

Q-1 0, 1, 20, 2, 20, 21, 32, 31, 0, 60, 0, 0, 16, 1, 17, 18, 32, 31, 0, 61

(i) FIFO HIT/MISS (To find)

⇒

0	1	20	2	20	21	32	2
0	0	1	1	20	20	21	21
						20	32

31	0	60	0	0	16	1	16
31	31	31	31	0	16	0	16
21		0	0	0	0	0	1
32		32	60	60	60	60	60

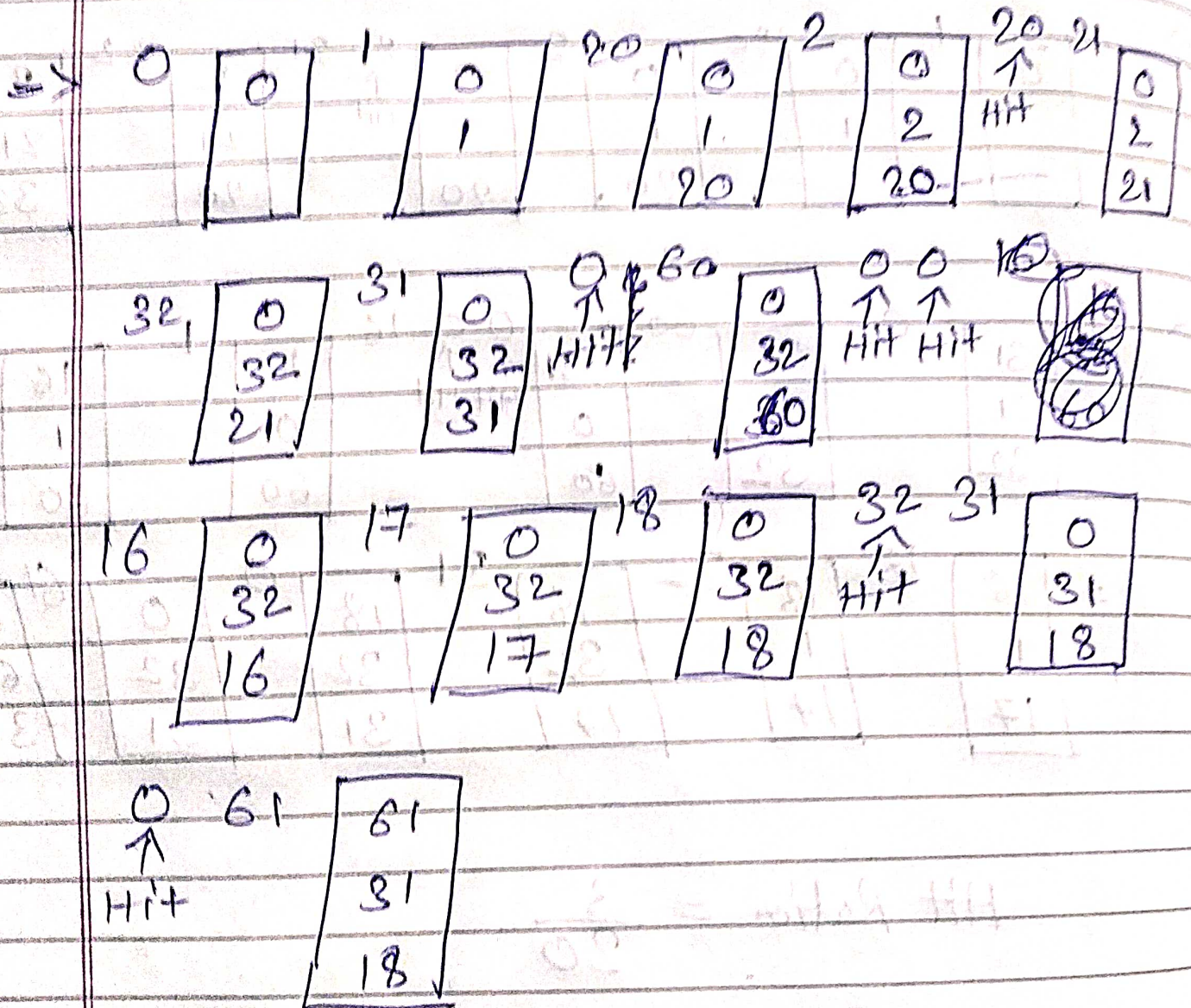
17	18	32	31	0	61
16	18	18	18	0	0
1	1	32	32	32	61
17	17	17	31	31	31

$$\text{Hit Ratio} = \frac{3}{20}$$

$$\text{Miss Ratio} = \frac{17}{20}$$

(ii) optimal

⇒ 0, 1, 20, 2, 20, 21, 32, 31, 0, 60, 10, 0, 16, 17, 18, 32, 31, 0, 61



$$\text{Hit ratio} = \frac{6}{20} = \frac{3}{10}$$

$$\text{Miss ratio} = \frac{14}{20} = \frac{7}{10}$$

iii) Least recently

$\Rightarrow 0, 1, 20, 2, 20, 21, 32, 31, 0, 60, 0, 0, 16, 17$
 $, 18, 32, 31, 0, 61$

\Rightarrow

0	1	20	2	20	21	32
0	0	0	2	2	2	32
	1	1	1	1	21	21
		20	20	20	20	20

31	0	60	0	0	16	17
32	32	60	0	0	60	17
21	0	0	↑	↑	0	0
31	31	31	Hit	Hit	16	16

18	32	31	0	61
17	17	31	31	31
18	18	18	0	0
16	32	32	32	61

$$\text{Hit ratio} = \frac{3}{20}$$

$$\text{Miss ratio} = \frac{17}{20}$$