

گزارش پروژه سیستم عامل

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نحوه اتصال به سوکت:

در کد سمت کلاینت با استفاده از قطه کد زیر به سوکت در پورت مشخص شده وصل میشویم . و میتوانیم توسط دو خط آخر ورودی هایی که از سمت سرور فرستاده میشود را بخوانیم.

```
Socket s=new Socket("localhost",8080);
DataInputStream dis=new DataInputStream(s.getInputStream());
int n = dis.readInt();
```

البته باید به یاد داشته باشیم که این کد ها را درون try قرار دهیم تا در صورت بروز اکسپشن آن را catch کنیم.و در آخر هم باید کانکشن های مربوط سوکت را close کنیم.

```
Dis.close();
s.close();
```

پیاده سازی الگوریتم ها:

FIFO: برای پیاده سازی این الگوریتم یک صف FIFO تشکیل میدهم و به ترتیب داده هایی را که میخوانیم به طور مشخص وارد آن میکنیم.اگر ظرفیت آن پر شد یعنی از n بیشتر شد باید داده جدید را با اولین خانه از صف یعنی داده ی سر صف جابجا کنیم. پس خانه سر صف را بیرون کرده و داده ی جدید را وارد صف میکنیم.در صورتی هم که داده از قبل در صف موجود باشد هیچ کاری نکرده و سراغ داده ی بعدی میرویم.

صف مربوط به FIFO:

```
Queueuf fifoQ = new Queueuf(n);
```

پیاده سازی توضیحاتی که دادیم برای هر داده ی ورودی یا item:

```
if(fifoQ.isIn(item)){
} else {
    ++fifo_pf;
    fifoQ=fifo(fifoQ,item);
}

static Queueuf fifo(Queueuf q,int num){
    if (q.cap != q.rear) { //not full
        q.queueenq(num);
    }else{
        q.queuedeq();
        q.queueenq(num);
    }
}
```

```

    }
    return q;
}

```

LRU: برای پیاده سازی این الگوریتم از استک استفاده میکنیم تا داده هایی که اخیراً مورد استفاده قرار میگیرند در top یا نزدیک آن قرار بگیرند و داده هایی که مدت بیشتری مورد استفاده قرار نگرفته اند در ته استک باشند. در ابتدا تا جایی که استک جا دارد داده هارا در آن push میکنیم. در صورتی که تعداد داده های استک از n بیشتر شد و پر شد باید یک داده را خارج کنیم و داده جدید را جایگزین آن نماییم. داده ای که خارج میشود پایین ترین داده ی استک است. در صورتی هم که داده در استک وجود داشت آن را از استک خارج میکنیم و بار دیگر push میکنیم تا در top قرار گیرد.

استک مربوط به LRU:

```
Stack<Integer> stk= new Stack<>();
```

پیاده سازی توضیحاتی که دادیم برای هر داده ی ورودی یا item:

```

if(stk.contains(item)){
    stk.remove(item);
    stk.push(item);
}else{
    ++lru_pf;
    if(stk.size() < n){
        stk.push(item);
    }else {
        stk.remove(stk.firstElement());
        stk.push(item);
    }
    // lru();
}

```

Second-chance: برای پیاده سازی این الگوریتم از یک صف FIFO استفاده میکنیم که همان هایی که نگهداری میکند کلاسی است که شامل یک عدد صحیح که همان شماره مشتری است و یک بیت که نشان دهنده مورد استفاده قرار گرفتن آن شماره مشتری است که در ابتدا 0 میباشد. در ابتدا مانند الگوریتم های قبل تا جایی که صف ظرفیت دارد داده های جدید را در آن وارد میکنیم. در صورتی که پر شد از ابتدای صف شروع میکنیم و بیت هر المان را چک میکنیم. اگر 0 بود داده ی جدید را با آن و با بیت 0 جایگزین کرده و کارمان تمام میشود. اگر 1 بود مقدار آن را نگه داشته و آن را از صف خارج میکنیم سپس همان مقدار را اما بیت 0 به تخ صف وارد میکنیم تا شانس دوباره بدهیم. این کار را تا جایی انجام میدهیم تا به المانی با بیت 0 برسیم. هم چنین اگر داده ای در مقدار های موجود در صف بود بیت آن را به 1 تغییر میدهیم.

صف مربوط به Second-chance:

```
BitQueue SCQ = new BitQueue(n);
```

پیاده سازی توضیحاتی که دادیم برای هر داده ی ورودی یا item:

```
int index_isin = SCQ.isIn(item); //return -1 if isnt in & return index of
element if it's in
if(index_isin != -1){
    SCQ.queue[index_isin].bit = 1;
}else{
    ++SC_pf;
    SCQ=second_chance(SCQ,item);
}
```

```
static BitQueue second_chance(BitQueue bitQueue,int num){
    IntBit newIntBit = new IntBit(num);
    if (bitQueue.cap != bitQueue.rear) { //not full
        bitQueue.queueenq(newIntBit);
    }else {
        for (int i = bitQueue.front; i < bitQueue.rear; i++) {
            if (bitQueue.queue[i].bit == 0) {
                bitQueue.queuedeq();
                bitQueue.queueenq(newIntBit);
                break;
            } else { //bit==1
                IntBit temp = new IntBit(bitQueue.queue[i].value);
                bitQueue.queuedeq();
                bitQueue.queueenq(temp);
            }
        }
    }
    return bitQueue;
}
```

نمونه هایی از ورودی و خروجی ها:

1) page trace:

67,28,46,21,50,80,21,100,94,35,80,77,

new item is:67

Customers at the table are:

FIFO:

67

LRU:

67

Second-chance:

67

new item is:28

Customers at the table are:

FIFO:

67 28

LRU:

67 28

Second-chance:

67 28

new item is:46

Customers at the table are:

FIFO:

67 28 46

LRU:

67 28 46

Second-chance:

67 28 46

new item is:21

Customers at the table are:

FIFO:

28 46 21

LRU:

28 46 21

Second-chance:

28 46 21

new item is:50

Customers at the table are:

FIFO:

46 21 50

LRU:

46 21 50

Second-chance:

46 21 50

new item is:80

Customers at the table are:

FIFO:

21 50 80

LRU:

21 50 80

Second-chance:

21 50 80

new item is:21

Customers at the table are:

FIFO:

21 50 80

LRU:

50 80 21

Second-chance:

21 50 80

new item is:100

Customers at the table are:

FIFO:

50 80 100

LRU:

