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:

```
Enter number of frames: 4
Enter number of pages: 6
Enter reference string: 4
```

Output:

```
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
```