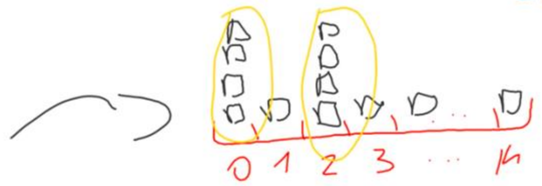
$k \xrightarrow[\text{bin}]{\#} v$

$\boxed{x \bmod 15}$

1. values uniformly dist
2. reasonable size



0
1
2
3
4
5
⋮

$\boxed{x \bmod 15}$

$k = \alpha \cdot c$

	c=2		c=3	
α	k	v	k	v
0	0	0	0	0
1	2	2	3	3
2	4	4	6	6
3	6	6	9	9
4	8	8	12	12
5	10	10	15	0
6	12	12	18	3
7	14	14	21	6
8	16	1	⋮	
⋮				

5	15
3	3
1	

3, 6, 9, ...
5, 10, 15 ...

$\boxed{3x+2 \bmod 5}$

	k	v
0	2	2
1	5	0
2	8	3
3	11	1
4	14	4
5	17	2

(a) In terms of e, give approximations to

- $(1.01)^{500}$
- $(1.05)^{1000}$
- $(0.9)^{40}$

$$(1+a)^b = [(1+a)^{\frac{1}{a}}]^{ba} \approx e^{ab}$$

a small !

$$(1+a)^b = (1+a)^{b \cdot \frac{a}{a}} = [(1+a)^{\frac{1}{a}}]^{ba} \approx e^{ab}$$

$$(1,01)^{500} = [(1+0,01)^{\frac{1}{0,01}}]^{500 \cdot 0,01} \approx e^{500 \cdot 0,01} = e^5$$

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + ...$$

(b) Use the Taylor expansion of e^x to compute, to three decimal places:

- $e^{1/10}$
- $e^{-1/10}$
- e^2

$$e^{\frac{1}{10}} = 1 + 0,1 + \frac{(0,1)^2}{2!} = 1 + 0,1 + 0,005 = 1,105$$