80 21 100

Second-chance:

80 21 100

new item is:94

Customers at the table are:

FIFO:

80 100 94

LRU:

21 100 94

Second-chance:

21 100 94

new item is:35

Customers at the table are:

FIFO:

100 94 35

LRU:

100 94 35

Second-chance:

100 94 35

new item is:80

Customers at the table are:

FIFO:

94 35 80

LRU:

94 35 80

Second-chance:

94 35 80

new item is:77

Customers at the table are:

FIFO:

35 80 77

LRU:

35 80 77

Second-chance:

35 80 77

LRU:11,FIFO:11,Second-chance:11

2) page trace:

83,94,31,87,24,19,14,57,53,74,16,78,98,74,18,38,100,50,93,74,6,45,52,60,41,94,56,40,33,52,13,
,27,78,85,82,48,58,56,71,18,32,54,20,34,25,68,29,70,95,61,12,5,50,81,21,35,29,54,15,27,

new item is:83

Customers at the table are:

FIFO:

83

LRU:

83

Second-chance:

83

new item is:94

Customers at the table are:

FIFO:

83 94

LRU:

83 94

Second-chance:

83 94

new item is:31

Customers at the table are:

FIFO:

83 94 31

LRU:

83 94 31

Second-chance:

83 94 31

new item is:87

Customers at the table are:

FIFO:

83 94 31 87

LRU:

83 94 31 87

Second-chance:

83 94 31 87

new item is:24

Customers at the table are:

FIFO:

83 94 31 87 24

LRU:

83 94 31 87 24

Second-chance:

83 94 31 87 24

new item is:19

Customers at the table are:

FIFO:

94 31 87 24 19

LRU:

94 31 87 24 19

Second-chance:

94 31 87 24 19

new item is:14

Customers at the table are:

FIFO:

31 87 24 19 14

LRU:

31 87 24 19 14

Second-chance:

31 87 24 19 14

new item is:57

Customers at the table are:

FIFO:

87 24 19 14 57

LRU:

87 24 19 14 57

Second-chance:

87 24 19 14 57

new item is:53

Customers at the table are:

FIFO:

24 19 14 57 53

LRU:

24 19 14 57 53

Second-chance:

24 19 14 57 53

new item is:74

Customers at the table are:

FIFO:

19 14 57 53 74

LRU:

19 14 57 53 74

Second-chance:

19 14 57 53 74

new item is:16

Customers at the table are:

FIFO:

14 57 53 74 16

LRU:

14 57 53 74 16

Second-chance:

14 57 53 74 16

new item is:78

Customers at the table are:

FIFO:

57 53 74 16 78

LRU:

57 53 74 16 78

Second-chance:

57 53 74 16 78

new item is:98

Customers at the table are:

FIFO:

53 74 16 78 98

LRU:

53 74 16 78 98

Second-chance:

53 74 16 78 98

new item is:74

Customers at the table are:

FIFO:

53 74 16 78 98

LRU:

53 16 78 98 74

Second-chance:

53 74 16 78 98

new item is:18

Customers at the table are:

FIFO:

74 16 78 98 18

LRU:

16 78 98 74 18

Second-chance:

74 16 78 98 18

new item is:38

Customers at the table are:

FIFO:

16 78 98 18 38

LRU:

78 98 74 18 38

Second-chance:

78 98 18 74 38

new item is:100

Customers at the table are:

FIFO:

78 98 18 38 100

LRU:

98 74 18 38 100

Second-chance:

98 18 74 38 100

new item is:50

Customers at the table are:

FIFO:

98 18 38 100 50

LRU:

74 18 38 100 50

Second-chance:

18 74 38 100 50

new item is:93

Customers at the table are:

FIFO:

18 38 100 50 93

LRU:

18 38 100 50 93

Second-chance:

74 38 100 50 93

new item is:74

Customers at the table are:

FIFO:

38 100 50 93 74

LRU:

38 100 50 93 74

Second-chance:

74 38 100 50 93

new item is:6

Customers at the table are:

FIFO:

100 50 93 74 6

LRU:

100 50 93 74 6

Second-chance:

100 50 93 74 6

new item is:45

Customers at the table are:

FIFO:

50 93 74 6 45

LRU:

50 93 74 6 45

Second-chance:

50 93 74 6 45

new item is:52

Customers at the table are:

FIFO:

93 74 6 45 52

LRU:

93 74 6 45 52

Second-chance:

93 74 6 45 52

new item is:60

Customers at the table are:

FIFO:

74 6 45 52 60

LRU:

74 6 45 52 60

Second-chance:

74 6 45 52 60

new item is:41

Customers at the table are:

FIFO:

6 45 52 60 41

LRU:

6 45 52 60 41

Second-chance:

6 45 52 60 41

new item is:94

Customers at the table are:

FIFO:

45 52 60 41 94

LRU:

45 52 60 41 94

Second-chance:

45 52 60 41 94

new item is:56

Customers at the table are:

FIFO:

52 60 41 94 56

LRU:

52 60 41 94 56

Second-chance:

52 60 41 94 56

new item is:40

Customers at the table are:

FIFO:

60 41 94 56 40

LRU:

60 41 94 56 40

Second-chance:

60 41 94 56 40

new item is:33

Customers at the table are:

FIFO:

41 94 56 40 33

LRU:

41 94 56 40 33

Second-chance:

41 94 56 40 33

new item is:52

Customers at the table are:

FIFO:

94 56 40 33 52

LRU:

94 56 40 33 52

Second-chance:

94 56 40 33 52

new item is:13

Customers at the table are:

FIFO:

56 40 33 52 13

LRU:

56 40 33 52 13

Second-chance:

56 40 33 52 13

new item is:27

Customers at the table are:

FIFO:

40 33 52 13 27

LRU:

40 33 52 13 27

Second-chance:

40 33 52 13 27

new item is:78

Customers at the table are:

FIFO:

33 52 13 27 78

LRU:

33 52 13 27 78

Second-chance:

33 52 13 27 78

new item is:85

Customers at the table are:

FIFO:

52 13 27 78 85

LRU:

52 13 27 78 85

Second-chance:

52 13 27 78 85

new item is:82

Customers at the table are:

FIFO:

13 27 78 85 82

LRU:

13 27 78 85 82

Second-chance:

13 27 78 85 82

new item is:48

Customers at the table are:

FIFO:

27 78 85 82 48

LRU:

27 78 85 82 48

Second-chance:

27 78 85 82 48

new item is:58

Customers at the table are:

