**Ex. No.: 11c)**

## Optimal

**Aim:**

To write a c program to implement an Optimal page replacement algorithm.

**ALGORITHM:**

1. Start the process
2. Declare the size
3. Get the number of pages to be inserted
4. Get the value
5. Declare counter and stack
6. Select the least frequently used page by counter value
7. Stack them according the selection.
8. Display the values
9. Stop the process

**PROGRAM:**

```
#include <stdio.h>

int predict(int pages[], int frames[], int pn, int index, int fn) {
   int result = -1, farthest = index;
   for (int i = 0; i < fn; i++) {
      int j;
      for (j = index; j < pn; j++) {
         if (frames[i] == pages[j]) {
            if (j > farthest) {
               farthest = j;
               result = i;
            }
            break;
         }
      }
```

```
        if (j == pn)
            return i;
    }
    return (result == -1) ? 0 : result;
}

int main() {
    int pages[50], frames[10], pn, fn, pageFaults = 0;
    int inFrame = 0;

    printf("Enter number of pages: ");
    scanf("%d", &pn);

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

    printf("Enter number of frames: ");
    scanf("%d", &fn);

    for (int i = 0; i < fn; i++)
        frames[i] = -1;

    for (int i = 0; i < pn; i++) {
        int hit = 0;
        for (int j = 0; j < fn; j++) {
            if (frames[j] == pages[i]) {
                hit = 1;
                break;
            }
        }

        if (!hit) {
            if (inFrame < fn) {
                frames[inFrame++] = pages[i];
            } else {
                int pos = predict(pages, frames, pn, i + 1, fn);
                frames[pos] = pages[i];
            }
            pageFaults++;
        }
    }

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

**Output:**

```
Enter number of pages: 12
Enter the reference string:
7 0 1 2 0 3 0 4 2 3 0 3
Enter number of frames: 3

Total Page Faults = 9
```

**Result:**

C program for implementing Optimal page replacement algorithm has been completed successfully and the output has been verified.