

FAIZAN CHOUDHARY

20BCS021

OS LAB

28th April 2022

CODE: (code pasted in this format for readability)

```
#include <iostream>
using namespace std;
int n, no;
int hit_indices[100];
int counter=0;
int page_faults=0;

int findIndex (int ref_ele, int *page_slots) {
    for (int i=0; i<no; i++) {
        if (page_slots[i] == ref_ele)
            return i;
    }
    return -1;
}

void display (int ref_ele, int *page_slots, int hit_index) {
    cout<<"|\t\t\t\t\t" <<ref_ele<<"|\t\t\t\t\t" <<(hit_index != -1 ? "Hit\t\t\t\t\t" :
"Fault")<<"|\t\t\t\t\t";
    for (int i=0; i<no; i++)
        cout<<" ";
    for (int i=0; i<no; i++) {
        if (page_slots[i] != -1)
            cout<<page_slots[i]<<" ";
        else
            cout<<"- ";
    }
    for (int i=2; i<no; i++)
        cout<<" ";
    cout<<"|\n";
}

void FIFO_replacement(int *ref_str, int *page_slots) {
    for (int i=0; i<n; i++) {
        for (int j=0; j<no; j++) {
            if (page_slots[j] == -1) {
                page_faults++;
                page_slots[j] = ref_str[i];
                break;
            }
            else if (page_slots[j] != -1 && findIndex(ref_str[i], page_slots) != -1 ) {
                hit_indices[i] = findIndex(ref_str[i], page_slots);
                break;
            }
        }
    }
}
```

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        }
        else {
            page_faults++;
            counter = (counter + 1) % no;
            page_slots[counter] = ref_str[i];
            break;
        }
    }
    display(ref_str[i], page_slots, hit_indices[i]);
}
}

int main() {
    cout<<"\nFAIZAN CHOUDHARY\n20BCS021\n";
    cout<<"\nFirst In First Out (FIFO) Page Replacement\n";
    cout<<"\nEnter the number of elements in page reference string: ";
    cin>>n;
    int *ref_str = new int[n];
    cout<<"\nEnter the reference string: ";
    for (int i=0; i<n; i++)
        cin>>ref_str[i];

    cout<<"\nEnter the number of page slots (pages that can be accomodated in memory): ";
    cin>>no;
    int *page_slots = new int[no];
    for (int i=0; i<no; i++)
        page_slots[i] = -1;

    for (int i=0; i<n; i++)
        hit_indices[i] = -1;

    // cout<<endl<<" ----- ";
    cout<<"\n|  Reference String Entry |  Hit/Fault  |";
    for (int i=1; i<no; i++)
        cout<<" ";
    if (no < 4)
        cout<<"Page Slots";
    else
        cout<<" Page Slots ";
    for (int i=1; i<no; i++)
        cout<<" ";
    cout<<"|\n\n";
    // cout<<" ----- \n";
    FIFO_replacement(ref_str, page_slots);
    // cout<<" ----- \n";

    double avg_page_fault = (double)page_faults/n;
    cout<<"\nNumber of page faults: "<<page_faults<<endl;
    cout<<"Number of page hits: "<<n-page_faults<<endl;
    cout<<"\nHit Ratio: "<<(1-avg_page_fault)<<endl;
    cout<<"Average number of page faults (Miss ratio): "<<avg_page_fault<<endl<<endl;

    return 0;
}

```

OUTPUT:

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First In First Out (FIFO) Page Replacement

Enter the number of elements in page reference string: 6

Enter the reference string: 1 3 0 3 5 6

Enter the number of page slots (pages that can be accomodated in memory): 3

Reference String Entry	Hit/Fault	Page Slots
1	Fault	1 - -
3	Fault	1 3 -
0	Fault	1 3 0
3	Hit	1 3 0
5	Fault	5 3 0
6	Fault	5 6 0

Number of page faults: 5

Number of page hits: 1

Hit Ratio: 0.166667

Average number of page faults (Miss ratio): 0.833333

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First In First Out (FIFO) Page Replacement

Enter the number of elements in page reference string: 8

Enter the reference string: 4 0 1 0 1 5 4 1

Enter the number of page slots (pages that can be accomodated in memory): 4

Reference String Entry	Hit/Fault	Page Slots
4	Fault	4 - - -
0	Fault	4 0 - -
1	Fault	4 0 1 -
0	Hit	4 0 1 -
1	Hit	4 0 1 -
5	Fault	4 0 1 5
4	Hit	4 0 1 5
1	Hit	4 0 1 5

Number of page faults: 4

Number of page hits: 4

Hit Ratio: 0.5

Average number of page faults (Miss ratio): 0.5

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First In First Out (FIFO) Page Replacement

Enter the number of elements in page reference string: 12

Enter the reference string: 0 2 1 6 4 0 1 0 3 1 2 1

Enter the number of page slots (pages that can be accommodated in memory): 4

Reference String Entry	Hit/Fault	Page Slots
0	Fault	0 - - -
2	Fault	0 2 - -
1	Fault	0 2 1 -
6	Fault	0 2 1 6
4	Fault	4 2 1 6
0	Fault	4 0 1 6
1	Hit	4 0 1 6
0	Hit	4 0 1 6
3	Fault	4 0 3 6
1	Fault	4 0 3 1
2	Fault	2 0 3 1
1	Hit	2 0 3 1

Number of page faults: 9

Number of page hits: 3

Hit Ratio: 0.25

Average number of page faults (Miss ratio): 0.75

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First In First Out (FIFO) Page Replacement

Enter the number of elements in page reference string: 10

Enter the reference string: 2 5 3 6 3 7 6 4 8 1

Enter the number of page slots (pages that can be accommodated in memory): 3

Reference String Entry	Hit/Fault	Page Slots
2	Fault	2 - -
5	Fault	2 5 -
3	Fault	2 5 3
6	Fault	6 5 3
3	Hit	6 5 3
7	Fault	6 7 3
6	Hit	6 7 3
4	Fault	6 7 4
8	Fault	8 7 4
1	Fault	8 1 4

Number of page faults: 8

Number of page hits: 2

Hit Ratio: 0.2

Average number of page faults (Miss ratio): 0.8