FIFO:

78 85 82 48 58

LRU:

78 85 82 48 58

Second-chance:

78 85 82 48 58

new item is:56

Customers at the table are:

FIFO:

85 82 48 58 56

LRU:

85 82 48 58 56

Second-chance:

85 82 48 58 56

new item is:71

Customers at the table are:

FIFO:

82 48 58 56 71

LRU:

82 48 58 56 71

Second-chance:

82 48 58 56 71

new item is:18

Customers at the table are:

FIFO:

48 58 56 71 18

LRU:

48 58 56 71 18

Second-chance:

48 58 56 71 18

new item is:32

Customers at the table are:

FIFO:

58 56 71 18 32

LRU:

58 56 71 18 32

Second-chance:

58 56 71 18 32

new item is:54

Customers at the table are:

FIFO:

56 71 18 32 54

LRU:

56 71 18 32 54

Second-chance:

56 71 18 32 54

new item is:20

Customers at the table are:

FIFO:

71 18 32 54 20

LRU:

71 18 32 54 20

Second-chance:

71 18 32 54 20

new item is:34

Customers at the table are:

FIFO:

18 32 54 20 34

LRU:

18 32 54 20 34

Second-chance:

18 32 54 20 34

new item is:25

Customers at the table are:

FIFO:

32 54 20 34 25

LRU:

32 54 20 34 25

Second-chance:

32 54 20 34 25

new item is:68

Customers at the table are:

FIFO:

54 20 34 25 68

LRU:

54 20 34 25 68

Second-chance:

54 20 34 25 68

new item is:29

Customers at the table are:

FIFO:

20 34 25 68 29

LRU:

20 34 25 68 29

Second-chance:

20 34 25 68 29

new item is:70

Customers at the table are:

FIFO:

34 25 68 29 70

LRU:

34 25 68 29 70

Second-chance:

34 25 68 29 70

new item is:95

Customers at the table are:

FIFO:

25 68 29 70 95

LRU:

25 68 29 70 95

Second-chance:

25 68 29 70 95

new item is:61

Customers at the table are:

FIFO:

68 29 70 95 61

LRU:

68 29 70 95 61

Second-chance:

68 29 70 95 61

new item is:12

Customers at the table are:

FIFO:

29 70 95 61 12

LRU:

29 70 95 61 12

Second-chance:

29 70 95 61 12

new item is:5

Customers at the table are:

FIFO:

70 95 61 12 5

LRU:

70 95 61 12 5

Second-chance:

70 95 61 12 5

new item is:50

Customers at the table are:

FIFO:

95 61 12 5 50

LRU:

95 61 12 5 50

Second-chance:

95 61 12 5 50

new item is:81

Customers at the table are:

FIFO:

61 12 5 50 81

LRU:

61 12 5 50 81

Second-chance:

61 12 5 50 81

new item is:21

Customers at the table are:

FIFO:

12 5 50 81 21

LRU:

12 5 50 81 21

Second-chance:

12 5 50 81 21

new item is:35

Customers at the table are:

FIFO:

5 50 81 21 35

LRU:

5 50 81 21 35

Second-chance:

5 50 81 21 35

new item is:29

Customers at the table are:

FIFO:

50 81 21 35 29

LRU:

50 81 21 35 29

Second-chance:

50 81 21 35 29

new item is:54

Customers at the table are:

FIFO:

81 21 35 29 54

LRU:

81 21 35 29 54

Second-chance:

81 21 35 29 54

new item is:15

Customers at the table are:

FIFO:

21 35 29 54 15

LRU:

21 35 29 54 15

Second-chance:

21 35 29 54 15

new item is:27

Customers at the table are:

FIFO:

35 29 54 15 27

LRU:

35 29 54 15 27

Second-chance:

35 29 54 15 27

LRU:59,FIFO:59,Second-chance:58

3) page trace:

59,47,72,73,65,79,48,84,69,97,7,40,61,64,100,64,76,28,24,99,28,8,86,75,46,58,88,82,48,76,9,2
8,70,43,44,58,85,21,22,71,24,92,23,7,43,60,70,98,27,51,76,61,90,54,29,71,96,74,96,63,88,49,4
2,50,91,36,59,59,53,76,22,81,40,94,64,24,84,36,86,66,62,37,24,79,34,47,17,80,62,33,52,55,

new item is:59

Customers at the table are:

FIFO:

59

LRU:

59

Second-chance:

59

new item is:47

Customers at the table are:

FIFO:

59 47

LRU:

59 47

Second-chance:

59 47

new item is:72

Customers at the table are:

FIFO:

59 47 72

LRU:

59 47 72

Second-chance:

59 47 72

new item is:73

Customers at the table are:

FIFO:

59 47 72 73

LRU:

59 47 72 73

Second-chance:

59 47 72 73

new item is:65

Customers at the table are:

FIFO:

59 47 72 73 65

LRU:

59 47 72 73 65

Second-chance:

59 47 72 73 65

new item is:79

Customers at the table are:

FIFO:

59 47 72 73 65 79

LRU:

59 47 72 73 65 79

Second-chance:

59 47 72 73 65 79

new item is:48

Customers at the table are:

FIFO:

59 47 72 73 65 79 48

LRU:

59 47 72 73 65 79 48

Second-chance:

59 47 72 73 65 79 48

new item is:84

Customers at the table are:

FIFO:

47 72 73 65 79 48 84

LRU:

47 72 73 65 79 48 84

Second-chance:

47 72 73 65 79 48 84

new item is:69

Customers at the table are:

FIFO:

72 73 65 79 48 84 69

LRU:

72 73 65 79 48 84 69

Second-chance:

72 73 65 79 48 84 69

new item is:97

Customers at the table are:

FIFO:

73 65 79 48 84 69 97

LRU:

73 65 79 48 84 69 97

Second-chance:

73 65 79 48 84 69 97

new item is:7

Customers at the table are:

FIFO:

65 79 48 84 69 97 7

LRU:

65 79 48 84 69 97 7

Second-chance:

65 79 48 84 69 97 7

new item is:40

Customers at the table are:

FIFO:

79 48 84 69 97 7 40

LRU:

79 48 84 69 97 7 40

Second-chance:

79 48 84 69 97 7 40

new item is:61

Customers at the table are:

FIFO:

48 84 69 97 7 40 61

LRU:

48 84 69 97 7 40 61

Second-chance:

48 84 69 97 7 40 61

new item is:64

Customers at the table are:

