lru

```
#include <stdio.h>

int findLRU(int time[], int n) {
   int i, min = time[0], pos = 0;
   for(i = 1; i < n; i++) {
      if(time[i] < min) {
         min = time[i];
         pos = i;
      }
   }
   return pos;
}

int main() {
   int pages[30], frame[10], time[10], n, f, i, j, pos, counter = 0, flag1, flag2, fault = 0;

   printf("Enter number of pages: ");
   scanf("%d", &n);
   printf("Enter the page reference string:\n");
   for(i = 0; i < n; i++)
      scanf("%d", &pages[i]);

   printf("Enter number of frames (min 3): ");
   scanf("%d", &f);

   for(i = 0; i < f; i++)
      frame[i] = -1;

   printf("\nPage\tFrames\t\tPage Fault\n");
   for(i = 0; i < n; i++) {
```

```
flag1 = flag2 = 0;
for(j = 0; j < f; j++) {
   if(frame[j] == pages[i]) {
      counter++;
      time[j] = counter;
      flag1 = flag2 = 1;
      break;
   }
}

if(flag1 == 0) {
   for(j = 0; j < f; j++) {
      if(frame[j] == -1) {
         counter++;
         fault++;
         frame[j] = pages[i];
         time[j] = counter;
         flag2 = 1;
         break;
      }
   }
}

if(flag2 == 0) {
   pos = findLRU(time, f);
   counter++;
   fault++;
   frame[pos] = pages[i];
   time[pos] = counter;
}
```

```
        printf("%d\t", pages[i]);
        for(j = 0; j < f; j++) {
            if(frame[j] != -1)
                printf("%d ", frame[j]);
            else
                printf("- ");
        }
        if(flag1 == 0)
            printf("\tPage Fault %d", fault);
        printf("\n");
    }

    printf("\nTotal Page Faults: %d\n", fault);
    return 0;
}
```

```
Enter number of pages: 10
Enter the page reference string:
7 0 1 2 0 3 0 4 2 3
Enter number of frames: 3

Page    Frames          Page Fault
7       7 - -           Page Fault 1
0       7 0 -           Page Fault 2
1       7 0 1           Page Fault 3
2       2 0 1           Page Fault 4
0       2 0 1
3       2 3 1           Page Fault 5
0       2 3 0           Page Fault 6
4       4 3 0           Page Fault 7
2       4 3 2           Page Fault 8
```

3 4 3 2

Total Page Faults: 8

⚙️ 2️⃣ **LRU (Least Recently Used)**

🧠 **Logic:**

- Replace the page that was **least recently used in the past**.
- Keep track of **recently used order**.

📋 **Step-by-Step Table:**

Step	Page	Frames	Page Fault?	Explanation
1	7	7 - -	✅	7 inserted
2	0	7 0 -	✅	0 inserted
3	1	7 0 1	✅	1 inserted
4	2	2 0 1	✅	7 was least recently used → replaced
5	0	2 0 1	❌	0 already present (most recent now)
6	3	2 3 1	✅	1 was least recently used → replaced
7	0	2 3 0	✅	0 inserted, 2 was least recently used → replaced
8	4	4 3 0	✅	3 replaced (least recently used)
9	2	4 3 2	✅	0 replaced (least recently used)
10	3	4 3 2	❌	3 already present

✅ **Total Page Faults = 8**

🧩 **Explanation:**
LRU replaces the page that hasn't been used for the longest time *in the past*.
It performs better than FCFS because it uses actual usage history.