java ...
1907
No of connections:1906

Process finished with exit code 0
```

Run TODO Problems Terminal Services Build Dependencies

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WQUPC.java UF_HWQUPC_Test.java UFClient.java

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    int n= s.nextInt();
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    System.out.println("No of connections:"+connections);
}
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```

UFClient

```
/Library/Java/JavaVirtualMachines/jdk-18.0.2.1.jdk/Contents/Home/bin/java ...
327547
No of connections:327547

Process finished with exit code 0
```

Run TODO Problems Terminal Services Build Dependencies

```
INFO6205-Spring2023 | src | test | java | edu | neu | coe | info6205 | union_find | UFClient | main | Current File
Project: UF_HWQUPC.java x UF_HWQUPC_Test.java x UFClient.java x
7 public static int count(int n){
8     UF_HWQUPC uf = new UF_HWQUPC(n);
9     //Random r = new Random();
10    int connections=0;
11    while(uf.size()>1){
12        int p=(int) (Math.random() * n);
13        int q=(int) (Math.random() * n);
14        if(!uf.connected(p,q)){
15            connections++;
16            uf.union(p,q);
17        }
18    }
19    return connections;
20 }
21 no usages
22 public static void main(String[] args)
23 {
24     Scanner s = new Scanner(System.in);
25 }
Run: UFClient x UFClient x
/Library/Java/JavaVirtualMachines/jdk-18.0.2.1.jdk/Contents/Home/bin/java ...
Enter n value:
0
No of connections:0
Process finished with exit code 0
```

```
INFO6205-Spring2023 | src | test | java | edu | neu | coe | info6205 | union_find | UFClient | count | Current File
Project: UF_HWQUPC.java x UF_HWQUPC_Test.java x UFClient.java x
7 public static int count(int n){
8     UF_HWQUPC uf = new UF_HWQUPC(n);
9     //Random r = new Random();
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11    while(uf.size()>1){
12        int p=(int) (Math.random() * n);
13        int q=(int) (Math.random() * n);
14        if(!uf.connected(p,q)){
15            connections++;
16            uf.union(p,q);
17        }
18    }
19    return connections;
20 }
21 no usages
22 public static void main(String[] args)
23 {
24     Scanner s = new Scanner(System.in);
25 }
Run: UFClient x UFClient x
/Library/Java/JavaVirtualMachines/jdk-18.0.2.1.jdk/Contents/Home/bin/java ...
Enter n value:
1
No of connections:0
Process finished with exit code 0
```

Task 3:

As seen in the above images initially when I used the loop condition `while(connections<n-1)` in the count function, for every value of n, the connections were n-1.

When used the loop condition `while(uf.size()>1)`, value for 0 and 1 is given as 0 but for the values greater than 1, its taking long time to process. So the complexity could be $O(n * \log n)$ as the time increases with the increase in n value.