FIFO:

84 69 97 7 40 61 64

LRU:

84 69 97 7 40 61 64

Second-chance:

84 69 97 7 40 61 64

new item is:100

Customers at the table are:

FIFO:

69 97 7 40 61 64 100

LRU:

69 97 7 40 61 64 100

Second-chance:

69 97 7 40 61 64 100

new item is:64

Customers at the table are:

FIFO:

69 97 7 40 61 64 100

LRU:

69 97 7 40 61 100 64

Second-chance:

69 97 7 40 61 64 100

new item is:76

Customers at the table are:

FIFO:

97 7 40 61 64 100 76

LRU:

97 7 40 61 100 64 76

Second-chance:

97 7 40 61 64 100 76

new item is:28

Customers at the table are:

FIFO:

7 40 61 64 100 76 28

LRU:

7 40 61 100 64 76 28

Second-chance:

7 40 61 64 100 76 28

new item is:24

Customers at the table are:

FIFO:

40 61 64 100 76 28 24

LRU:

40 61 100 64 76 28 24

Second-chance:

40 61 64 100 76 28 24

new item is:99

Customers at the table are:

FIFO:

61 64 100 76 28 24 99

LRU:

61 100 64 76 28 24 99

Second-chance:

61 64 100 76 28 24 99

new item is:28

Customers at the table are:

FIFO:

61 64 100 76 28 24 99

LRU:

61 100 64 76 24 99 28

Second-chance:

61 64 100 76 28 24 99

new item is:8

Customers at the table are:

FIFO:

64 100 76 28 24 99 8

LRU:

100 64 76 24 99 28 8

Second-chance:

64 100 76 28 24 99 8

new item is:86

Customers at the table are:

FIFO:

100 76 28 24 99 8 86

LRU:

64 76 24 99 28 8 86

Second-chance:

76 28 24 99 8 64 86

new item is:75

Customers at the table are:

FIFO:

76 28 24 99 8 86 75

LRU:

76 24 99 28 8 86 75

Second-chance:

28 24 99 8 64 86 75

new item is:46

Customers at the table are:

FIFO:

28 24 99 8 86 75 46

LRU:

24 99 28 8 86 75 46

Second-chance:

99 8 64 86 75 28 46

new item is:58

Customers at the table are:

FIFO:

24 99 8 86 75 46 58

LRU:

99 28 8 86 75 46 58

Second-chance:

8 64 86 75 28 46 58

new item is:88

Customers at the table are:

FIFO:

99 8 86 75 46 58 88

LRU:

28 8 86 75 46 58 88

Second-chance:

64 86 75 28 46 58 88

new item is:82

Customers at the table are:

FIFO:

8 86 75 46 58 88 82

LRU:

8 86 75 46 58 88 82

Second-chance:

86 75 28 46 58 88 82

new item is:48

Customers at the table are:

FIFO:

86 75 46 58 88 82 48

LRU:

86 75 46 58 88 82 48

Second-chance:

75 28 46 58 88 82 48

new item is:76

Customers at the table are:

FIFO:

75 46 58 88 82 48 76

LRU:

75 46 58 88 82 48 76

Second-chance:

28 46 58 88 82 48 76

new item is:9

Customers at the table are:

FIFO:

46 58 88 82 48 76 9

LRU:

46 58 88 82 48 76 9

Second-chance:

46 58 88 82 48 76 9

new item is:28

Customers at the table are:

FIFO:

58 88 82 48 76 9 28

LRU:

58 88 82 48 76 9 28

Second-chance:

58 88 82 48 76 9 28

new item is:70

Customers at the table are:

FIFO:

88 82 48 76 9 28 70

LRU:

88 82 48 76 9 28 70

Second-chance:

88 82 48 76 9 28 70

new item is:43

Customers at the table are:

FIFO:

82 48 76 9 28 70 43

LRU:

82 48 76 9 28 70 43

Second-chance:

82 48 76 9 28 70 43

new item is:44

Customers at the table are:

FIFO:

48 76 9 28 70 43 44

LRU:

48 76 9 28 70 43 44

Second-chance:

48 76 9 28 70 43 44

new item is:58

Customers at the table are:

FIFO:

76 9 28 70 43 44 58

LRU:

76 9 28 70 43 44 58

Second-chance:

76 9 28 70 43 44 58

new item is:85

Customers at the table are:

FIFO:

9 28 70 43 44 58 85

LRU:

9 28 70 43 44 58 85

Second-chance:

9 28 70 43 44 58 85

new item is:21

Customers at the table are:

FIFO:

28 70 43 44 58 85 21

LRU:

28 70 43 44 58 85 21

Second-chance:

28 70 43 44 58 85 21

new item is:22

Customers at the table are:

FIFO:

70 43 44 58 85 21 22

LRU:

70 43 44 58 85 21 22

Second-chance:

70 43 44 58 85 21 22

new item is:71

Customers at the table are:

FIFO:

43 44 58 85 21 22 71

LRU:

43 44 58 85 21 22 71

Second-chance:

43 44 58 85 21 22 71

new item is:24

Customers at the table are:

FIFO:

44 58 85 21 22 71 24

LRU:

44 58 85 21 22 71 24

Second-chance:

44 58 85 21 22 71 24

new item is:92

Customers at the table are:

FIFO:

58 85 21 22 71 24 92

LRU:

58 85 21 22 71 24 92

Second-chance:

58 85 21 22 71 24 92

new item is:23

Customers at the table are:

FIFO:

85 21 22 71 24 92 23

LRU:

85 21 22 71 24 92 23

Second-chance:

85 21 22 71 24 92 23

new item is:7

Customers at the table are:

FIFO:

21 22 71 24 92 23 7

LRU:

21 22 71 24 92 23 7

Second-chance:

21 22 71 24 92 23 7

new item is:43

Customers at the table are:

FIFO:

22 71 24 92 23 7 43

LRU:

22 71 24 92 23 7 43

Second-chance:

22 71 24 92 23 7 43

new item is:60

Customers at the table are:

FIFO:

71 24 92 23 7 43 60

LRU:

71 24 92 23 7 43 60

Second-chance:

71 24 92 23 7 43 60

new item is:70

Customers at the table are:

FIFO:

24 92 23 7 43 60 70

LRU:

24 92 23 7 43 60 70

Second-chance:

24 92 23 7 43 60 70

new item is:98

Customers at the table are:

FIFO:

92 23 7 43 60 70 98

LRU:

