#include<stdio.h>

int n,nf;

int in[100];

int p[50];

int hit=0;

int i,j,k;

int pgfaultcnt=0;

void getData()

{

printf("\nEnter length of page reference sequence:");

scanf("%d",&n);

printf("\nEnter the page reference sequence:");

for(i=0; i<n; i++)

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

printf("\nEnter no of frames:");

scanf("%d",&nf);

}

void initialize()

{

pgfaultcnt=0;

for(i=0; i<nf; i++)

p[i]=9999;

}

int isHit(int data)

{

hit=0;

for(j=0; j<nf; j++)

{

if(p[j]==data)

{

hit=1;

break;

}

}

return hit;

}

int getHitIndex(int data)

{

int hitind;

for(k=0; k<nf; k++)

{

if(p[k]==data)

{

hitind=k;

break;

}

}

return hitind;

}

void dispPages()

{

for (k=0; k<nf; k++)

{

if(p[k]!=9999)

printf(" %d",p[k]);

}

}

void dispPgFaultCnt()

{

printf("\nTotal no of page faults:%d",pgfaultcnt);

}

void fifo()

{

initialize();

for(i=0; i<n; i++)

{

printf("\nFor %d :",in[i]);

if(isHit(in[i])==0)

{

for(k=0; k<nf-1; k++)

p[k]=p[k+1];

p[k]=in[i];

pgfaultcnt++;

dispPages();

}

else

printf("No page fault");

}

dispPgFaultCnt();

}

void optimal()

{

initialize();

int near[50];

for(i=0; i<n; i++)

{

printf("\nFor %d :",in[i]);

if(isHit(in[i])==0)

{

for(j=0; j<nf; j++)

{

int pg=p[j];

int found=0;

for(k=i; k<n; k++)

{

if(pg==in[k])

{

near[j]=k;

found=1;

break;

}

else

found=0;

}

if(!found)

near[j]=9999;

}

int max=-9999;

int repindex;

for(j=0; j<nf; j++)

{

if(near[j]>max)

{

max=near[j];

repindex=j;

}

}

p[repindex]=in[i];

pgfaultcnt++;

dispPages();

}

else

printf("No page fault");

}

dispPgFaultCnt();

}

void lru()

{

initialize();

int least[50];

for(i=0; i<n; i++)

{

printf("\nFor %d :",in[i]);

if(isHit(in[i])==0)

{

for(j=0; j<nf; j++)

{

int pg=p[j];

int found=0;

for(k=i-1; k>=0; k--)

{

if(pg==in[k])

{

least[j]=k;

found=1;

break;

}

else

found=0;

}

if(!found)

least[j]=-9999;

}

int min=9999;

int repindex;

for(j=0; j<nf; j++)

{

if(least[j]<min)

{

min=least[j];

repindex=j;

}

}

p[repindex]=in[i];

pgfaultcnt++;

dispPages();

}

else

printf("No page fault!");

}

dispPgFaultCnt();

}

void lfu()

{

int usedcnt[100];

int least,repin,sofarcnt=0,bn;

initialize();

for(i=0; i<nf; i++)

usedcnt[i]=0;

for(i=0; i<n; i++)

{

printf("\n For %d :",in[i]);

if(isHit(in[i]))

{

int hitind=getHitIndex(in[i]);

usedcnt[hitind]++;

printf("No page fault!");

}

else

{

pgfaultcnt++;

if(bn<nf)

{

p[bn]=in[i];

usedcnt[bn]=usedcnt[bn]+1;

bn++;

}

else

{

least=9999;

for(k=0; k<nf; k++)

if(usedcnt[k]<least)

{

least=usedcnt[k];

repin=k;

}

p[repin]=in[i];

sofarcnt=0;

for(k=0; k<=i; k++)

if(in[i]==in[k])

sofarcnt=sofarcnt+1;

usedcnt[repin]=sofarcnt;

}

dispPages();

}

}

dispPgFaultCnt();

}

void secondchance()

{

int usedbit[50];

int victimptr=0;

initialize();

for(i=0; i<nf; i++)

usedbit[i]=0;

for(i=0; i<n; i++)

{

printf("\nFor %d:",in[i]);

if(isHit(in[i]))

{

printf("No page fault!");

int hitindex=getHitIndex(in[i]);

if(usedbit[hitindex]==0)

usedbit[hitindex]=1;

}

else

{

pgfaultcnt++;

if(usedbit[victimptr]==1)

