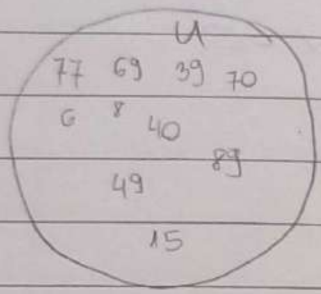
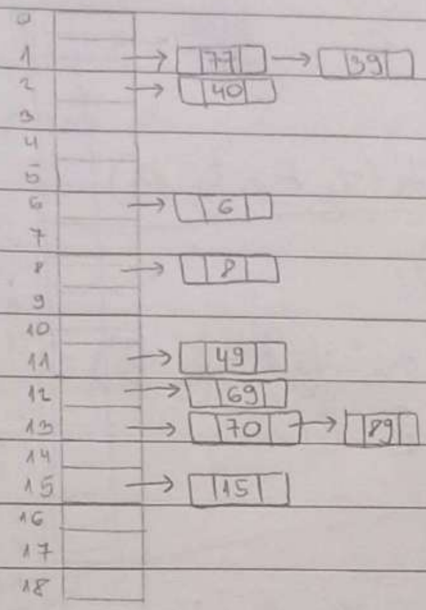
1) 1) $m = 19$

a) $h(k) = k \bmod m$





$77 \bmod 19 = 1$

$69 \bmod 19 = 12$

$39 \bmod 19 = 1$

$70 \bmod 19 = 13$

$6 \bmod 19 = 6$

$8 \bmod 19 = 8$

$40 \bmod 19 = 2$

$89 \bmod 19 = 13$

$49 \bmod 19 = 11$

$15 \bmod 19 = 15$

b)

0		h(89,13)
1		
2		
3		
4		h(8,8)
5		h(39,1)
6		h(70,13)
7		h(77,1)
8		h(15,15)
9		
10		h(6,6)
11		
12		h(40,2)
13		h(49,11)
14		h(69,12)
15		
16		
17		
18		

$h(k,i) = (h_1(k) + i \cdot h_2(k)) \bmod m$

$h_1 = k \bmod m$

$h_2(k) = 1 + (k \bmod (m-1))$

$h(77,1) = (1+6) \bmod 19 = 7$

$h(69,12) = (12+192) \bmod 19 = 14$

$h(39,1) = (1+4) \bmod 19 = 5$

$h(70,13) = (13+221) \bmod 19 = 6$

$h(6,6) = (6+42) \bmod 19 = 10$

$h(8,8) = (8+72) \bmod 19 = 4$

$h(40,2) = (2+10) \bmod 19 = 12$

$h(89,13) = (13+234) \bmod 19 = 0$

$h(49,11) = (11+154) \bmod 19 = 13$

$h(15,15) = (15+240) \bmod 19 = 8$

2. Uzmimo f-ju $c_{x,y} = \begin{cases} 1, & h(x) = h(y) \\ 0, & \text{inače} \end{cases}$

Pomoću nje definirajmo novu f-ju $c_x = \sum_{y \in T / \{x\}} c_{x,y}$ koja nam daje ukupni broj kolizija s x.

$$E[x] = E\left[\sum_{y \in T \setminus \{x\}} c_{x,y}\right] = \sum_{y \in T \setminus \{x\}} E[c_{x,y}] = \sum_{y \in T \setminus \{x\}} \frac{1}{m} = \frac{n-1}{m}$$