92 23 7 43 60 70 98

Second-chance:

92 23 7 43 60 70 98

new item is:27

Customers at the table are:

FIFO:

23 7 43 60 70 98 27

LRU:

23 7 43 60 70 98 27

Second-chance:

23 7 43 60 70 98 27

new item is:51

Customers at the table are:

FIFO:

7 43 60 70 98 27 51

LRU:

7 43 60 70 98 27 51

Second-chance:

7 43 60 70 98 27 51

new item is:76

Customers at the table are:

FIFO:

43 60 70 98 27 51 76

LRU:

43 60 70 98 27 51 76

Second-chance:

43 60 70 98 27 51 76

new item is:61

Customers at the table are:

FIFO:

60 70 98 27 51 76 61

LRU:

60 70 98 27 51 76 61

Second-chance:

60 70 98 27 51 76 61

new item is:90

Customers at the table are:

FIFO:

70 98 27 51 76 61 90

LRU:

70 98 27 51 76 61 90

Second-chance:

70 98 27 51 76 61 90

new item is:54

Customers at the table are:

FIFO:

98 27 51 76 61 90 54

LRU:

98 27 51 76 61 90 54

Second-chance:

98 27 51 76 61 90 54

new item is:29

Customers at the table are:

FIFO:

27 51 76 61 90 54 29

LRU:

27 51 76 61 90 54 29

Second-chance:

27 51 76 61 90 54 29

new item is:71

Customers at the table are:

FIFO:

51 76 61 90 54 29 71

LRU:

51 76 61 90 54 29 71

Second-chance:

51 76 61 90 54 29 71

new item is:96

Customers at the table are:

FIFO:

76 61 90 54 29 71 96

LRU:

76 61 90 54 29 71 96

Second-chance:

76 61 90 54 29 71 96

new item is:74

Customers at the table are:

FIFO:

61 90 54 29 71 96 74

LRU:

61 90 54 29 71 96 74

Second-chance:

61 90 54 29 71 96 74

new item is:96

Customers at the table are:

FIFO:

61 90 54 29 71 96 74

LRU:

61 90 54 29 71 74 96

Second-chance:

61 90 54 29 71 96 74

new item is:63

Customers at the table are:

FIFO:

90 54 29 71 96 74 63

LRU:

90 54 29 71 74 96 63

Second-chance:

90 54 29 71 96 74 63

new item is:88

Customers at the table are:

FIFO:

54 29 71 96 74 63 88

LRU:

54 29 71 74 96 63 88

Second-chance:

54 29 71 96 74 63 88

new item is:49

Customers at the table are:

FIFO:

29 71 96 74 63 88 49

LRU:

29 71 74 96 63 88 49

Second-chance:

29 71 96 74 63 88 49

new item is:42

Customers at the table are:

FIFO:

71 96 74 63 88 49 42

LRU:

71 74 96 63 88 49 42

Second-chance:

71 96 74 63 88 49 42

new item is:50

Customers at the table are:

FIFO:

96 74 63 88 49 42 50

LRU:

74 96 63 88 49 42 50

Second-chance:

96 74 63 88 49 42 50

new item is:91

Customers at the table are:

FIFO:

74 63 88 49 42 50 91

LRU:

96 63 88 49 42 50 91

Second-chance:

63 88 49 42 50 96 91

new item is:36

Customers at the table are:

FIFO:

63 88 49 42 50 91 36

LRU:

63 88 49 42 50 91 36

Second-chance:

88 49 42 50 96 91 36

new item is:59

Customers at the table are:

FIFO:

88 49 42 50 91 36 59

LRU:

88 49 42 50 91 36 59

Second-chance:

49 42 50 96 91 36 59

new item is:59

Customers at the table are:

FIFO:

88 49 42 50 91 36 59

LRU:

88 49 42 50 91 36 59

Second-chance:

49 42 50 96 91 36 59

new item is:53

Customers at the table are:

FIFO:

49 42 50 91 36 59 53

LRU:

49 42 50 91 36 59 53

Second-chance:

42 50 96 91 36 59 53

new item is:76

Customers at the table are:

FIFO:

42 50 91 36 59 53 76

LRU:

42 50 91 36 59 53 76

Second-chance:

50 96 91 36 59 53 76

new item is:22

Customers at the table are:

FIFO:

50 91 36 59 53 76 22

LRU:

50 91 36 59 53 76 22

Second-chance:

96 91 36 59 53 76 22

new item is:81

Customers at the table are:

FIFO:

91 36 59 53 76 22 81

LRU:

91 36 59 53 76 22 81

Second-chance:

91 36 59 53 76 22 81

new item is:40

Customers at the table are:

FIFO:

36 59 53 76 22 81 40

LRU:

36 59 53 76 22 81 40

Second-chance:

36 59 53 76 22 81 40

new item is:94

Customers at the table are:

FIFO:

59 53 76 22 81 40 94

LRU:

59 53 76 22 81 40 94

Second-chance:

59 53 76 22 81 40 94

new item is:64

Customers at the table are:

FIFO:

53 76 22 81 40 94 64

LRU:

53 76 22 81 40 94 64

Second-chance:

76 22 81 40 94 59 64

new item is:24

Customers at the table are:

FIFO:

76 22 81 40 94 64 24

LRU:

76 22 81 40 94 64 24

Second-chance:

22 81 40 94 59 64 24

new item is:84

Customers at the table are:

FIFO:

22 81 40 94 64 24 84

LRU:

22 81 40 94 64 24 84

Second-chance:

81 40 94 59 64 24 84

new item is:36

Customers at the table are:

FIFO:

81 40 94 64 24 84 36

LRU:

81 40 94 64 24 84 36

Second-chance:

40 94 59 64 24 84 36

new item is:86

Customers at the table are:

FIFO:

40 94 64 24 84 36 86

LRU:

40 94 64 24 84 36 86

Second-chance:

94 59 64 24 84 36 86

new item is:66

Customers at the table are:

FIFO:

94 64 24 84 36 86 66

LRU:

94 64 24 84 36 86 66

Second-chance:

59 64 24 84 36 86 66

new item is:62

Customers at the table are:

FIFO:

64 24 84 36 86 66 62

LRU:

64 24 84 36 86 66 62

Second-chance:

64 24 84 36 86 66 62

new item is:37

Customers at the table are:

FIFO:

24 84 36 86 66 62 37

LRU:

24 84 36 86 66 62 37

Second-chance:

24 84 36 86 66 62 37

new item is:24

Customers at the table are:

