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OS LAB-10

Page Replacement Algorithms

FIFO

Code:

```
1 #include<stdio.h>
2 int main(){
3
4     int incomingStream[] = {3,4,1,2,5};
5     int pageFaults = 0;
6     int frames = 3;
7     int m,n,s,pages;
8     pages = sizeof(incomingStream)/sizeof(incomingStream[0]);
9     printf("Incoming \t Frame 1 \t Frame 2 \t Frame 3");
10    int temp[frames];
11
12    for(m = 0; m< frames; m++){
13        temp[m] = -1;
14    }
15    for(m = 0; m< pages;m++){
16        s = 0;
17        for(n=0; n< frames;n++){
18            if(incomingStream[m] == temp[n]){
19                s++;
20                pageFaults--;
21            }
22        }
23        pageFaults++;
24
25        if((pageFaults <= frames) && (s==0)){
26            temp[m] = incomingStream[m];
27        }
28        else if(s==0){
29            temp[(pageFaults - 1) % frames] = incomingStream[m];
30        }
31        printf("\n");
32
33        printf("\n");
34        printf("%d\t\t\t",incomingStream[m]);
35
36        for(n=0;n< frames;n++){
37            if(temp[n]!= -1){
38                printf("%d\t\t\t", temp[n]);
39            }else{
40                printf(" - \t\t\t");
41            }
42        }
43        printf("\nTotal Page Faults:\t%d\n", pageFaults);
44        return 0;
45    }
```

Output:

```
alaric@alaric-virtual-machine:~/Desktop$ gcc fifo.c
alaric@alaric-virtual-machine:~/Desktop$ ./a.out
Incoming      Frame 1      Frame 2      Frame 3
3              3              -              -
4              3              4              -
1              3              4              1
2              2              4              1
5              2              5              1
Total Page Faults: 5
```

LRU

Code:

```
1 #include <stdio.h>
2
3
4 int findLRU(int time[], int n)
5 {
6     int i, minimum = time[0], pos = 0;
7     for (i = 1; i < n; ++i)
8     {
9         if (time[i] < minimum)
10        {
11            minimum = time[i];
12            pos = i;
13        }
14    }
15    return pos;
16 }
17
18 int main()
19 {
20     int no_of_frames, no_of_pages, frames[10], pages[30], counter = 0, time[10], flag1,
21     flag2, i, j, pos, faults = 0;
22
23     printf("Enter number of frames: ");
24     scanf("%d", &no_of_frames);
25     printf("Enter number of pages: ");
26     scanf("%d", &no_of_pages);
27     printf("Enter reference string: ");
28
29     for (i = 0; i < no_of_pages; ++i)
30     {
31         scanf("%d", &pages[i]);
32     }
33
34     for (i = 0; i < no_of_frames; ++i)
35     {
36         frames[i] = -1;
37     }
```

```

38
39 for (i = 0; i < no_of_pages; ++i)
40 {
41     flag1 = flag2 = 0;
42
43     for (j = 0; j < no_of_frames; ++j)
44     {
45
46         if (frames[j] == pages[i])
47         {
48             counter++;
49             time[j] = counter;
50             flag1 = flag2 = 1;
51             break;
52         }
53     }
54     if (flag1 == 0)
55     {
56
57         for (j = 0; j < no_of_frames; ++j)
58         {
59             if (frames[j] == -1)
60             {
61                 counter++;
62                 faults++;
63                 frames[j] = pages[i];
64                 time[j] = counter;
65                 flag2 = 1;
66                 break;
67             }
68         }
69     }
70     if (flag2 == 0)
71     {
72
73         {
74             pos = findLRU(time, no_of_frames);
75             counter++;
76             faults++;
77             frames[pos] = pages[i];
78             time[pos] = counter;
79         }
80         printf("\n");
81
82         for (j = 0; j < no_of_frames; ++j)
83         {
84             printf("%d\t", frames[j]);
85         }
86         printf("\nTotal Page Faults = %d", faults);
87     }
88     return 0;
89 }

```

Output:

```

alaric@alaric-virtual-machine:~/Desktop$ ./a.out
Enter number of frames: 5
Enter number of pages: 6
Enter reference string: 8 9 11 7 5 6

8      -1      -1      -1      -1
8      9       -1      -1      -1
8      9       11      -1      -1
8      9       11      7       -1
8      9       11      7       5
6      9       11      7       5

Total Page Faults = 6
alaric@alaric-virtual-machine:~

```

Optimal

Code:

```

1 #include <stdio.h>
2
3
4 int main()
5 {
6
7     int no_of_frames, no_of_pages, frames[10], pages[30], temp[10], flag1, flag2, flag3, i,
8     j, k, pos, max, faults = 0;
9     printf("Enter number of frames: ");
10    scanf("%d", &no_of_frames);
11    printf("Enter number of pages: ");
12    scanf("%d", &no_of_pages);
13    printf("Enter page reference string: ");
14
15    for (i = 0; i < no_of_pages; ++i)
16    {
17        scanf("%d", &pages[i]);
18    }
19
20    for (i = 0; i < no_of_frames; ++i)
21    {
22        frames[i] = -1;
23    }
24
25    for (i = 0; i < no_of_pages; ++i)
26    {
27        flag1 = flag2 = 0;
28
29        for (j = 0; j < no_of_frames; ++j)
30        {
31            if (frames[j] == pages[i])
32            {
33                flag1 = flag2 = 1;
34                break;
35            }
36        }
37        if (flag1 == 0)

```

```

38 {
39
40 for (j = 0; j < no_of_frames; ++j)
41 {
42 if (frames[j] == -1)
43 {
44 faults++;
45 frames[j] = pages[i];
46 flag2 = 1;
47 break;
48 }
49 }
50 }
51 if (flag2 == 0)
52 {
53 flag3 = 0;
54
55 for (j = 0; j < no_of_frames; ++j)
56 {
57 temp[j] = -1;
58
59 for (k = i + 1; k < no_of_pages; ++k)
60 {
61 if (frames[j] == pages[k])
62 {
63 temp[j] = k;
64 break;
65 }
66 }
67 }
68
69 for (j = 0; j < no_of_frames; ++j)
70 {
71 if (temp[j] == -1)

```

```

72 {
73 pos = j;
74 flag3 = 1;
75 break;
76 }
77 }
78 if (flag3 == 0)
79 {
80 max = temp[0];
81 pos = 0;
82
83 for (j = 1; j < no_of_frames; ++j)
84 {
85 if (temp[j] > max)
86 {
87 max = temp[j];
88 pos = j;
89 }
90 }
91 }
92 frames[pos] = pages[i];
93 faults++;
94 }
95 printf("\n");
96
97 for (j = 0; j < no_of_frames; ++j)
98 {
99 printf("%d\t", frames[j]);
100 }
101 }
102 printf("\n\nTotal Page Faults = %d", faults);
103 return 0;
104 }

```

Output:

```

alaric@alaric-virtual-machine:~/Desktop$ ./a.out
Enter number of frames: 4
Enter number of pages: 8
Enter page reference string: 4 5 7 6 9 10 3 2

4      -1      -1      -1
4       5      -1      -1
4       5       7      -1
4       5       7       6
9       5       7       6
10      5       7       6
3       5       7       6
2       5       7       6

Total Page Faults = 8alaric@alaric-virtual-machine:

```

