import java.io.\*;

class optimal{

public static void main(String args[]) throws IOException {

BufferedReader obj = new BufferedReader(new InputStreamReader(System.in));

int f, page = 0, pgf = 0, n, chn = 0;

boolean flag;

int pages[];

int pt = 0;

System.out.println("Enter the number of frames: ");

f = Integer.parseInt(obj.readLine());

int frame[] = new int[f];

for (int i = 0; i < f; i++) {

frame[i] = -1;

}

System.out.println("Enter the number of pages: ");

n = Integer.parseInt(obj.readLine());

pages = new int[n];

System.out.println("Enter the page numbers: ");

for (int j = 0; j < n; j++)

pages[j] = Integer.parseInt(obj.readLine());

do {

int pg = 0;

for (pg = 0; pg < n; pg++) {

page = pages[pg];

flag = true;

// Check if the page is already in a frame

for (int j = 0; j < f; j++) {

if (page == frame[j]) {

flag = false;

break;

}

}

// If the page is not found in frames, a page fault occurs

if (flag) {

// Check for an empty frame

if (pt < f) {

frame[pt] = page;

pt++;

} else {

// If no empty frame, replace the optimal page

int farthest = -1;

int indexToReplace = -1;

for (int j = 0; j < f; j++) {

int nextUse = -1;

for (int k = pg + 1; k < n; k++) {

if (frame[j] == pages[k]) {

nextUse = k;

break;

}

}

// If the page is not found in the future, it can be

replaced

if (nextUse == -1) {

indexToReplace = j;

break;

}

// Find the page that is used farthest in the future

if (nextUse > farthest) {

farthest = nextUse;

indexToReplace = j;

}

}

// Replace the page in the frame

frame[indexToReplace] = page;

}

// Print the current frame state

System.out.print("Frame: ");

for (int j = 0; j < f; j++) {

System.out.print(frame[j] + " \t ");

}

System.out.println();

pgf++; // Increment page fault count

} else {

// Print the current frame state for hits

System.out.print("Frame: ");

for (int j = 0; j < f; j++) {

System.out.print(frame[j] + " \t ");

}

System.out.println();

}

chn++; // Increment total pages processed

}

} while (chn != n);

int phit = n - pgf; // Calculate page hits

System.out.println("Page fault: " + pgf);

System.out.println("Page hit: " + phit);

}

}