Practice 5

Random hill climbing

We need to show how much iterations in average of 10 runs we need to find code of 2 to 20 binary genes.

We always need to generate our chromosome at random.

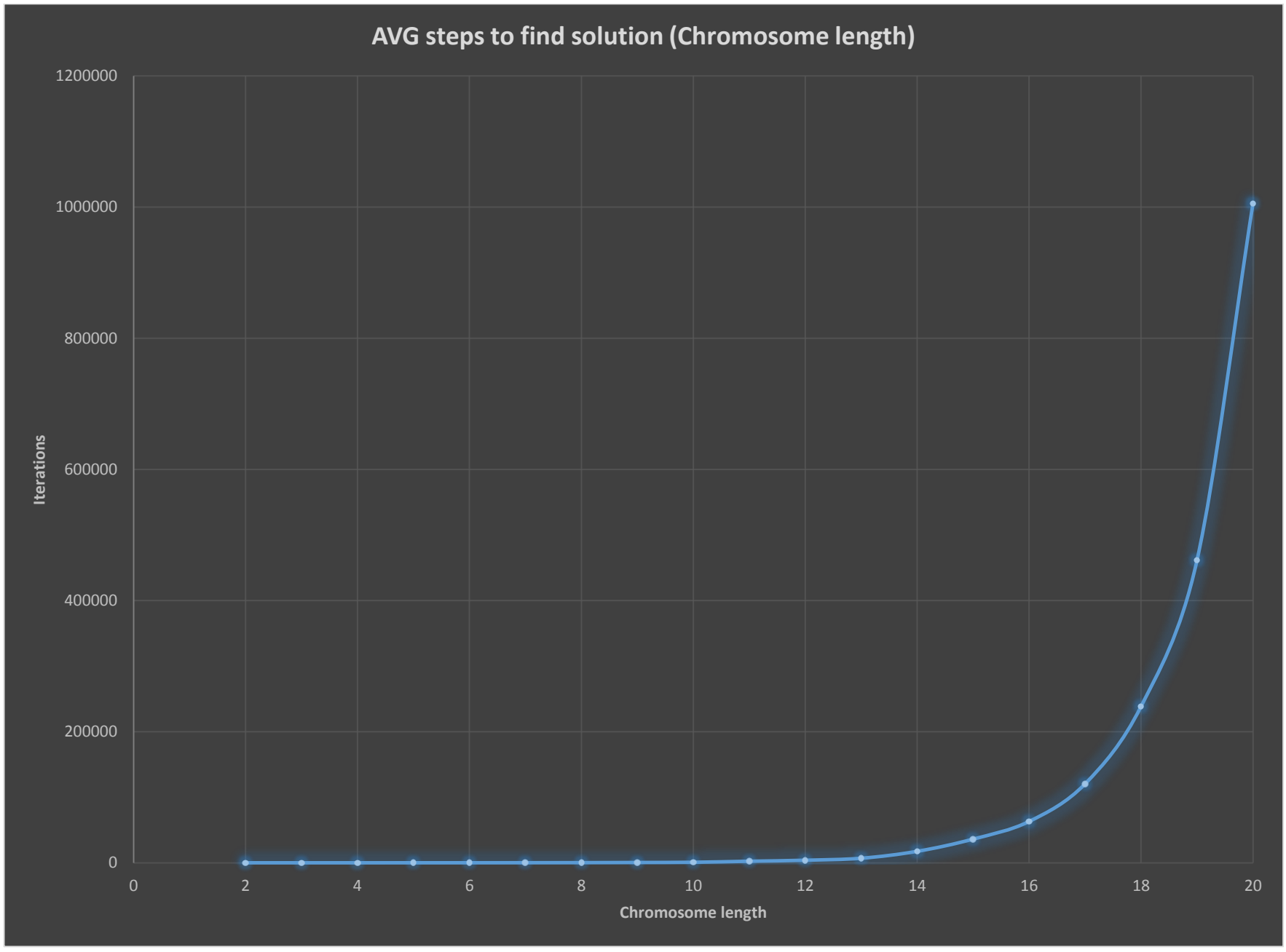
Code

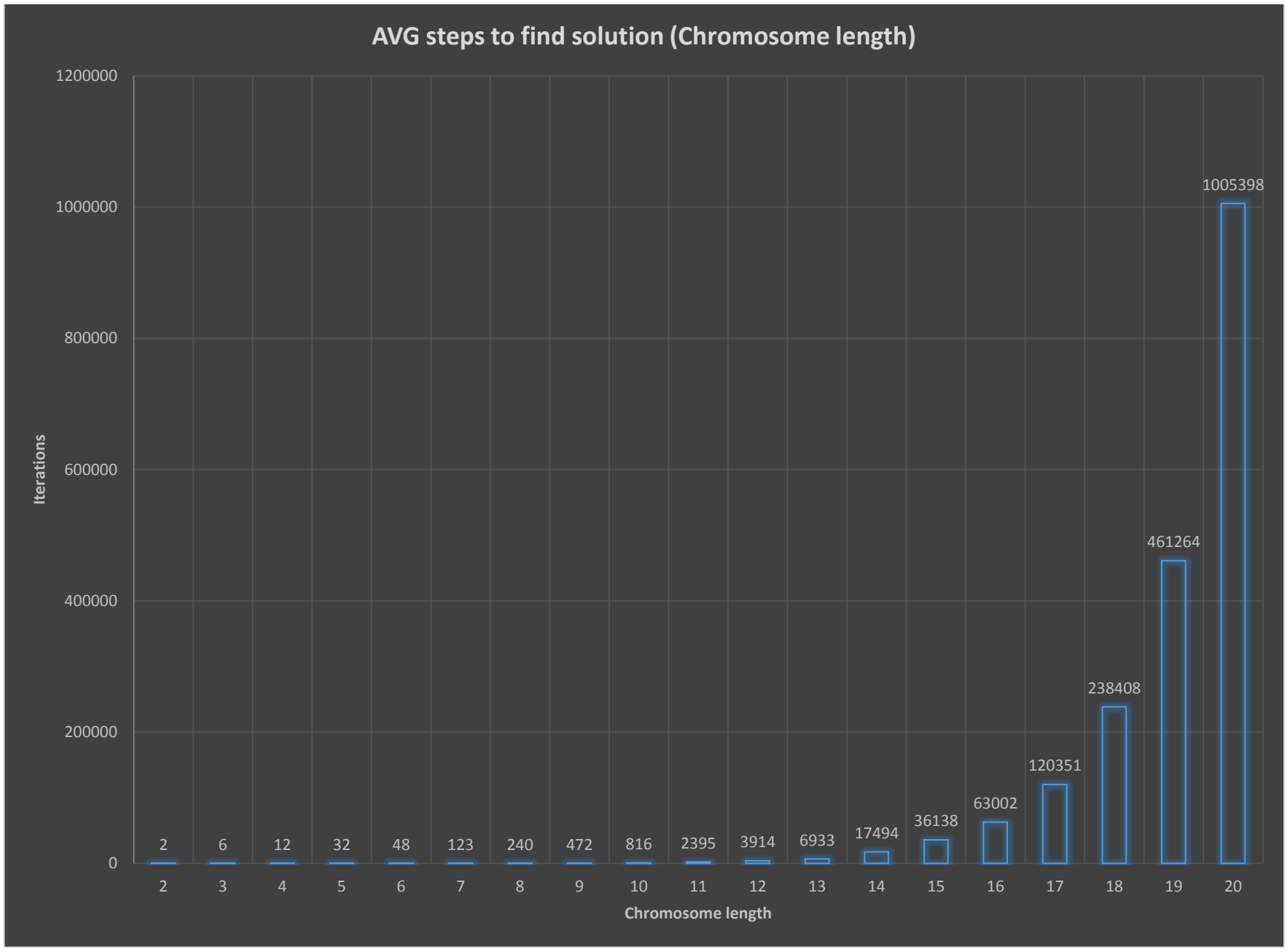
Main.java

```
package com.company;

import java.util.ArrayList;
import java.util.List;
import java.util.Random;

public class Main {

    public static Random random = new Random();

    public static void main(String[] args) {
        for(int size = 2; size < 21; size++){
            List<Boolean> code = new ArrayList<>();

            for(int i = 0; i < size; i++){
                code.add(random.nextBoolean());
            }

            int sum = 0;

            for(int j = 0; j < 50; j++){
                int timesToFindSolution = 0;
                List<Boolean> chromosome = new ArrayList<>();
                for(int i = 0; i < size; i++){
                    chromosome.add(random.nextBoolean());
                }

                while(!isEqual(chromosome, code)){
                    chromosome.clear();

                    for(int i = 0; i < size; i++){
                        chromosome.add(random.nextBoolean());
                    }

                    timesToFindSolution++;
                }

                sum+=timesToFindSolution;
            }

            System.out.printf("%d\n", (int)(sum/50.0) );
        }
}
```

```
    public static Boolean isEqual(List<Boolean> first, List<Boolean> second){
        for(int i = 0; i < first.size(); i++){
            if(!first.get(i).equals(second.get(i))){
                return false;
            }
        }

        return true;
    }
}
```

Results
50 repeats




AVG steps to find solution (Chromosome length)
Iterations
1200000
1000000
800000
600000
400000
200000
0
2
6
12
32
48
123
240
472
816
2395
3914
6933
17494
36138
63002
120351
238408
461264
1005398
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Chromosome length