

Home Work 16

Q1.

①

$A = \{0, 1, 2, 3, \dots\}$  - positive integers

$B = \{-1, -2, -3, -4, \dots\}$  - negative integers

$f: A \rightarrow B$ ,  $f(x) = x/2$  when  $x$  is even

$f(x) = -(x-1)/2$  when  $x$  is odd

0	1	2	3	4	5
↓	↑	↓	↑	↓	↑
0	1	2	-1	2	-2
.....	.....	.....	.....	.....	.....

Countable infinity

②

$$\frac{1}{1} - \frac{1}{1} \quad \frac{2}{1} - \frac{2}{1} \quad \frac{3}{1} - \frac{3}{1} \quad \dots \dots \dots \dots \dots \dots$$

$$\frac{1}{2} - \frac{1}{2} \quad \frac{2}{2} - \frac{2}{2} \quad \frac{3}{2} - \frac{3}{2} \quad \dots \dots \dots \dots \dots \dots$$

$$\frac{1}{3} - \frac{1}{3} \quad \frac{2}{3} - \frac{2}{3} \quad \dots \dots \dots \dots \dots \dots$$

$$\frac{1}{4} - \frac{1}{4} \quad \frac{2}{4} - \frac{2}{4} \quad \dots \dots \dots \dots \dots \dots$$

$$\frac{1}{5} - \frac{1}{5} \quad \dots \dots \dots \dots \dots \dots$$

$$\frac{1}{6} - \frac{1}{6} \quad \dots \dots \dots \dots \dots \dots$$

Countable  
infinity

(3)

$\{1, 2, 3, 4, 5, 6\}$

1  $\Rightarrow$  (N) YY N N N

2  $\Rightarrow$  N (N) N N N N

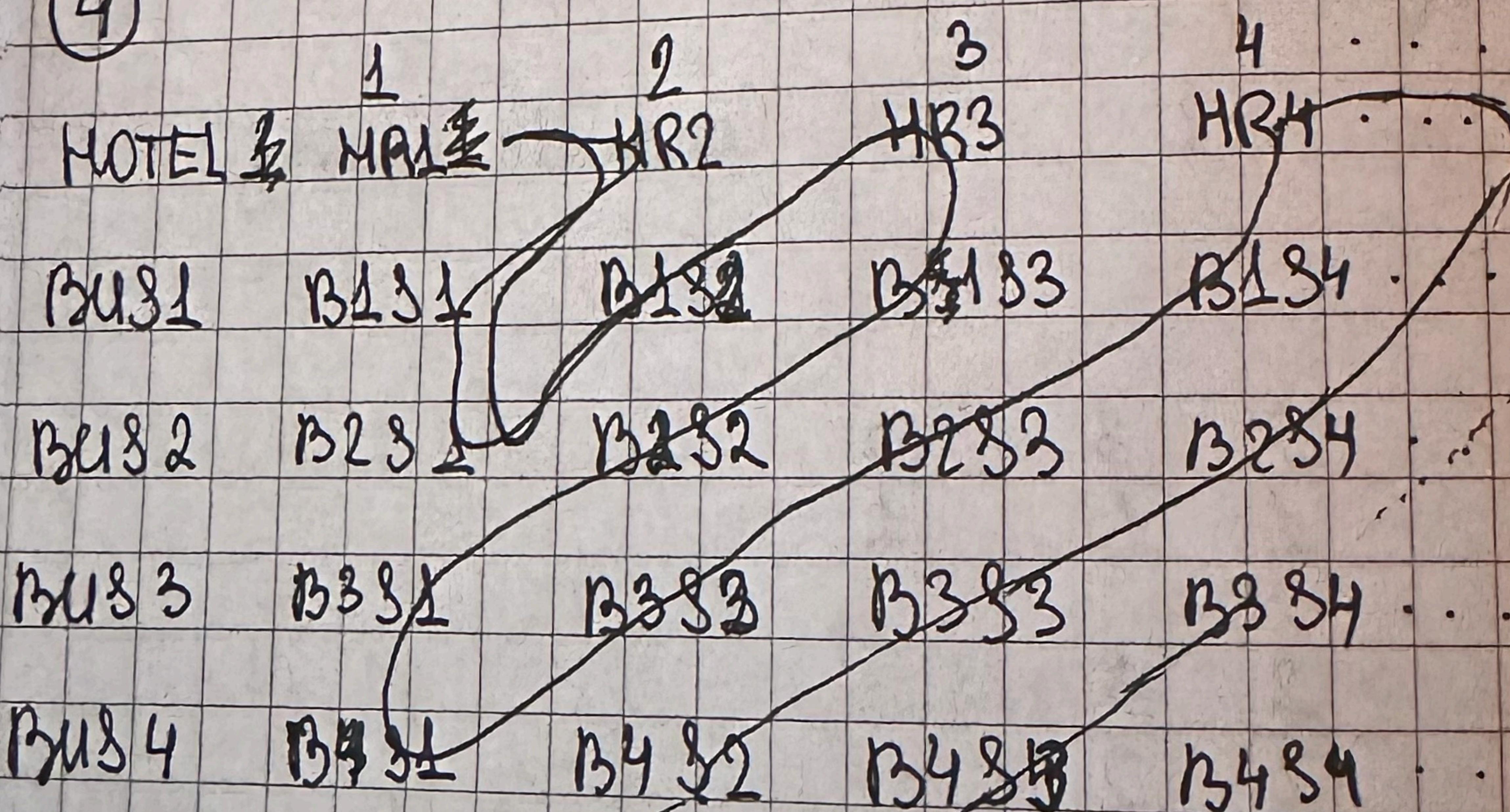
3  $\Rightarrow$  Y Y (Y) Y Y Y

4  $\Rightarrow$  N Y N (Y) N Y

Result: YYNN

$$|S| < |P(S)| < |P(P(S))| <$$

(4)



(5)

Room 1

BB Nam

Room 2

BBB Ar

Room 3

AA(A) A

Room 4

BBB(B) R

Room 5

BA

No Room

R

Full string at  
the end

nam



⑤	NAME
Room 1	(A)BABA A BABA A ... ..
Room 2	B(B)A BAA BAA A A B ... ..
Room 3	AAA(A)A AA B B B B B A ... ..
Room 4	B(B)B B(B)Baa B B B B A A A ... ..
Room 5	BABA(A)B A A B A A B A ... ..
...	...
No Room	BABAB ... ..

name infinity > rooms infinity at the hotel.