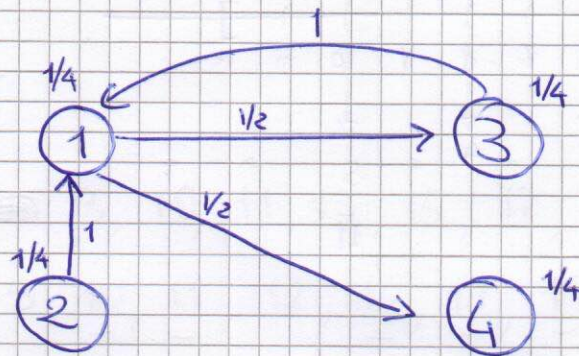


Exercise 1



Teleportation steps follows node 3 $\rightarrow [0 \ 0 \ 1 \ 0]$

$$Pr(1) = \frac{1}{2} \left[\frac{1}{4} + \frac{1}{4} \right] + \frac{1}{2} \cdot 0 = \frac{1}{4}$$

$$Pr(2) = \frac{1}{2} [0] + \frac{1}{2} \cdot 0 = 0$$

$$Pr(3) = \frac{1}{2} \left[\frac{1}{2} \cdot \frac{1}{4} \right] + \frac{1}{2} \cdot 1 = \frac{1}{16} + \frac{1}{2} = \frac{9}{16}$$

$$Pr(4) = \frac{1}{2} \left[\frac{1}{2} \cdot \frac{1}{4} \right] + \frac{1}{2} \cdot 0 = \frac{1}{16}$$

Exercise 2

$$U = \{3, 4, 9, 2, 5, 7, 12, 11\}$$

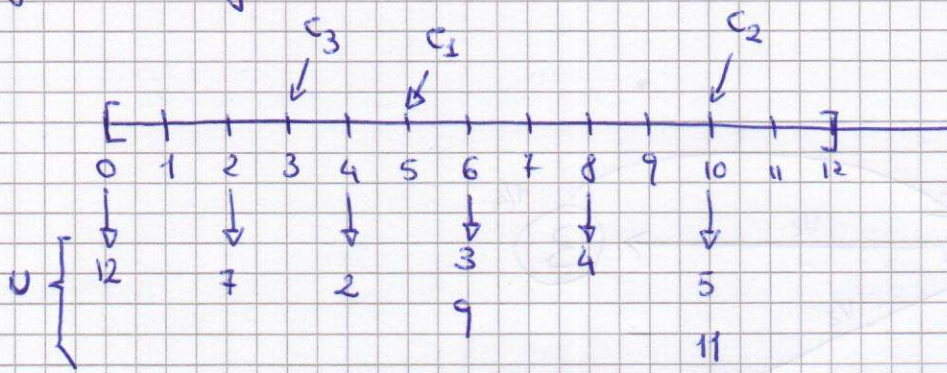
$$C = \{1, 2, 3\}$$

We choose the hash functions:

$$h_U(x) = 2x \pmod{13}$$

$$h_C(x) = 5x \pmod{13}$$

We draw the space of the co-domain as a segment, by assuming that it is "circular".

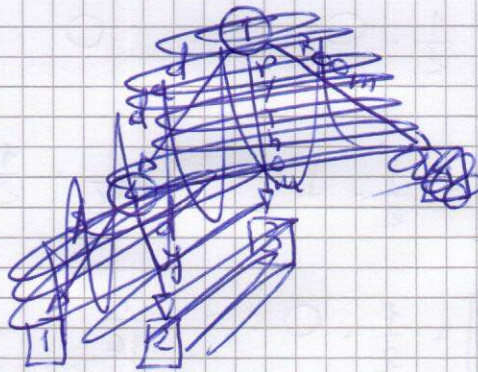


$$c_3 \Rightarrow \{2\}$$

$$c_1 \Rightarrow \{3, 9, 4\}$$

$$c_2 \Rightarrow \{5, 11, 12, 7\}$$

Exercise 3



\$PITOM, \$DAD, \$DADDY, \$ROOM

$$\$D \rightarrow 2, 3$$

$$\$P \rightarrow 1$$

$$\$T \rightarrow 4$$

$$AD \rightarrow 2, 3$$

$$DA \rightarrow 2, 3$$

$$DD \rightarrow 3$$

$$DY \rightarrow 3$$

$$IT \rightarrow 1$$

$$OM \rightarrow 1, 4$$

$$OO \rightarrow 4$$

$$PI \rightarrow 1$$

$$TO \rightarrow 1 \text{ and } ZO \rightarrow 4$$

$$P = atom \rightarrow$$

$$\$A \rightarrow -$$

$$AT \rightarrow -$$

$$TO \rightarrow 1$$

$$OM \rightarrow 1, 4$$

since $q = 2$ and $e = 1$ and $L = 4$ (for P) then

$\geq 4 - 2 \cdot 1 = 2$ shared q -grams
 \Rightarrow candidate is \$PITOM

Exercise 3

see book and slides

Exercise 4

14 → ~~3~~ 3, 10, 11, 13, 14, 17, 19, 21, 25

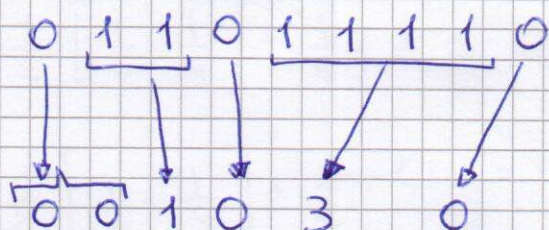
15 → 5, 10, 11, 12, 14, 17, 19, 20, 21, 24, 33

I have indicated with a dot the items in the IL(14) which occur in IL(15) and these can be copied.

15 → 0 1 1 0 1 1 1 1 0 ; 5, 12, 20, 24, 33
extra nodes

For encoding the copy-blocks, we proceed as follows

len = 9
#blocks = 5



(length - 1)

we could have dropped the last 0 because we can infer from the length 9 of the binary sequence.