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1  #include <stdio.h>
2
3  int search(int key, int frameItems[], int frame_occupied)
4  {
5      for (int i = 0; i < frame_occupied; i++)
6          if (frameItems[i] == key)
7              return 1;
8      return 0;
9  }
10 void printOuterStructure(int frames)
11 {
12     printf("Incoming ");
13
14     for (int i = 0; i < frames; i++)
15         printf("\tFrame%d\t", i + 1);
16 }
17 void printCurrFrames(int item, int frameItems[], int frame_occupied, int frames)
18 {
19     printf("\n%d \t\t", item);
20     for (int i = 0; i < frames; i++)
21     {
22         if (i < frame_occupied)
23             printf("%d \t\t", frameItems[i]);
24         else
25             printf("- \t\t");
26     }
27 }
28 int predict(int incomingStream[], int frameItems[], int page, int index, int frame_occupied)
29 {
30     int result = -1, farthest = index;
31     for (int i = 0; i < frame_occupied; i++)
32     {
33         int j;
34         for (j = index; j < page; j++)
35         {
36             if (frameItems[i] == incomingStream[j])
37             {
38                 if (j > farthest)
39                 {
40                     farthest = j;
41                     result = i;
42                 }
43                 break;
44             }
45         }
46
47         if (j == page)
48             return i;
49     }
50
51     return (result == -1) ? 0 : result;
52 }
53
54 void optimalPage(int incomingStream[], int page, int frameItems[], int frames)
55 {
56     int frame_occupied = 0;
57     printOuterStructure(frames);
```

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58
59     int hits = 0;
60     for (int i = 0; i < page; i++)
61     {
62         if (search(incomingStream[i], frameItems, frame_occupied))
63         {
64             hits++;
65             printCurrFrames(incomingStream[i], frameItems, frame_occupied, frames);
66             continue;
67         }
68         if (frame_occupied < frames)
69         {
70             frameItems[frame_occupied] = incomingStream[i];
71             frame_occupied++;
72             printCurrFrames(incomingStream[i], frameItems, frame_occupied, frames);
73         }
74         else
75         {
76             int pos = predict(incomingStream, frameItems, page, i + 1, frame_occupied);
77             frameItems[pos] = incomingStream[i];
78             printCurrFrames(incomingStream[i], frameItems, frame_occupied, frames);
79         }
80     }
81     printf("\n\nHits: %d\n", hits);
82     printf("Misses: %d", page - hits);
83 }
84
85 int main()
86 {
87     int incomingStream[] = {7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1};
88     int page = sizeof(incomingStream) / sizeof(incomingStream[0]);
89     int frames = 4;
90     int frameItems[frames];
91
92     optimalPage(incomingStream, page, frameItems, frames);
93     return 0;
94 }
```