

OS LAB MANUAL (CS23431)

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EX.NO:11(C)

Optimal

Aim: To write a c program to implement Optimal page replacement algorithm

Program:

```
#include <stdio.h>

int findOptimal(int pages[], int frames[], int n, int index, int frameSize) {

    int farthest = index;

    int pos = -1;

    for (int i = 0; i < frameSize; i++) {

        int j;

        for (j = index; j < n; j++) {

            if (frames[i] == pages[j]) {

                if (j > farthest) {

                    farthest = j;

                    pos = i;

                }

                break;

            }

        }

        if (j == n)

            return i;

    }

    if (pos == -1)

        return 0;

    else

        return pos;

}
```

```

int main() {

    int frames[10], pages[30], n, frameSize, i, j, k, pageFaults = 0, found;

    printf("Enter number of frames: ");

    scanf("%d", &frameSize);

    printf("Enter number of pages: ");

    scanf("%d", &n);

    printf("Enter reference string: ");

    for (i = 0; i < n; i++)

        scanf("%d", &pages[i]);

    for (i = 0; i < frameSize; i++)

        frames[i] = -1;

    for (i = 0; i < n; i++) {

        found = 0;

        for (j = 0; j < frameSize; j++) {

            if (frames[j] == pages[i]) {

                found = 1;

                break;

            }

        }

        if (!found) {

            int replaceIndex = -1;

            for (j = 0; j < frameSize; j++) {

                if (frames[j] == -1) {

                    replaceIndex = j;

                    break;

                }

            }

            if (replaceIndex == -1) {

                replaceIndex = findOptimal(pages, frames, n, i + 1, frameSize);

            }

            frames[replaceIndex] = pages[i];

```

```

        pageFaults++;
    }

    for (k = 0; k < frameSize; k++) {
        if (frames[k] != -1)
            printf("%d ", frames[k]);

        else
            printf("-1 ");
    }

    printf("\n");
}

printf("Total Page Faults = %d\n", pageFaults);

return 0;
}

```

Input:

```

praveen@LAPTOP-Q0D806DB:~$ vi optimal.c
praveen@LAPTOP-Q0D806DB:~$ gcc optimal.c
praveen@LAPTOP-Q0D806DB:~$ ./a.out
Enter number of frames: 4
Enter number of pages: 6
Enter reference string: 4
8
5
5
7
1

```

Output:

```

praveen@LAPTOP-Q0D806DB:~$ vi optimal.c
praveen@LAPTOP-Q0D806DB:~$ gcc optimal.c
praveen@LAPTOP-Q0D806DB:~$ ./a.out
Enter number of frames: 4
Enter number of pages: 6
Enter reference string: 4
8
5
5
7
1
4 -1 -1 -1
4 8 -1 -1
4 8 5 -1
4 8 5 -1
4 8 5 7
1 8 5 7
Total Page Faults = 5

```