#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();

}

int main()

{

int choice;

while(1)

{

printf("\nPage Replacement Algorithms\n1.Enter data\n2.FIFO\n3.Optimal\n4.LRU\n5.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;

default:

return 0;

break;

}

}

}