FIFO:

24 84 36 86 66 62 37

LRU:

84 36 86 66 62 37 24

Second-chance:

24 84 36 86 66 62 37

new item is:79

Customers at the table are:

FIFO:

84 36 86 66 62 37 79

LRU:

36 86 66 62 37 24 79

Second-chance:

36 86 66 62 37 24 79

new item is:34

Customers at the table are:

FIFO:

36 86 66 62 37 79 34

LRU:

86 66 62 37 24 79 34

Second-chance:

86 66 62 37 24 79 34

new item is:47

Customers at the table are:

FIFO:

86 66 62 37 79 34 47

LRU:

66 62 37 24 79 34 47

Second-chance:

66 62 37 24 79 34 47

new item is:17

Customers at the table are:

FIFO:

66 62 37 79 34 47 17

LRU:

62 37 24 79 34 47 17

Second-chance:

62 37 24 79 34 47 17

new item is:80

Customers at the table are:

FIFO:

62 37 79 34 47 17 80

LRU:

37 24 79 34 47 17 80

Second-chance:

37 24 79 34 47 17 80

new item is:62

Customers at the table are:

FIFO:

62 37 79 34 47 17 80

LRU:

24 79 34 47 17 80 62

Second-chance:

24 79 34 47 17 80 62

new item is:33

Customers at the table are:

FIFO:

37 79 34 47 17 80 33

LRU:

79 34 47 17 80 62 33

Second-chance:

79 34 47 17 80 62 33

new item is:52

Customers at the table are:

FIFO:

79 34 47 17 80 33 52

LRU:

34 47 17 80 62 33 52

Second-chance:

34 47 17 80 62 33 52

new item is:55

Customers at the table are:

FIFO:

34 47 17 80 33 52 55

LRU:

47 17 80 62 33 52 55

Second-chance:

47 17 80 62 33 52 55

LRU:87,FIFO:86,Second-chance:87

4) page trace:

59,47,72,73,65,79,48,84,69,97,7,40,61,64,100,64,76,28,24,99,28,8,86,75,46,58,88,82,48,76,9,2
8,70,43,44,58,85,21,22,71,24,92,23,7,43,60,70,98,27,51,76,61,90,54,29,71,96,74,96,63,88,49,4
2,50,91,36,59,59,53,76,22,81,40,94,64,24,84,36,86,66,62,37,24,79,34,47,17,80,62,33,52,55,

new item is:59

Customers at the table are:

FIFO:

59

LRU:

59

Second-chance:

59

new item is:47

Customers at the table are:

FIFO:

59 47

LRU:

59 47

Second-chance:

59 47

new item is:72

Customers at the table are:

FIFO:

59 47 72

LRU:

59 47 72

Second-chance:

59 47 72

new item is:73

Customers at the table are:

FIFO:

59 47 72 73

LRU:

59 47 72 73

Second-chance:

59 47 72 73

new item is:65

Customers at the table are:

FIFO:

59 47 72 73 65

LRU:

59 47 72 73 65

Second-chance:

59 47 72 73 65

new item is:79

Customers at the table are:

FIFO:

59 47 72 73 65 79

LRU:

59 47 72 73 65 79

Second-chance:

59 47 72 73 65 79

new item is:48

Customers at the table are:

FIFO:

59 47 72 73 65 79 48

LRU:

59 47 72 73 65 79 48

Second-chance:

59 47 72 73 65 79 48

new item is:84

Customers at the table are:

FIFO:

47 72 73 65 79 48 84

LRU:

47 72 73 65 79 48 84

Second-chance:

47 72 73 65 79 48 84

new item is:69

Customers at the table are:

FIFO:

72 73 65 79 48 84 69

LRU:

72 73 65 79 48 84 69

Second-chance:

72 73 65 79 48 84 69

new item is:97

Customers at the table are:

FIFO:

73 65 79 48 84 69 97

LRU:

73 65 79 48 84 69 97

Second-chance:

73 65 79 48 84 69 97

new item is:7

Customers at the table are:

FIFO:

65 79 48 84 69 97 7

LRU:

65 79 48 84 69 97 7

Second-chance:

65 79 48 84 69 97 7

new item is:40

Customers at the table are:

FIFO:

79 48 84 69 97 7 40

LRU:

79 48 84 69 97 7 40

Second-chance:

79 48 84 69 97 7 40

new item is:61

Customers at the table are:

FIFO:

48 84 69 97 7 40 61

LRU:

48 84 69 97 7 40 61

Second-chance:

48 84 69 97 7 40 61

new item is:64

Customers at the table are:

FIFO:

84 69 97 7 40 61 64

LRU:

84 69 97 7 40 61 64

Second-chance:

84 69 97 7 40 61 64

new item is:100

Customers at the table are:

FIFO:

69 97 7 40 61 64 100

LRU:

69 97 7 40 61 64 100

Second-chance:

69 97 7 40 61 64 100

new item is:64

Customers at the table are:

FIFO:

69 97 7 40 61 64 100

LRU:

69 97 7 40 61 100 64

Second-chance:

69 97 7 40 61 64 100

new item is:76

Customers at the table are:

FIFO:

97 7 40 61 64 100 76

LRU:

97 7 40 61 100 64 76

Second-chance:

97 7 40 61 64 100 76

new item is:28

Customers at the table are:

FIFO:

7 40 61 64 100 76 28

LRU:

7 40 61 100 64 76 28

Second-chance:

7 40 61 64 100 76 28

new item is:24

Customers at the table are:

FIFO:

40 61 64 100 76 28 24

LRU:

40 61 100 64 76 28 24

Second-chance:

40 61 64 100 76 28 24

new item is:99

Customers at the table are:

FIFO:

61 64 100 76 28 24 99

LRU:

61 100 64 76 28 24 99

Second-chance:

61 64 100 76 28 24 99

new item is:28

Customers at the table are:

FIFO:

61 64 100 76 28 24 99

LRU:

61 100 64 76 24 99 28

Second-chance:

61 64 100 76 28 24 99

new item is:8

Customers at the table are:

FIFO:

64 100 76 28 24 99 8

LRU:

100 64 76 24 99 28 8

Second-chance:

64 100 76 28 24 99 8

new item is:86

Customers at the table are:

FIFO:

100 76 28 24 99 8 86

LRU:

64 76 24 99 28 8 86

Second-chance:

76 28 24 99 8 64 86

new item is:75

Customers at the table are:

FIFO:

