

LAB 12

CODE:

A) FIFO

```
#include <stdio.h>
#include <conio.h>

int main() {
    int i, j, k, f, pf = 0, count = 0, rs[25], m[10], n;
    clrscr();

    printf("\nEnter the length of reference string: ");
    scanf("%d", &n);

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

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

    for (i = 0; i < f; i++) m[i] = -1;

    printf("\nThe Page Replacement Process is:\n");
    for (i = 0; i < n; i++) {
        for (k = 0; k < f; k++) {
            if (m[k] == rs[i]) break;
        }
    }
```

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```
        if (k == f) {
            m[count++] = rs[i];
            pf++;
        }

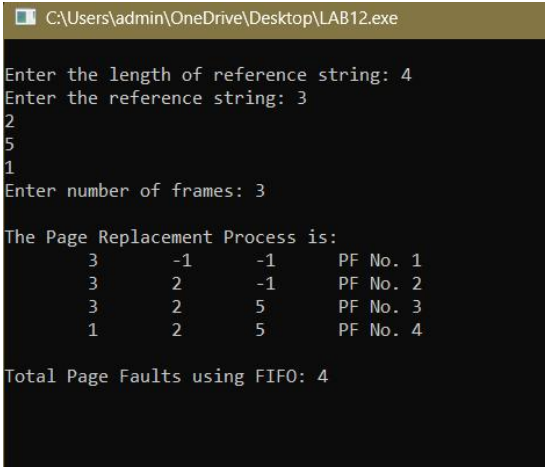
        for (j = 0; j < f; j++)
            printf("\t%d", m[j]);

        if (k == f)
            printf("\tPF No. %d", pf);
        printf("\n");

        if (count == f) count = 0;
    }

    printf("\nTotal Page Faults using FIFO: %d\n", pf);
    getch();
    return 0;
}
```

OUTPUT:



The screenshot shows a Windows command prompt window titled "C:\Users\admin\OneDrive\Desktop\LAB12.exe". The program prompts the user for the length of the reference string (4), the reference string (3 2 5 1), and the number of frames (3). It then displays the page replacement process as a table with 4 rows, each representing a page fault. The table shows the current page in memory, the page being replaced (or -1 if none), the new page being added, and the page fault number. Finally, it prints the total page faults using FIFO, which is 4.

```
C:\Users\admin\OneDrive\Desktop\LAB12.exe
Enter the length of reference string: 4
Enter the reference string: 3
2
5
1
Enter number of frames: 3

The Page Replacement Process is:
    3      -1      -1      PF No. 1
    3      2      -1      PF No. 2
    3      2      5       PF No. 3
    1      2      5       PF No. 4

Total Page Faults using FIFO: 4
```

B) LRU

```
#include <stdio.h>
```

```
#include <conio.h>
```

```
int main() {  
    int i, j, k, min, rs[25], m[10], count[10], flag[25], n, f, pf = 0, next = 1;  
    clrscr();  
  
    printf("Enter the length of reference string: ");  
    scanf("%d", &n);  
  
    printf("Enter the reference string: ");  
    for (i = 0; i < n; i++) {  
        scanf("%d", &rs[i]);  
        flag[i] = 0;  
    }  
  
    printf("Enter number of frames: ");  
    scanf("%d", &f);  
  
    for (i = 0; i < f; i++) {  
        count[i] = 0;  
        m[i] = -1;  
    }  
  
    printf("\n\nThe Page Replacement Process is:\n\n");  
    for (i = 0; i < n; i++) {  
        for (j = 0; j < f; j++) {
```

```
        if (m[j] == rs[i]) {  
            flag[i] = 1;  
            count[j] = next++;  
        }  
    }
```

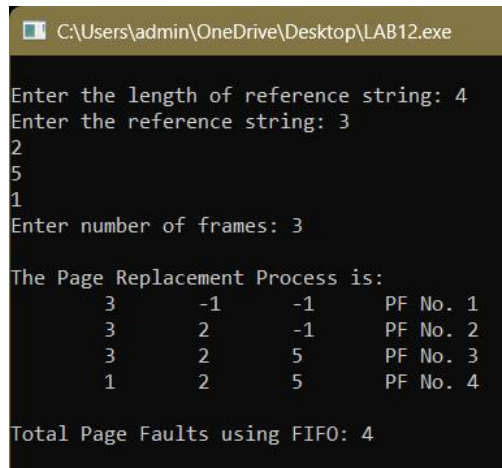
```
if (flag[i] == 0) {  
    if (i < f) {  
        m[i] = rs[i];  
        count[i] = next++;  
    } else {  
        min = 0;  
        for (j = 1; j < f; j++)  
            if (count[min] > count[j])  
                min = j;  
        m[min] = rs[i];  
        count[min] = next++;  
    }  
    pf++;  
}
```

```
for (j = 0; j < f; j++)  
    printf("%d\t", m[j]);  
if (flag[i] == 0)  
    printf("PF No. -- %d", pf);  
printf("\n");  
}
```

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```
printf("\nTotal Page Faults using LRU: %d\n", pf);  
getch();  
return 0;  
}
```

