OPERATING SYSTEM - CS23431

EXP 11(C)

OPTIMAL PAGE REPLACEMENT

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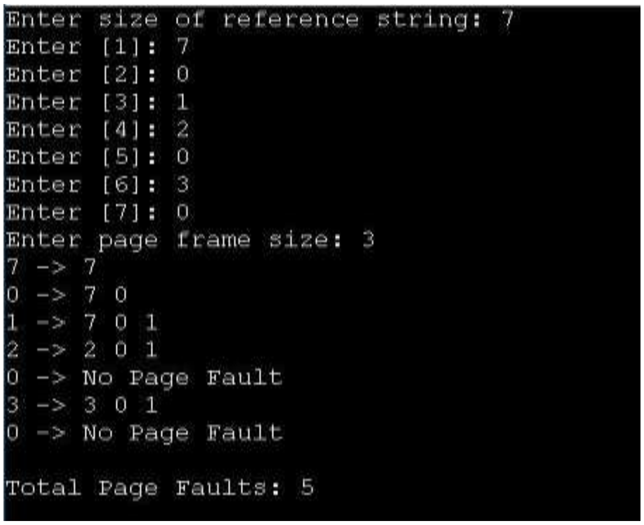
PROGRAM:

```
#include <stdio.h>

int findreplacementindex(int n, int frame_size, int page[], int mem[], int current) {
   int ind[frame_size];

   for (int i = 0; i < frame_size; i++) {
      ind[i] = -1;
      for (int j = current + 1; j < n; j++) {
         if (mem[i] == page[j]) {
            ind[i] = j;
            break;
         }
      }
   }

   int dist = -1, reqind = -1;

   for (int i = 0; i < frame_size; i++) {
      if (ind[i] == -1) {
         // This page is not used in the future, so replace it
         return i;
      } else if (ind[i] > dist) {
         // Find the page with the farthest future use
         dist = ind[i];
         reqind = i;
      }
   }
   return reqind;
```

```
}

int main() {
    int n, frame_size, count = 0, page_faults = 0;

    printf("Enter size of reference string: ");
    scanf("%d", &n);

    int page[n];
    for (int i = 0; i < n; i++) {
        printf("Enter [%d]: ", i + 1);
        scanf("%d", &page[i]);
    }

    printf("Enter page frame size: ");
    scanf("%d", &frame_size);

    int mem[frame_size];

    for (int i = 0; i < n; i++) {
        int found = 0;
        for (int j = 0; j < count; j++) {
            if (mem[j] == page[i]) {
                found = 1;
                break;
            }
        }

        printf("%d -> ", page[i]);

        int f = 1;
        if (!found) {
            if (count < frame_size) {
                mem[count++] = page[i];
            } else {
                int index = findreplacementindex(n, frame_size, page, mem, i);
                mem[index] = page[i];
            }
            page_faults++;
        } else {
            f = 0;
            printf("No Page Fault ");
        }

        if (f) {
            for (int j = 0; j < count; j++) {
                printf("%d ", mem[j]);
            }
        }
        printf("\n");
    }

    printf("\nTotal Page Faults: %d\n", page_faults);

    return 0;
}
```

OUTPUT:



```
Enter size of reference string: 7
Enter [1]: 7
Enter [2]: 0
Enter [3]: 1
Enter [4]: 2
Enter [5]: 0
Enter [6]: 3
Enter [7]: 0
Enter page frame size: 3
7 -> 7
0 -> 7 0
1 -> 7 0 1
2 -> 2 0 1
0 -> No Page Fault
3 -> 3 0 1
0 -> No Page Fault

Total Page Faults: 5
```