Assignment No: 3

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Topic: Page Scheduling Algorithms

1) LRU

Code:

```
#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;
    }

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

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

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

        if(flag2 == 0){
            pos = findLRU(time, no_of_frames);
            counter++;
            faults++;
            frames[pos] = pages[i];
            time[pos] = counter;
        }

        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:

```
Enter number of frames: 3
Enter number of pages: 6
Enter reference string: 5 7 5 6 7 3

5 -1 -1
5 7 -1
5 7 -1
5 7 6
5 7 6
3 7 6

Total Page Faults = 4
```

2) Optimal Page Replacement

Code:

```
#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:

```
Enter number of frames: 3
Enter number of pages: 10
Enter page reference string: 2 3 4 2 1 3 7 5 4 3

2 -1 -1
2 3 -1
2 3 4
2 3 4
1 3 4
1 3 4
7 3 4
5 3 4
5 3 4
5 3 4
```

3) FIFO Page Replacement

Code:

```
#include<stdio.h>
int main()
{
            int i,j,n,a[50],frame[10],no,k,avail,count=0;
            printf("\n ENTER THE NUMBER OF PAGES:\n");
            scanf("%d",&n);
            printf("\n ENTER THE PAGE NUMBER :\n");
            for(i=1;i<=n;i++)
            scanf("%d",&a[i]);
            printf("\n ENTER THE NUMBER OF FRAMES :");
            scanf("%d",&no);
            for(i=0;i<no;i++)
            frame[i]= -1;
                        j=0;
                        printf("\tref string\t page frames\n");
for(i=1;i<=n;i++)
                        {
                                    printf("%d\t\t",a[i]);
                                    avail=0;
                                    for(k=0;k<no;k++)
if(frame[k]==a[i])
                                                avail=1;
```

```
                    if (avail==0)
                    {
                            frame[j]=a[i];
                            j=(j+1)%no;
                            count++;
                            for(k=0;k<no;k++)
                            printf("%d\t",frame[k]);
        }
                    printf("\n");
        }
                printf("Page Fault Is %d",count);
                return 0;
}
```

Output:

```
ENTER THE NUMBER OF PAGES:  20

ENTER THE PAGE NUMBER :     7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

ENTER THE NUMBER OF FRAMES :3

    ref string     page frames

7          7     -1     -1

0          7     0      -1

1          7     0      1

2          2     0      1

0

3          2     3      1

0          2     3      0

4          4     3      0

2          4     2      0

3          4     2      3

0          0     2      3

3

2

1          0     1      3

2          0     1      2

0

1

7          7     1      2
```

```
0          7     0     2

1          7     0     1

Page Fault Is 15
```