OUTPUT:



```
C:\Users\admin\OneDrive\Desktop\LAB12.exe  
Enter the length of reference string: 4  
Enter the reference string: 3  
2  
5  
1  
Enter number of frames: 3  
  
The Page Replacement Process is:  
3      -1      -1      PF No. 1  
3       2      -1      PF No. 2  
3       2       5      PF No. 3  
1       2       5      PF No. 4  
  
Total Page Faults using FIFO: 4
```

C) OPTIMAL Page Replacement

```
#include <stdio.h>
```

```
int main() {  
    int no_of_frames, no_of_pages, frames[10], pages[30], temp[10];  
    int flag1, flag2, flag3, i, j, k, pos, max, faults = 0;  
  
    printf("Enter number of frames: ");  
    scanf("%d", &no_of_frames);  
  
    printf("Enter number of pages: ");  
    scanf("%d", &no_of_pages);  
  
    printf("Enter page reference string: ");  
    for (i = 0; i < no_of_pages; ++i)
```

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

```
for (i = 0; i < no_of_frames; ++i)
```

```
frames[i] = -1;
```

```
for (i = 0; i < no_of_pages; ++i) {
```

```
flag1 = flag2 = 0;
```

```
for (j = 0; j < no_of_frames; ++j) {
```

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

```
flag1 = flag2 = 1;
```

```
break;
```

```
}
```

```
}
```

```
if (flag1 == 0) {
```

```
for (j = 0; j < no_of_frames; ++j) {
```

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

```
frames[j] = pages[i];
```

```
faults++;
```

```
flag2 = 1;
```

```
break;
```

```
}
```

```
}
```

```
}
```

```
if (flag2 == 0) {
```

```
flag3 = 0;
```

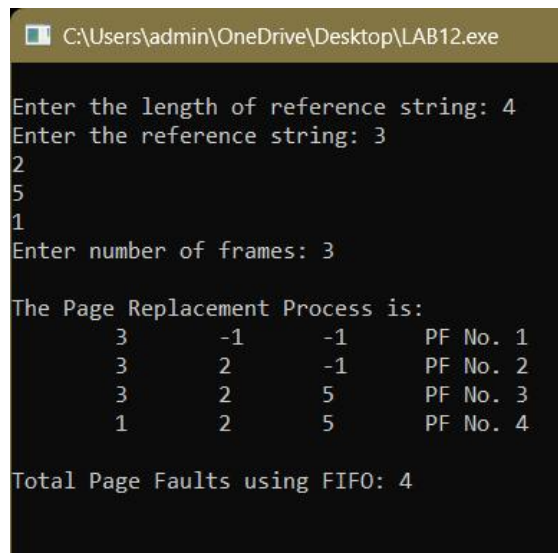
```
for (j = 0; j < no_of_frames; ++j) {  
    temp[j] = -1;  
    for (k = i + 1; k < no_of_pages; ++k) {  
        if (frames[j] == pages[k]) {  
            temp[j] = k;  
            break;  
        }  
    }  
}
```

```
for (j = 0; j < no_of_frames; ++j) {  
    if (temp[j] == -1) {  
        pos = j;  
        flag3 = 1;  
        break;  
    }  
}
```

```
if (flag3 == 0) {  
    max = temp[0];  
    pos = 0;  
    for (j = 1; j < no_of_frames; ++j) {  
        if (temp[j] > max) {  
            max = temp[j];  
            pos = j;  
        }  
    }  
}
```

```
        frames[pos] = pages[i];  
        faults++;  
    }  
  
    for (j = 0; j < no_of_frames; ++j)  
        printf("%d\t", frames[j]);  
    printf("\n");  
}  
  
printf("\nTotal Page Faults using OPTIMAL: %d\n", faults);  
return 0;  
}
```

OUTPUT:



```
C:\Users\admin\OneDrive\Desktop\LAB12.exe  
Enter the length of reference string: 4  
Enter the reference string: 3  
2  
5  
1  
Enter number of frames: 3  
  
The Page Replacement Process is:  
    3      -1      -1      PF No. 1  
    3       2      -1      PF No. 2  
    3       2       5      PF No. 3  
    1       2       5      PF No. 4  
  
Total Page Faults using FIFO: 4
```

D) MRU

```
#include <iostream>  
using namespace std;
```

```
// Update array in MRU fashion
```


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```
void recently(int* arr, int size, int elem) {
    int index = elem % size;
    int temp = index, id = arr[index];

    while (temp > 0)
        arr[temp] = arr[--temp];

    arr[0] = id;
}

// Print array
void print(int* arr, int size) {
    for (int i = 0; i < size; i++)
        cout << arr[i] << " ";
    cout << endl;
}

int main() {
    int elem = 3;
    int arr[] = {6, 1, 9, 5, 3};
    int size = sizeof(arr) / sizeof(arr[0]);

    recently(arr, size, elem);
    cout << "Array in Most Recently Used fashion: ";
    print(arr, size);

    return 0;
}
```

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OUTPUT:

```
C:\Users\admin\OneDrive\Desktop\LAB12.exe
Enter the length of reference string: 4
Enter the reference string: 3
2
5
1
Enter number of frames: 3

The Page Replacement Process is:
      3      -1      -1      PF No. 1
      3       2      -1      PF No. 2
      3       2       5      PF No. 3
      1       2       5      PF No. 4

Total Page Faults using FIFO: 4
```