GUI tasks — 7 T.R. Werner, April 25, 2021 (20:21)

Problem 1

To verify the quality of your random number generator, write a program which generates N random integers and prints the fractions of numbers that when divided by M yield the remainder $0, 1, \ldots, M-1$. In your program, create a stream of random numbers and *one* chain of function invocations.

For example, the program

download *StreamMod.java*

```java
import java.util.Random;
import java.util.stream.Collectors;
import java.util.stream.Stream;

public class StreamMod {
    public static void main(String[] args) {
        Random r = new Random();
        final int N = 10_000_000, M = 10;
        Stream.generate(r::nextInt)
           ./* one chain of invocations */;
    }
}
```

for $N = 10\,000\,000$ and $M = 4$ should print something similar to

```
0 -> 0.2499905
1 -> 0.2500857
2 -> 0.2500085
3 -> 0.2499153
```

and for $N = 10\,000\,000$ and $M = 10$

```
0 -> 0.100085
1 -> 0.1000545
2 -> 0.1001538
3 -> 0.0999173
4 -> 0.0998928
5 -> 0.10013
6 -> 0.0998632
7 -> 0.0999566
8 -> 0.10002
9 -> 0.0999268
```

Problem 2

Write a program which reads a file containing an unknown number of lines which look like this

```
Mary 12c 78
Jane 12c 90
Bill 13c 68
Kate 12c 76
John 13c 66
```

Each line corresponds to a student with a given name, group id and test score. Using streams, create a map with group ids as keys and list of students belonging to a given group as values; print these lists. Assuming that **toString** method in class **Student** is appropriately implemented, the output could be something like

```
Group 13c: [Bill(13c)-68, John(13c)-66]
Group 12c: [Mary(12c)-78, Jane(12c)-90, Kate(12c)-76]
```

Important: Do not use explicit loops!