Memory Management

Write a program to simulate Least Recently Used virtual memory page replacement algorithm. Specifications of the page replacement simulator is as follows:

User inputs are the following:

1. Total number of physical memory frames (maximum 100)
2. Sequence of page references (integers in the range 0 to 99)

The program will first read all the memory references and store them in a local array or suitable data structure. Then, it will play back these references one by one. For each referenced page, program will print the current allocation state of physical memory frames in the following format:

Frames must start with open square bracket [, end with closed square bracket] and be separated with vertical bar |. One-digit page numbers should have an extra space to the left so that frames are always 2 characters wide.

For Example:

Number of Frames: 5

Sequence of page references: 51 7 34 0 8 45 21

51: [51| | | |]

 7: [51| 7| | |]

34: [51| 7|34| |]

This line means that after using page 34, frames 0, 1 and 2 are occupied by pages 51, 7 and 34, and frames 3 and 4 are empty.

Each page fault should be signaled by an F character two spaces to the right of the closed bracket, for example:

45: [45| 7|34| 0| 8] F

After processing all the memory references, the program should finally print the total number of page faults and the miss rate (total number of page faults divided by number of references).