

# Least Recently Used

Problem Code: **LRU**



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You are part of a team that is making the next big Operating System. And you have taken the responsibility for implementing one of the Caching Algorithms for it - the Least Recently Used (LRU) caching algorithm.

You are given the number of total pages accessed  $N$ , the size of the cache  $S$ , and the  $N$  page numbers that are accessed.

You need to print the page numbers, in sorted order, that are in the cache at the end of all page accesses.

[All Submissions \(/DI17R045/status/LRU\)](#)

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## LRU

When the processor needs to read from or write to a location in main memory, it first checks whether a copy of that data is in the cache. If so (cache hit), the processor immediately reads from or writes to the cache, which is much faster than reading from or writing to main memory. Otherwise (cache miss), the cache allocates a new entry, and copies in data from main memory. In order to make room for the new entry on a cache miss, the cache may have to evict one of the existing entries using one of the replacement policies, LRU in our case. (LRU discards the cache entry which is the oldest accessed entry.)

## Input

The first line contains  $T$ , the number of test cases. ( $1 \leq T \leq 10$ )

Each test case contains 2 lines:

- The first line contains two space separated integers:  $N$  ( $1 \leq N \leq 1000$ ) and  $S$  ( $1 \leq S \leq 50$ ).
- The second line contains  $N$  integers  $A_i$  ( $1 \leq A_i \leq 100$ ).

## Output

For each test case, output on a line the page numbers in the cache in sorted order (space separated).

The value 0 denotes the empty cache space. All 0's should appear at the starting of the list.

## Solution Templates

In the solution templates provided, complete the function whose signature is

**C / C++**

```
void lru(int N, int S, int A[1001], int cached_pages[51])
```

**JAVA**

```
static void lru(int N, int S, int[] A, int[] cached_pages)
```

The function should store inside `cached_pages`, the numbers of the pages that are in the cache after  $N$  look-ups.

Make sure that you store  $S$  items inside `cached_pages` in sorted order. If there are less than  $S$  pages at the end of  $N$  look-ups, make sure to put 0's to depict empty spaces, all in the starting of `cached_pages`.

Note: You are allowed to edit the code as you please. Add / delete headers. Add / delete methods. And so on.. So long as your final code solves the problem with Input and Output as described above. You may submit your own code, without using the template at all.

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### Sample Input

```
2
6 3
4 7 2 7 4 5
5 3
1 1 1 1 1
```

---

### Sample Output

```
4 5 7
0 0 1
```

---

### Explanation

Explanation for test case 2: Only one page (1) is allocated into the cache, and the rest are empty.

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Tags: [directi\\_campus \(/tags/problems/directi\\_campus/\)](/tags/problems/directi_campus/)

Date Added: 5-08-2012

Time Limit: 1.4371 secs

Source Limit: 50000 Bytes

Languages: C, CPP 4.3.2, CPP 6.3, CPP14, JAVA, PYTH, PYTH 3.5

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