LAB_ASSIGNMENT-10

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1) FIFO(First in first out) :

Code :

```
#include <bits/stdc++.h>

using namespace std;

int main()
{
    cout<<"Supraja Madishetty "<<"20JE0991"<<endl;
    cout<<"Enter the number of page frames : "<<endl;
    int n;
    cin>>n;
    cout<<"Enter number of page reference string : "<<endl;
    int m;
    cin>>m;
    int s[m];
    cout<<"Enter the page reference string : "<<endl;
    for(int i=0; i<m; i++)
    {
        cin>>s[i];
    }

    set<int> st;
    queue<int> q;
    int miss = 0;
    int hits = 0;
```

```
    for(int i=0; i<m; i++)
    {
        if(st.find(s[i]) == st.end())
        {
            miss++;
        if(q.size() >= n)
        {
            int temp = q.front();
            q.pop();
            st.erase(temp);
            q.push(s[i]);
            st.insert(s[i]);
        }else
        {
            q.push(s[i]);
            st.insert(s[i]);
        }
        }else
        {
            hits++;
        }
    }


    cout<<"The no of MISS are : "<<miss<<endl;
    cout<<"The no of HITS are : "<<hits<<endl;
    cout<<"MISS ratio is : "<<(double)miss/m<<endl;
    cout<<"Hits ratio is : "<<(double)hits/m<<endl;


    return 0;
}
```

Output :

```
Supraja Madishetty 20JE0991
Enter the number of page frames :
3
Enter number of page reference string :
7
Enter the page reference string :
1 3 0 3 5 6 3
The no of MISS are : 6
The no of HITS are : 1
MISS ratio is : 0.857143
Hits ratio is : 0.142857

--------------------------------
Process exited after 18.45 seconds with return value 0
Press any key to continue . . .
```

2) LRU (Least recently used) :

Code:

```
#include <bits/stdc++.h>

using namespace std;

int main()
{
    cout<<"Supraja Madishetty "<<"20JE1120"<<endl;
```

```
cout<<"Enter the number of page frames : "<<endl;
int n;
cin>>n;
cout<<"Enter number of page reference string : "<<endl;
int m;
cin>>m;
vector<int> s(m);
vector<int> hi(m);

int hit = 0;

int i,j,k;
cout<<"Enter the page reference string : "<<endl;
for(i=0; i<m; i++)
{
    cin>>s[i];
}

vector<vector<int> > a(n);
for(i=0; i<n; i++)
{
    a[i] = vector<int>(m, -1);
}
map<int,int> mp;
for(i=0; i<m; i++)
{
    vector<pair<int, int> > c;
    for(auto q : mp)
    {
        c.push_back({q.second, q.first});
    }
    sort(c.begin(), c.end());
```

```
bool ok = false;
for(j=0; j<n; j++)
{
   if(a[j][i] == s[i])
   {
      hit++;
      hi[i] = 1;
      mp[s[i]] = 1;
      ok = true;
      break;
   }
   if(a[j][i] == -1)
   {
      for(int k=i; k<m; k++)
      a[j][k] = s[i];
      mp[s[i]]++;
      ok = true;
      break;
   }
}
if(j==n || ok==false)
{
   for(j=0;j<n;j++)
   {
      if(a[j][i]==c[c.size()-1].second)
      {
         mp.erase(a[j][i]);
         for(k=i;k<m;k++)
         a[j][k] = s[i];
         mp[s[i]]++;
         break;
      }
```

```
            }
        }

        for(auto q : mp)
        {
            if(q.first != s[i])
            {
                mp[q.first]++;
            }
        }
    }
    cout<<"\n";

    cout<<"The no of HITS are : "<<hit<<endl;
    cout<<"The Page Fault is : "<<m-hit<<endl;
    cout<<"MISS ratio is : "<<(double)(m-hit)/m<<endl;
    cout<<"Hits ratio is : "<<(double)hit/m<<endl;


    return 0;
}
```

Output :

```
Supraja Madishetty 20JE1120
Enter the number of page frames :
4
Enter number of page reference string :
14
Enter the page reference string :
7 0 1 2 0 3 0 4 2 3 0 3 2 3

The no of HITS are : 8
The Page Fault is : 6
MISS ratio is : 0.428571
Hits ratio is : 0.571429


...Program finished with exit code 0
Press ENTER to exit console.
```

3) OPTIMAL ALGORITHM

Code :

```
#include<bits/stdc++.h>
using namespace std;
int main()
{
	cout<<"Supraja Madishetty 20JE0991"<<"\n";

	cout<<"Enter number of frames::\n";
```

```
int n;
cin>>n;
cout<<"Enter the number of page reference string ::\n";
int m;
cin>>m;
int s[m];
cout<<"Enter the page reference string ::\n";
for(int i=0;i<m;i++)
{
	cin>>s[i];
}
map<int,int>mp;
set<int> st;
int miss =0;
int hit =0;
for(int i=0;i<m;i++)
{
	if(st.find(s[i])==st.end())
	{
		miss++;
		int p;
		if(st.size()>=n)
		{
			mp.clear();
			for(int j=i+1;j<m;j++)
			{
				if(mp[s[j]]==0&&st.find(s[j])!=st.end())
				{
					p++;
				}
				mp[s[j]]++;
			}
```

```
                        for(auto   it = st.begin();it!=st.end();it++)
                        {
                                if(mp[*it]==0)
                                {
                                        p=*it;
                                        break;
                                }
                        }
                        st.erase(p);
                        st.insert(s[i]);
                }
                else
                {
                        st.insert(s[i]);
                }
        }
        else
        hit++;
    }
    cout<<"The number of MISS is "<<miss<<endl;
    cout<<"The number of HITS IS"<<hit<<endl;
    cout<<"The miss ratio is "<<(double)miss/m<<endl;
    cout<<"The miss ratio is "<<(double)hit/m<<endl;
    return 0;
}
```

Output :

```
Supraja Madishetty 20JE0991
Enter number of frames::
4
Enter the number of page reference string ::
14
Enter the page reference string ::
7 0 1 2 0 3 0 4 2 3 0 3 2 3
The number of MISS is 6
The number of HITS IS8
The miss ratio is 0.428571
The miss ratio is 0.571429


...Program finished with exit code 0
Press ENTER to exit console.
```