CS 278 Lab7: Functions

Due: Thursday 10/11 by 11:30pm

Your task is to generate all possible functions from X={a, b, c} to a set Y. Set Y contains integers 0, 1, …, n for some integer n≥0. The value of n is provided by the user. To define a function you need to specify what it outputs for each element of X. For instance, if Y= {0, 1}, then f(a)=0, f(b)=1, f(c)=1 defines function f from X to Y.

Write a program that prompts the user to enter the size of Y, then generates, enumerates, and prints out in a neat format all possible functions from X to Y. Your program should number generated functions f1, f2, f3, f4, etc. For each generated function, output whether or not it is one-to-one, onto, or a bijection. Compute total number of functions generated, how many of them are one-to-one, how many of them are onto, and how many of them are bijections.

Sample dialog with the user may look like the following:

```
The program will generate all functions from X={a,b,c} to Y={0,1,…,n}.
Please enter the value of n: 1
f1(a)=0     f1(b)=0     f1(c)=0
    f1 is not one-to-one, not onto, and  not a bijection.
f2(a)=0     f2(b)=0     f2(c)=1
    f2 is not one-to-one, onto, and  not a bijection.
f3(a)=0     f3(b)=1     f3(c)=0
    f3 is not one-to-one, onto, and  not a bijection.
f4(a)=0     f4(b)=1     f4(c)=1
    f4 is not one-to-one, onto, and  not a bijection.
f5(a)=1     f5(b)=0     f5(c)=0
    f5 is not one-to-one, onto, and  not a bijection.
f6(a)=1     f6(b)=0     f6(c)=1
    f6 is not one-to-one, onto, and  not a bijection.
f7(a)=1     f7(b)=1     f7(c)=0
    f7 is not one-to-one, onto, and  not a bijection.
f8(a)=1     f8(b)=1     f8(c)=1
    f8 is not one-to-one, not onto, and  not a bijection.
There are 8 functions total.
0 of them are one-to-one.
6 of them are onto.
0 of them are bijections.
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Implementation details:

All possible functions must be automatically generated by your program (e.g., use nested loops to do it). Your program must work for any value of n (n≥0) entered by the user (you may assume that n is no more than 10).

What to submit:

- Submit the source code of your program using Canvas.
- If you write your program in a programming language other than Java, then submit instructions on how to compile and run your program on CS machines.