76 28 24 99 8 86 75

LRU:

76 24 99 28 8 86 75

Second-chance:

28 24 99 8 64 86 75

new item is:46

Customers at the table are:

FIFO:

28 24 99 8 86 75 46

LRU:

24 99 28 8 86 75 46

Second-chance:

99 8 64 86 75 28 46

new item is:58

Customers at the table are:

FIFO:

24 99 8 86 75 46 58

LRU:

99 28 8 86 75 46 58

Second-chance:

8 64 86 75 28 46 58

new item is:88

Customers at the table are:

FIFO:

99 8 86 75 46 58 88

LRU:

28 8 86 75 46 58 88

Second-chance:

64 86 75 28 46 58 88

new item is:82

Customers at the table are:

FIFO:

8 86 75 46 58 88 82

LRU:

8 86 75 46 58 88 82

Second-chance:

86 75 28 46 58 88 82

new item is:48

Customers at the table are:

FIFO:

86 75 46 58 88 82 48

LRU:

86 75 46 58 88 82 48

Second-chance:

75 28 46 58 88 82 48

new item is:76

Customers at the table are:

FIFO:

75 46 58 88 82 48 76

LRU:

75 46 58 88 82 48 76

Second-chance:

28 46 58 88 82 48 76

new item is:9

Customers at the table are:

FIFO:

46 58 88 82 48 76 9

LRU:

46 58 88 82 48 76 9

Second-chance:

46 58 88 82 48 76 9

new item is:28

Customers at the table are:

FIFO:

58 88 82 48 76 9 28

LRU:

58 88 82 48 76 9 28

Second-chance:

58 88 82 48 76 9 28

new item is:70

Customers at the table are:

FIFO:

88 82 48 76 9 28 70

LRU:

88 82 48 76 9 28 70

Second-chance:

88 82 48 76 9 28 70

new item is:43

Customers at the table are:

FIFO:

82 48 76 9 28 70 43

LRU:

82 48 76 9 28 70 43

Second-chance:

82 48 76 9 28 70 43

new item is:44

Customers at the table are:

FIFO:

48 76 9 28 70 43 44

LRU:

48 76 9 28 70 43 44

Second-chance:

48 76 9 28 70 43 44

new item is:58

Customers at the table are:

FIFO:

76 9 28 70 43 44 58

LRU:

76 9 28 70 43 44 58

Second-chance:

76 9 28 70 43 44 58

new item is:85

Customers at the table are:

FIFO:

9 28 70 43 44 58 85

LRU:

9 28 70 43 44 58 85

Second-chance:

9 28 70 43 44 58 85

new item is:21

Customers at the table are:

FIFO:

28 70 43 44 58 85 21

LRU:

28 70 43 44 58 85 21

Second-chance:

28 70 43 44 58 85 21

new item is:22

Customers at the table are:

FIFO:

70 43 44 58 85 21 22

LRU:

70 43 44 58 85 21 22

Second-chance:

70 43 44 58 85 21 22

new item is:71

Customers at the table are:

FIFO:

43 44 58 85 21 22 71

LRU:

43 44 58 85 21 22 71

Second-chance:

43 44 58 85 21 22 71

new item is:24

Customers at the table are:

FIFO:

44 58 85 21 22 71 24

LRU:

44 58 85 21 22 71 24

Second-chance:

44 58 85 21 22 71 24

new item is:92

Customers at the table are:

FIFO:

58 85 21 22 71 24 92

LRU:

58 85 21 22 71 24 92

Second-chance:

58 85 21 22 71 24 92

new item is:23

Customers at the table are:

FIFO:

85 21 22 71 24 92 23

LRU:

85 21 22 71 24 92 23

Second-chance:

85 21 22 71 24 92 23

new item is:7

Customers at the table are:

FIFO:

21 22 71 24 92 23 7

LRU:

21 22 71 24 92 23 7

Second-chance:

21 22 71 24 92 23 7

new item is:43

Customers at the table are:

FIFO:

22 71 24 92 23 7 43

LRU:

22 71 24 92 23 7 43

Second-chance:

22 71 24 92 23 7 43

new item is:60

Customers at the table are:

FIFO:

71 24 92 23 7 43 60

LRU:

71 24 92 23 7 43 60

Second-chance:

71 24 92 23 7 43 60

new item is:70

Customers at the table are:

FIFO:

24 92 23 7 43 60 70

LRU:

24 92 23 7 43 60 70

Second-chance:

24 92 23 7 43 60 70

new item is:98

Customers at the table are:

FIFO:

92 23 7 43 60 70 98

LRU:

92 23 7 43 60 70 98

Second-chance:

92 23 7 43 60 70 98

new item is:27

Customers at the table are:

FIFO:

23 7 43 60 70 98 27

LRU:

23 7 43 60 70 98 27

Second-chance:

23 7 43 60 70 98 27

new item is:51

Customers at the table are:

FIFO:

7 43 60 70 98 27 51

LRU:

7 43 60 70 98 27 51

Second-chance:

7 43 60 70 98 27 51

new item is:76

Customers at the table are:

FIFO:

43 60 70 98 27 51 76

LRU:

43 60 70 98 27 51 76

Second-chance:

43 60 70 98 27 51 76

new item is:61

Customers at the table are:

FIFO:

60 70 98 27 51 76 61

LRU:

60 70 98 27 51 76 61

Second-chance:

60 70 98 27 51 76 61

new item is:90

Customers at the table are:

FIFO:

70 98 27 51 76 61 90

LRU:

70 98 27 51 76 61 90

Second-chance:

70 98 27 51 76 61 90

new item is:54

Customers at the table are:

FIFO:

98 27 51 76 61 90 54

LRU:

98 27 51 76 61 90 54

Second-chance:

98 27 51 76 61 90 54

new item is:29

Customers at the table are:

FIFO:

27 51 76 61 90 54 29

LRU:

27 51 76 61 90 54 29

Second-chance:

27 51 76 61 90 54 29

new item is:71

Customers at the table are:

FIFO:

51 76 61 90 54 29 71

LRU:

51 76 61 90 54 29 71

Second-chance:

51 76 61 90 54 29 71

new item is:96

Customers at the table are:

FIFO:

76 61 90 54 29 71 96

LRU:

76 61 90 54 29 71 96

Second-chance:

76 61 90 54 29 71 96

new item is:74

Customers at the table are:

FIFO:

61 90 54 29 71 96 74

LRU:

61 90 54 29 71 96 74

Second-chance:

