CODE:-

```java
import java.util.Scanner;

public class OptimalPageReplacement {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int noofpages, capacity, ptr = 0, hit = 0, fault = 0;
        boolean isFull=false;
        double hitRatio,faultRatio;
        System.out.print("Enter the number of pages you want to enter: ");
        noofpages = sc.nextInt();
        int pages[] = new int[noofpages];
        for (int i = 0; i < noofpages; i++) {
            pages[i] = sc.nextInt();
        }
        System.out.print("Enter the capacity of frame: ");
        capacity = sc.nextInt();
        int frame[] = new int[capacity];
        int table[][] = new int[noofpages][capacity];
        for (int i = 0; i < capacity; i++) {
            frame[i] = -1;
        }
        System.out.println("--------------------------------------------------------------------");
        for (int i = 0; i < noofpages; i++) {
            int search = -1;
            for (int j = 0; j < capacity; j++) {
                if (frame[j] == pages[i]) {
                    search = j;
                    hit++;
                    System.out.printf("%4s","H");
                    break;
                } }
            if (search == -1) {
                if (isFull) {
                    int[] index = new int[capacity];
                    boolean[] index_flag = new boolean[capacity];
                    for (int j = i + 1; j < noofpages; j++) {
```

```java
                    for (int k = 0; k < capacity; k++) {
                        if ((pages[j] == frame[k]) &&
                            (!index_flag[k])) {
                            index[k] = j;
                            index_flag[k] = true;
                            break;
                        } } }
                int max = index[0];
                ptr = 0;
                if (max == 0)
                    max = 200;
                for (int j = 0; j < capacity; j++) {
                    if (index[j] == 0)
                        index[j] = 200;
                    if (index[j] > max) {
                        max = index[j];
                        ptr = j;
                    } } }
            frame[ptr] = pages[i];
            fault++;
            System.out.printf("%4s","F");
            if (!isFull) {
                ptr++;
                if (ptr == capacity) {
                    ptr = 0;
                    isFull = true;
                } } }
        System.arraycopy(frame, 0, table[i], 0, capacity);
    }
    System.out.println("\n---------------------------------------------------------------------");
    for (int i = 0; i < capacity; i++) {
        for (int j = 0; j < noofpages; j++)
            System.out.printf("%3d ", table[j][i]);
        System.out.println();
    }
System.out.println("---------------------------------------------------------------------");
hitRatio = ((double)hit / noofpages) * 100;
```

```java
        faultRatio = ((double)fault / noofpages) * 100;

        System.out.println("Page Fault: " + fault + "\nPage Hit: " + hit);

        System.out.printf("Hit Ratio:%.2f \nFault Ratio:%.2f ", hitRatio, faultRatio);

    }}
```

OUTPUT: -

Enter the number of pages you want to enter: 13

7 0 1 2 0 3 0 4 2 3 0 3 2

Enter the capacity of frame: 4

  F F F F H F H F H H H H H

----

  7 7 7 7 7 3 3 3 3 3 3 3 3

 -1 0 0 0 0 0 0 0 0 0 0 0 0

 -1 -1 1 1 1 1 1 4 4 4 4 4 4

 -1 -1 -1 2 2 2 2 2 2 2 2 2 2

Page Fault: 6

Page Hit: 7

Hit Ratio:53.85

Fault Ratio:46.