
Operating System Lab

CEN-493

Program - 13

Code :-

```
#include <iostream>
#include <math.h>
#include <stack>
#include <algorithm>
using namespace std;

struct Fifo_State
{
    vector<int> state;
    bool isFault;
    int top;
};

void printLines()
{
    for (int i = 0; i < 120; i++)
    {
        cout << "-";
    }
}
```

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        cout << "\n";
    }

void Print(vector<Fifo_State> &allStates, int pageFaults)
{
    printLines();
    cout << "Page Replacement Table\n";
    printLines();
    printLines();
    cout << "Page Reference\n";
    for (int state = 0; state < allStates.size(); state++)
    {
        cout << "|" << allStates[state].top << "|\t";
    }
    cout << "\n\n";

    for (int state = allStates[0].state.size() - 1; state >= 0;
state--)
    {
        for (int i = 0; i < allStates.size(); i++)
        {
            if (allStates[i].state[state] == -1)
                cout << "|"
                    << " "
                    << "|\t";
            else
                cout << "|" << allStates[i].state[state] << "|\t";
        }
        cout << "\n";
    }
    cout << "\n";
    for (int state = 0; state < allStates.size(); state++)
    {
        if (allStates[state].isFault)
        {
            cout << "|"
                << "Miss"
                << "\t";
        }
        else
        {
            cout << "|"
                << "Hit"
                << "\t";
        }
    }
}

```

```

    }
    cout << "\n";
    printLines();
    cout << "Total Page Faults : " << pageFaults << "\n";
    double averagePageFaults = pageFaults /
(double)allStates.size();
    cout << "Average Page Faults : " << averagePageFaults << "\n";
    printLines();
}

void Page_Replacement_Fifo(int noOfPageFrames, vector<int>
&pageReferences)
{
    vector<Fifo_State> allStates;
    vector<int> frame(noOfPageFrames, -1);
    int firstIndex = 0, pageFaults = 0, prIndex, top = 0;

    for (prIndex = 0; top != noOfPageFrames; prIndex++)
    {
        bool isFind = 0;
        for (int fIndex = 0; fIndex < top; fIndex++)
        {
            if (frame[fIndex] == pageReferences[prIndex])
            {
                isFind = true;
                break;
            }
        }
        Fifo_State newState;
        if (isFind)
        {
            newState.isFault = 0;
        }
        else
        {
            frame[top] = pageReferences[prIndex];
            newState.isFault = 1;
            pageFaults++;
            top++;
        }
        newState.top = pageReferences[prIndex];
        newState.state = frame;
        allStates.push_back(newState);
    }
}

```

```

for (prIndex; prIndex < pageReferences.size(); prIndex++)
{
    bool isFind = 0;
    for (int fIndex = 0; fIndex < noOfPageFrames; fIndex++)
    {
        if (frame[fIndex] == pageReferences[prIndex])
        {
            isFind = true;
            break;
        }
    }
    if (isFind)
    {
        Fifo_State newState;
        newState.isFault = 0;
        newState.top = pageReferences[prIndex];
        newState.state = frame;
        allStates.push_back(newState);
    }
    else
    {
        Fifo_State newState;
        newState.isFault = 1;
        pageFaults++;
        newState.top = pageReferences[prIndex];
        for (int fIndex = 0; fIndex <= noOfPageFrames;
fIndex++)
        {
            if (frame[fIndex] == pageReferences[firstIndex])
            {
                firstIndex++;
                frame[fIndex] = pageReferences[prIndex];
                break;
            }
        }
        newState.state = frame;
        allStates.push_back(newState);
    }
}
Print(allStates, pageFaults);
}

int main()
{
    system("cls");

```

```
printLines();
cout << "Vicky_Gupta_20BCS070\n";
printLines();
cout << "First In First Out Page Replacement Algorithm\n";
printLines();
printLines();
int noOfPageFrames;

cout << "Enter The No Of Page Frames \n";
cin >> noOfPageFrames;

int noOfPageReference;
cout << "Enter The No Of Page Reference\n";
cin >> noOfPageReference;

vector<int> pageReferences(noOfPageReference);
cout << "Enter The Page References\n";
for (int i = 0; i < noOfPageReference; i++)
{
    cin >> pageReferences[i];
}

Page_Replacement_Fifo(noOfPageFrames, pageReferences);
return 0;
}
```

Output :-

Vicky_Gupta_20BCS070

First In First Out Page Replacement Algorithm

Enter The No Of Page Frames

4

Enter The No Of Page Reference

12

Enter The Page References

0 2 1 6 4 0 1 0 3 1 2 1

Page Replacement Table

Page Reference

0	2	1	6	4	0	1	0	3	1	2	1
_	_	_	6	6	6	6	6	6	1	1	1
_	_	1	1	1	1	1	1	3	3	3	3
_	2	2	2	2	0	0	0	0	0	0	0
0	0	0	0	4	4	4	4	4	4	2	2
Miss	Miss	Miss	Miss	Miss	Miss	Hit	Hit	Miss	Miss	Miss	Hit

Total Page Faults : 9

Average Page Faults : 0.75