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OS LAB-10

Page Replacement Algorithms

FIFO

Code:

```c
#include<stdio.h>
int main(){

int incomingStream[] = {3,4,1,2,5};
int pageFaults = 0;
int frames = 3;
int m,n,s,pages;
pages = sizeof(incomingStream)/sizeof(incomingStream[0]);
printf("Incoming \t Frame 1 \t Frame 2 \t Frame 3");
int temp[frames];

for(m = 0; m< frames; m++){
temp[m] = -1;
}
for(m = 0; m< pages;m++){
s = 0;
for(n=0; n< frames;n++){
if(incomingStream[m] == temp[n]){
s++;
pageFaults--;
}
}
pageFaults++;

if((pageFaults <= frames) && (s==0)){
temp[m] = incomingStream[m];
}
else if(s==0){
temp[(pageFaults - 1) % frames] = incomingStream[m];
}
printf("\n");
```

```c
printf("\n");
printf("%d\t\t\t",incomingStream[m]);

for(n=0;n< frames;n++){
if(temp[n]!= -1){
printf("%d\t\t\t", temp[n]);
}else{
printf(" - \t\t\t");
}
}
}
printf("\nTotal Page Faults:\t%d\n", pageFaults);
return 0;
}
```

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:

```c
#include <stdio.h>


int findLRU(int time[], int n)
{
int i, minimum = time[0], pos = 0;
for (i = 1; i < n; ++i)
{
if (time[i] < minimum)
{
minimum = time[i];
pos = i;
}
}
return pos;
}

int main()
{
int no_of_frames, no_of_pages, frames[10], pages[30], counter = 0, time[10], flag1,
flag2, i, j, pos, faults = 0;

printf("Enter number of frames: ");
scanf("%d", &no_of_frames);
printf("Enter number of pages: ");
scanf("%d", &no_of_pages);
printf("Enter reference string: ");

for (i = 0; i < no_of_pages; ++i)
{
scanf("%d", &pages[i]);
}

for (i = 0; i < no_of_frames; ++i)
{
frames[i] = -1;
}
```

```
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 {
```

```
71 {
72 pos = findLRU(time, no_of_frames);
73 counter++;
74 faults++;
75 frames[pos] = pages[i];
76 time[pos] = counter;
77 }
78 printf("\n");
79
80 for (j = 0; j < no_of_frames; ++j)
81 {
82 printf("%d\t", frames[j]);
83 }
84 }
85 printf("\nTotal Page Faults = %d", faults);
86 return 0;
87 }
```

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 = 6alaric@alaric-virtual-machine:~
```

Optimal

Code:

```c
#include <stdio.h>


int main()
{

int no_of_frames, no_of_pages, frames[10], pages[30], temp[10], flag1, flag2, flag3, i,
j, k, pos, max, faults = 0;
printf("Enter number of frames: ");
scanf("%d", &no_of_frames);
printf("Enter number of pages: ");
scanf("%d", &no_of_pages);
printf("Enter page reference string: ");

for (i = 0; i < no_of_pages; ++i)
{
scanf("%d", &pages[i]);
}

for (i = 0; i < no_of_frames; ++i)
{
frames[i] = -1;
}

for (i = 0; i < no_of_pages; ++i)
{
flag1 = flag2 = 0;

for (j = 0; j < no_of_frames; ++j)
{
if (frames[j] == pages[i])
{
flag1 = flag2 = 1;
break;
}
}
if (flag1 == 0)
```

```
{

for (j = 0; j < no_of_frames; ++j)
{
if (frames[j] == -1)
{
faults++;
frames[j] = pages[i];
flag2 = 1;
break;
}
}
}
if (flag2 == 0)
{
flag3 = 0;

for (j = 0; j < no_of_frames; ++j)
{
temp[j] = -1;

for (k = i + 1; k < no_of_pages; ++k)
{
if (frames[j] == pages[k])
{
temp[j] = k;
break;
}
}
}

for (j = 0; j < no_of_frames; ++j)
{
if (temp[j] == -1)
```

```
{
pos = j;
flag3 = 1;
break;
}
}
if (flag3 == 0)
{
max = temp[0];
pos = 0;

for (j = 1; j < no_of_frames; ++j)
{
if (temp[j] > max)
{
max = temp[j];
pos = j;
}
}
}
frames[pos] = pages[i];
faults++;
}
printf("\n");

for (j = 0; j < no_of_frames; ++j)
{
printf("%d\t", frames[j]);
}
}
printf("\n\nTotal Page Faults = %d", faults);
return 0;
}
```

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:
```