PROGRAMMING ASSIGNMENT 1

The assignment has three parts. The three parts must be done separately.

In the first part of the assignment, write a program that will compute the union and the intersection of two sets. The input to the program is a file containing two sets. The ouput of the program is a file containing the union and the intersection. The set elements are positive integers with no duplicates and unordered. For each set, the size is specified first and then the elements are listed in the next line. The program asks the user for file names.

```
4                                   8
15 9 20 6                           15 9 20 6 19 33 42 27
                    ⟶
6                                   2
19 15 33 42 20 27                   15 20
```

Run your program with the given sets and compute their unions and intersections. Submit the results.

In the second part of the assignment, write a program that will decide whether a function is one to one, onto, and bijective. The input to the program is a file containing a function. The output of the program is a file containing the three decisions about the function. The input file contains the size of the domain, the elements in the domain, the size of the codomain, the elements in the codomain, the number of mappings in the function, and the list of mappings. The elements are positive integers with no duplicates and unordered. The pairs are unordered. The program asks the user for file names.

```
5                                   one to one
10 15 12 23 19          ⟶          not onto
                                    not bijective
8
80 15 20 29 10 45 50 30

5
12  45
19  30
10  80
23  10
15  29
```

Run your program with the given functions and decide whether they are one to one, onto, and bijective. Submit the results.

In the third part of the assignment, write a program that will compute the sum and the product of two square matrices. The input to the program is a file containing two square matrices. The output of the program is a file containing the sum and the product. The matrix elements are integers. For each matrix, the size is specified first and then the matrix is specified. The program asks the user for file names.

```
4                          4
1  0  3  2                 2  0  3  3
5  1  2  1                 7  6  9  5
0  0  4  2                 0  0  7  2
2  0  1  0                 5  1  1  0
```



```
4                          4
1  0  0  1                 7   2   9   1
2  5  7  4                 10  6   13  9
0  0  3  0                 6   2   12  0
3  1  0  0                 2   0   3   2
```

Run your program with the given matrices and compute their sums and products. Submit the results.

Requirements

1) Doing the assignment

Programming assignment must be done in Java language

Each part must be done separately

2) Getting results

Run the programs on the given input files and get the results

Place the results of all parts in one text file.

Make sure the results are formatted, organized, and labeled in the text file

Convert the text file to a pdf file named results.pdf

3) Program files

Place .java files of each part in separate folders named part1, part2, part3

Place only .java files in the folders

Zip the three folders separately into part1.zip, part2.zip, part3.zip

4) Submission

Submit part1.zip, part2.zip, part3.zip, results.pdf

Attach the four files to the email

5) Other matters

There should not be any screenshot anywhere

Program must be written in good style

Program must be well documented with comments explaining all steps

6) Not following these requirements will result in zero for the assignment.