{

do

{

usedbit[victimptr]=0;

victimptr++;

if(victimptr==nf)

victimptr=0;

}

while(usedbit[victimptr]!=0);

}

if(usedbit[victimptr]==0)

{

p[victimptr]=in[i];

usedbit[victimptr]=1;

victimptr++;

}

dispPages();

}

if(victimptr==nf)

victimptr=0;

}

dispPgFaultCnt();

}

int main()

{

int choice;

while(1)

{

printf("\nPage Replacement Algorithms\n1.Enter data\n2.FIFO\n3.Optimal\n4.LRU\n5.LFU\n7.Exit\nEnter your choice:");

scanf("%d",&choice);

switch(choice)

{

case 1:

getData();

break;

case 2:

fifo();

break;

case 3:

optimal();

break;

case 4:

lru();

break;

case 5:

lfu();

break;

default:

return 0;

break;

}

}

}

OUTPUT:

Page Replacement Algorithms

1.Enter data

2.FIFO

3.Optimal

4.LRU

5.LFU

7.Exit

Enter your choice:1

Enter length of page reference sequence:20

Enter the page reference sequence:1 2 3 4 2 5 3 4 2 6 7 8 7 9 7 8 2 5 4 9

Enter no of frames:3

Page Replacement Algorithms

1.Enter data

2.FIFO

3.Optimal

4.LRU

5.LFU

7.Exit

Enter your choice:2

For 1 : 1

For 2 : 1 2

For 3 : 1 2 3

For 4 : 2 3 4

For 2 :No page fault

For 5 : 3 4 5

For 3 :No page fault

For 4 :No page fault

For 2 : 4 5 2

For 6 : 5 2 6

For 7 : 2 6 7

For 8 : 6 7 8

For 7 :No page fault

For 9 : 7 8 9

For 7 :No page fault

For 8 :No page fault

For 2 : 8 9 2

For 5 : 9 2 5

For 4 : 2 5 4

For 9 : 5 4 9

Total no of page faults:14

Page Replacement Algorithms

1.Enter data

2.FIFO

3.Optimal

4.LRU

5.LFU

7.Exit

Enter your choice:4

For 1 : 1

For 2 : 1 2

For 3 : 1 2 3

For 4 : 4 2 3

For 2 :No page fault!

For 5 : 4 2 5

For 3 : 3 2 5

For 4 : 3 4 5

For 2 : 3 4 2

For 6 : 6 4 2

For 7 : 6 7 2

For 8 : 6 7 8

For 7 :No page fault!

For 9 : 9 7 8

For 7 :No page fault!

For 8 :No page fault!

For 2 : 2 7 8

For 5 : 2 5 8

For 4 : 2 5 4

For 9 : 9 5 4

Total no of page faults:16

Page Replacement Algorithms

1.Enter data

2.FIFO

3.Optimal

4.LRU

5.LFU

7.Exit

Enter your choice:5

For 1 : 1

For 2 : 1 2

For 3 : 1 2 3

For 4 : 4 2 3

For 2 :No page fault!

For 5 : 5 2 3

For 3 :No page fault!

For 4 : 4 2 3

For 2 :No page fault!

For 6 : 6 2 3

For 7 : 7 2 3

For 8 : 8 2 3

For 7 : 7 2 3

For 9 : 9 2 3

For 7 : 7 2 3

For 8 : 7 2 8

For 2 :No page fault!

For 5 : 7 2 5

For 4 : 7 2 4

For 9 : 9 2 4

Total no of page faults:16

Page Replacement Algorithms

1.Enter data

2.FIFO

3.Optimal

4.LRU

5.LFU

7.Exit

Enter your choice:3

For 1 : 1

For 2 : 2

For 3 : 2 3

For 4 : 2 3 4

For 2 :No page fault

For 5 : 5 3 4

For 3 :No page fault

For 4 :No page fault

For 2 : 5 2 4

For 6 : 5 2 6

For 7 : 5 2 7

For 8 : 8 2 7

For 7 :No page fault

For 9 : 8 9 7

For 7 :No page fault

For 8 :No page fault

For 2 : 2 9 7

For 5 : 5 9 7

For 4 : 4 9 7

For 9 :No page fault

Total no of page faults:13

Page Replacement Algorithms

1.Enter data

2.FIFO

3.Optimal

4.LRU

5.LFU

7.Exit

Enter your choice: