

- Logic
- Prod
- Number
- Structure

math compet insft

$$3^4 = 81$$

Q1-10 - point → M/C/I

Q12, F - M/C/I

Monday
Q12 ←

45 min
0 topics
or

1 topic

M/C/I

Thur/Fri
Final

3 hr

0-4 topics

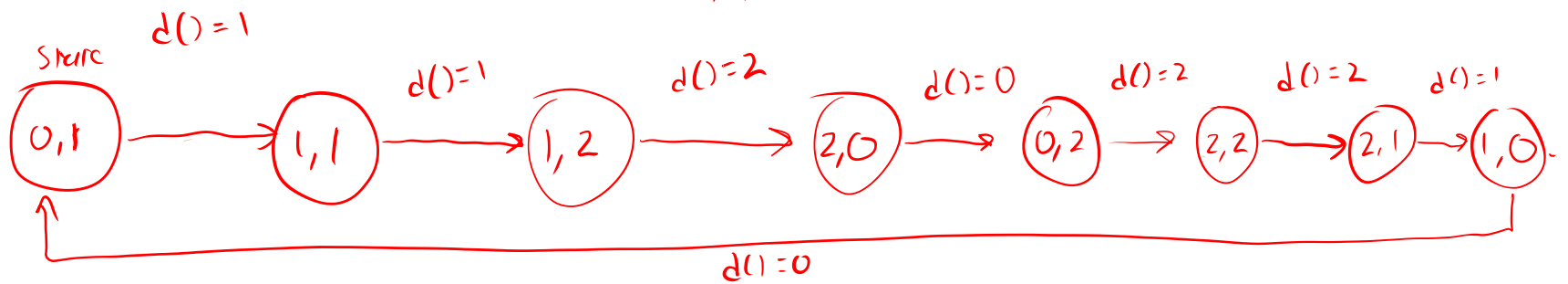
$d()$

$a, b = b, (a+b) \bmod 3$

return a

State Machine

$a=0$
 $b=1$



$$4 \bmod 1.5 = 1$$

$$5 \bmod 1.5 = 0.5$$

$d(x)$

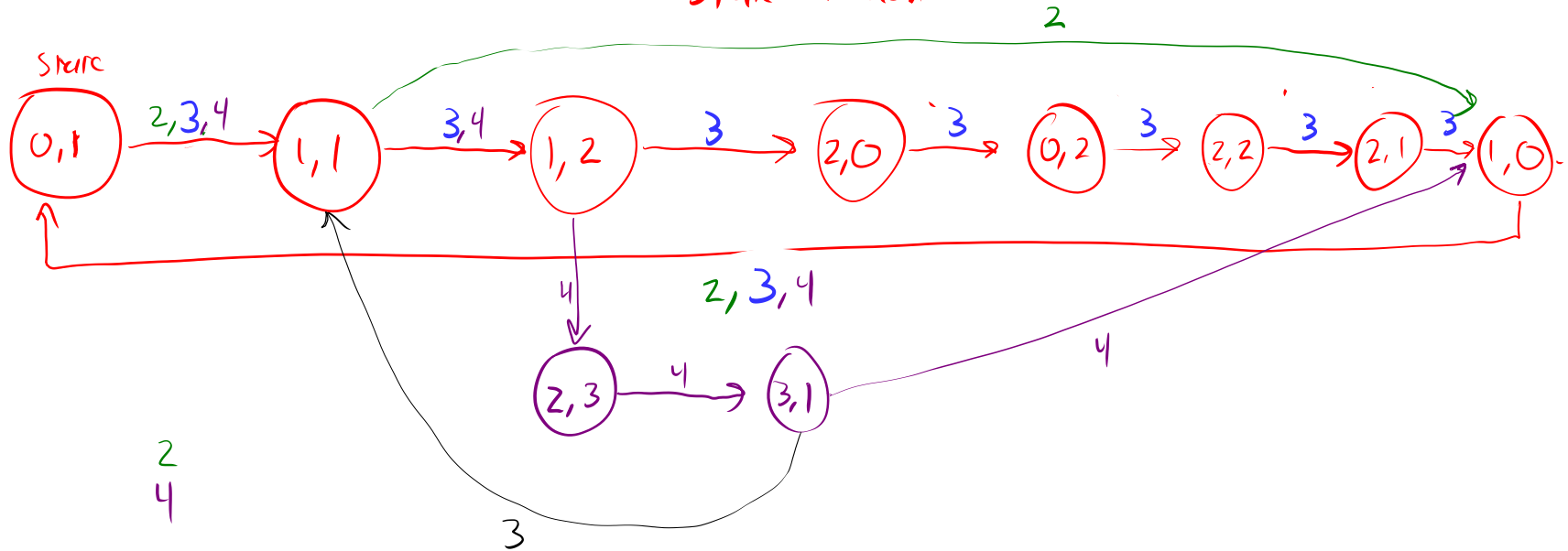
$a, b = b, (a+b) \bmod x$

return a



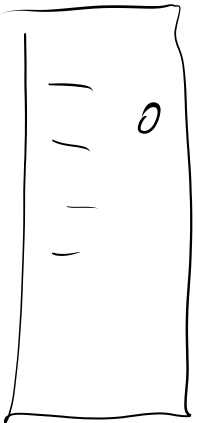
State Machine

$a=0$
 $b=1$



Security | given start state, \exists sequence of actions that reaches

- Some unreachable states
- Some states cannot be reached except via _____



State: all bits in RAM
all bits on disk —
all bits in reg

actions: clock tick
mouse
key board
network
⋮

thm:

$d(3)$ will never reach $(0,0)$

Contradiction

assume k^{th} state reached is $(0,0)$

for some $k > 0$

then $k-1^{\text{th}}$ state was $(x,0)$ where

$$x \bmod 3 = 0$$

then $k-2^{\text{nd}}$ state was (y,x) where

$$x \bmod 3 = 0$$

$$y \bmod 3 = 0$$

\vdots

all are multiples of 3

if state k is $(0,0)$

the state $k+1$ is $(0,0)$