

ZADACĀ 1

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

1. d) $h(77) = 77 \bmod 19 = 1$, 77 jā mē indēlsu 1

$$h(69) = 69 - 11 = 12$$

$$h(39) = 39 - 11 = 1$$

$$h(70) = 70 - 11 = 13$$

$$h(6) = 6 - 11 = 6$$

$$h(8) = 8 - 11 = 8$$

$$h(40) = 40 + 11 = 2$$

$$h(89) = 89 - 11 = 13$$

$$h(49) = 49 - 11 = 11$$

$$h(15) = 15 - 11 = 15$$

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

b) $h(k, i) = (h_1(k) + i \cdot h_2(k)) \bmod m$, $h_1(k) = k \bmod m$
 $h_2(k) = 1 + (k \bmod (m-1))$

$$h(77, 0) = (h_1(77) + 0 \cdot h_2(77)) \bmod 19 = 1$$

$$h(69, 0) = (12 + 0) \bmod 19 = 12$$

$$h(39, 0) = 1$$

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

$$h(70, 0) = 13$$

$$h(6, 0) = 6$$

$$h(8, 0) = 8$$

$$h(40, 0) = 2$$

$$h(89, 0) = 13$$

$$h(89, 1) = (13 + 1 \cdot 18) \bmod 19 = 12$$

$$h(89, 2) = (13 + 2 \cdot 18) \bmod 19 = 11$$

$$h(49, 0) = 11$$

$$h(49, 1) = (11 + 1 \cdot 14) \bmod 19 = 6$$

$$h(49, 2) = (11 + 2 \cdot 14) \bmod 19 = \underline{1}$$

$$h(49, 3) = (11 + 3 \cdot 14) \bmod 19 = \underline{15}$$

$$h(15, 0) = \underline{15}$$

$$h(15, 1) = (15 + 1 \cdot 16) \bmod 19 = \underline{12}$$

$$h(15, 2) = (15 + 2 \cdot 16) \bmod 19 = \underline{9}$$

0	
1	77
2	40
3	
4	
5	29
6	6
7	
8	8
9	15
10	
11	89
12	69
13	70
14	
15	49
16	
17	
18	

1) 2) $f(x) = \sum_{i=1}^m a_i x_i \pmod{8}$

• npr. za $m=2$ $a_1 = a_2 = 1$ i za npr. 62 i 71 imamo

$$6 \cdot 1 + 2 \cdot 1 = 8 \bmod 8 = 0$$

$$7 \cdot 1 + 1 \cdot 1 = 8 \bmod 8 = 0$$

$\Rightarrow f$ -ja nije univerzalna

2.)

X - sl. varijabla koja modelira vjerovatnost kolizije za ubacene ključevi

$$X \sim \begin{pmatrix} 0 & 1 & 2 & \dots & m-1 \\ 0 & \frac{1}{m} & \frac{1}{m} & \dots & \frac{1}{m} \end{pmatrix}$$

Očekivanje od X :

$$E X = \sum_{i=0}^{m-1} i \cdot \frac{1}{m} = \frac{1}{m} \cdot \frac{(m-1) \cdot m}{2} = \frac{m(m-1)}{2m}$$