Zadacia 1

1.

1) a) $h(77) = 77 \bmod 19 = 1$ (77 je na indeksu 1)

$h(69) = 12$

$h(39) = 1$

$h(70) = 13$

$h(6) = 6$

$h(8) = 8$

$h(40) = 2$

$h(89) = 13$

$h(49) = 11$

$h(15) = 15$

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

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

$h(69,0) = 12$

$h(39,0) = 1$

$h(39,1) = (h_1(39) + 1 \cdot h_2(39)) \bmod 19 = 5$

$h(70,0) = 13$

$h(6,0) = 6$

$h(8,0) = 8$

$h(40,0) = 2$

$h(89,0) = 13$

$h(89,1) = 12$

$h(89,2) = 11$

$h(49,0) = 11$

$h(49,1) = 6$

$h(49,2) = 1$

$h(49,3) = 15$

$h(15,0) = 15$

$h(15,1) = 12$

$h(15,2) = 9$

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

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

$f(x)$ nije univerzalna fja.

npr. za $a_i = 0$ je $f(x) = 0$, $\forall x$

(2.)

X - slučajna varijabla koja modelira vj. kolizije za ubačene ključeve

$$X \sim \begin{pmatrix} 0 & 1 & 2 & 3 & \cdots & n-1 \\ 0 & \frac{1}{m} & \frac{1}{m} & \frac{1}{m} & \cdots & \frac{1}{m} \end{pmatrix}$$

Tada je očekivanje od X:

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