EXPERIMENT NO. 07

FIFO PAGE REPLACEMENT ALGORITHM

Objective

To write a program to simulate the First-In-First-Out (FIFO) page replacement algorithm.

Theory

FIFO (First-In-First-Out) is a basic page replacement technique in Operating Systems. It maintains a queue to keep track of the order in which pages enter the memory. When a new page is requested and no space is available, the oldest page in the memory (front of the queue) is replaced with the new page.

Algorithm Steps

1. Initialize a queue to hold pages.
2. Traverse each page in the reference string.
3. If the page is in memory, continue.
4. If the page is not in memory:
    - If the frame is full, remove the front page.
    - Insert the new page at the rear.
    - Increase the page fault count.
5. Print the number of page faults.

Program Code (C Language)

```
#include <stdio.h>

int main() {
    int frames, pages, page[50], temp[50], i, j, k, flag, fault = 0, pos = 0;

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

    printf("Enter number of frames: ");
    scanf("%d", &frames);
    for(i = 0; i < pages; i++) {
        flag = 0;
        for(j = 0; j < frames; j++) {
            if(temp[j] == page[i]) {
                flag = 1;
                break;
            }
        }

        if(!flag) {
            temp[pos] = page[i];
            pos = (pos + 1) % frames;
            fault++;

            printf("Page fault for %d: ", page[i]);
            for(k = 0; k < frames; k++) {
                if(temp[k] != 0)
                    printf("%d ", temp[k]);
            }
            printf("\n");
        }
    }

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

Sample Output

```
Enter number of pages: 12

Enter page reference string: 1 2 3 4 1 2 5 1 2 3 4 5

Enter number of frames: 4

Page fault for 1: 1

Page fault for 2: 1 2

Page fault for 3: 1 2 3

Page fault for 4: 1 2 3 4
```

Page fault for 5: 5 2 3 4

Page fault for 1: 5 1 3 4

Page fault for 2: 5 1 2 4

Page fault for 3: 5 1 2 3

Page fault for 4: 4 1 2 3

Page fault for 5: 4 5 2 3

Total Page Faults = 10

Conclusion

The FIFO page replacement algorithm replaces the oldest page in memory, ensuring a simple yet effective mechanism. Though easy to implement, it may cause frequent replacements even for frequently accessed pages.