T2 assignment 1.A

Set up ssh key to code01, etc.
https://www.digitalocean.com/community/tutorials/how-to-set-up-ssh-keys--2

Have this done to demo by next class.

Go to via code01.fit.edu/~kgallagher/public_html/sampleprogs.
Discover black-box specs for programs reflex, onto, onetoone, func. That is what is the output on various command parameter sequence. Hint: use many parms; repeat parm sequence. Start with small values; explore; hypothesize; validate.

Have this done in one week. Write up and submit via canvas.
Get an account on github.fit.edu

Then we will set dates for the rest.
Input: standard in [via code01.fit.edu/~kgallagher/public_html/sampleprogs]
  first line: one integer, U // U > 0
  the rest: pairs of integers // between 1 and U inclusive
              1 <= i j <= U
// the pairs of integers can be regarded as a relation over U x U

Outputs

1. Is the relation one to one? [each element in range that is mapped, maps to exactly one element in domain]
2. Is the relation onto? [every element in range is used/hit; can be more than once]
3. Is the relation reflexive?
4. Is the relation symmetric?
5. Is the relation transitive?
6. Is the relation a function? [every element in domain is used and has exactly one value in the range.]
   a. Is the function onto?
   b. Is the function 1-1?
7. if the relation is reflexive, symmetric and transitive, i.e., forms an equivalence relation, display the partitions, one partition per line, unless the number and/or size of the partitions is too large, then just display the number of partitions.

You must use the server to obtain the inputs, and you may not copy the output of the generator to your own [local] disk.

Use a code01.fit.edu/~kgallagher/public_html/oracles to determine

correctness, if you wish.

Be careful, as output from sampleprogs is random...

```
          11100
10101     11100
01010     11100
10101     00011
01010     00011
10101
```

```
1 3 5     1 2 3
2 4       4 5
```

The web:

A reflexive relation is a binary relation on a set for which every element is related to itself. In other words, a relation ~ on a set S is reflexive when x ~ x holds true for every x in S, formally: when S: x~x holds.

Let R be a binary relation on A. R is symmetric if for all x,y R implies (y,x) A, x R y implies that y R x.)

A binary relation R over a set X is transitive if whenever an element a is related to an element b, and b is in turn related to an element c, then a is also related to c. Transitivity is a key property of both partial order relations and equivalence relations.

Inputs [sorted for simplicity] [no you may not sort inputs!!!]

```
5             5
1 1           1 1
1 3           1 2
1 5           1 3
2 2           2 1
2 4           2 2
3 1           2 3
3 3           3 1
3 5           3 2
4 2           3 3
4 4           4 4
5 1           4 5
5 3           5 4
5 5           5 5
```