61 90 54 29 71 96 74

new item is:96

Customers at the table are:

FIFO:

61 90 54 29 71 96 74

LRU:

61 90 54 29 71 74 96

Second-chance:

61 90 54 29 71 96 74

new item is:63

Customers at the table are:

FIFO:

90 54 29 71 96 74 63

LRU:

90 54 29 71 74 96 63

Second-chance:

90 54 29 71 96 74 63

new item is:88

Customers at the table are:

FIFO:

54 29 71 96 74 63 88

LRU:

54 29 71 74 96 63 88

Second-chance:

54 29 71 96 74 63 88

new item is:49

Customers at the table are:

FIFO:

29 71 96 74 63 88 49

LRU:

29 71 74 96 63 88 49

Second-chance:

29 71 96 74 63 88 49

new item is:42

Customers at the table are:

FIFO:

71 96 74 63 88 49 42

LRU:

71 74 96 63 88 49 42

Second-chance:

71 96 74 63 88 49 42

new item is:50

Customers at the table are:

FIFO:

96 74 63 88 49 42 50

LRU:

74 96 63 88 49 42 50

Second-chance:

96 74 63 88 49 42 50

new item is:91

Customers at the table are:

FIFO:

74 63 88 49 42 50 91

LRU:

96 63 88 49 42 50 91

Second-chance:

63 88 49 42 50 96 91

new item is:36

Customers at the table are:

FIFO:

63 88 49 42 50 91 36

LRU:

63 88 49 42 50 91 36

Second-chance:

88 49 42 50 96 91 36

new item is:59

Customers at the table are:

FIFO:

88 49 42 50 91 36 59

LRU:

88 49 42 50 91 36 59

Second-chance:

49 42 50 96 91 36 59

new item is:59

Customers at the table are:

FIFO:

88 49 42 50 91 36 59

LRU:

88 49 42 50 91 36 59

Second-chance:

49 42 50 96 91 36 59

new item is:53

Customers at the table are:

FIFO:

49 42 50 91 36 59 53

LRU:

49 42 50 91 36 59 53

Second-chance:

42 50 96 91 36 59 53

new item is:76

Customers at the table are:

FIFO:

42 50 91 36 59 53 76

LRU:

42 50 91 36 59 53 76

Second-chance:

50 96 91 36 59 53 76

new item is:22

Customers at the table are:

FIFO:

50 91 36 59 53 76 22

LRU:

50 91 36 59 53 76 22

Second-chance:

96 91 36 59 53 76 22

new item is:81

Customers at the table are:

FIFO:

91 36 59 53 76 22 81

LRU:

91 36 59 53 76 22 81

Second-chance:

91 36 59 53 76 22 81

new item is:40

Customers at the table are:

FIFO:

36 59 53 76 22 81 40

LRU:

36 59 53 76 22 81 40

Second-chance:

36 59 53 76 22 81 40

new item is:94

Customers at the table are:

FIFO:

59 53 76 22 81 40 94

LRU:

59 53 76 22 81 40 94

Second-chance:

59 53 76 22 81 40 94

new item is:64

Customers at the table are:

FIFO:

53 76 22 81 40 94 64

LRU:

53 76 22 81 40 94 64

Second-chance:

76 22 81 40 94 59 64

new item is:24

Customers at the table are:

FIFO:

76 22 81 40 94 64 24

LRU:

76 22 81 40 94 64 24

Second-chance:

22 81 40 94 59 64 24

new item is:84

Customers at the table are:

FIFO:

22 81 40 94 64 24 84

LRU:

22 81 40 94 64 24 84

Second-chance:

81 40 94 59 64 24 84

new item is:36

Customers at the table are:

FIFO:

81 40 94 64 24 84 36

LRU:

81 40 94 64 24 84 36

Second-chance:

40 94 59 64 24 84 36

new item is:86

Customers at the table are:

FIFO:

40 94 64 24 84 36 86

LRU:

40 94 64 24 84 36 86

Second-chance:

94 59 64 24 84 36 86

new item is:66

Customers at the table are:

FIFO:

94 64 24 84 36 86 66

LRU:

94 64 24 84 36 86 66

Second-chance:

59 64 24 84 36 86 66

new item is:62

Customers at the table are:

FIFO:

64 24 84 36 86 66 62

LRU:

64 24 84 36 86 66 62

Second-chance:

64 24 84 36 86 66 62

new item is:37

Customers at the table are:

FIFO:

24 84 36 86 66 62 37

LRU:

24 84 36 86 66 62 37

Second-chance:

24 84 36 86 66 62 37

new item is:24

Customers at the table are:

FIFO:

24 84 36 86 66 62 37

LRU:

84 36 86 66 62 37 24

Second-chance:

24 84 36 86 66 62 37

new item is:79

Customers at the table are:

FIFO:

84 36 86 66 62 37 79

LRU:

36 86 66 62 37 24 79

Second-chance:

36 86 66 62 37 24 79

new item is:34

Customers at the table are:

FIFO:

36 86 66 62 37 79 34

LRU:

86 66 62 37 24 79 34

Second-chance:

86 66 62 37 24 79 34

new item is:47

Customers at the table are:

FIFO:

86 66 62 37 79 34 47

LRU:

66 62 37 24 79 34 47

Second-chance:

66 62 37 24 79 34 47

new item is:17

Customers at the table are:

FIFO:

66 62 37 79 34 47 17

LRU:

62 37 24 79 34 47 17

Second-chance:

62 37 24 79 34 47 17

new item is:80

Customers at the table are:

FIFO:

62 37 79 34 47 17 80

LRU:

37 24 79 34 47 17 80

Second-chance:

37 24 79 34 47 17 80

new item is:62

Customers at the table are:

FIFO:

62 37 79 34 47 17 80

LRU:

24 79 34 47 17 80 62

Second-chance:

24 79 34 47 17 80 62

new item is:33

Customers at the table are:

FIFO:

37 79 34 47 17 80 33

LRU:

79 34 47 17 80 62 33

Second-chance:

79 34 47 17 80 62 33

new item is:52

Customers at the table are:

FIFO:

79 34 47 17 80 33 52

LRU:

34 47 17 80 62 33 52

Second-chance:

34 47 17 80 62 33 52

new item is:55

Customers at the table are:

FIFO:

34 47 17 80 33 52 55

LRU:

47 17 80 62 33 52 55

Second-chance:

47 17 80 62 33 52 55

LRU:87,FIFO:86,Second-chance:87