Assignment 6

6a - FCFS

Code

6a.c

```c
/*
Problem Statement - Implement the C program for Page Replacement Algorithms: FCFS
for frame size as minimum three.
*/

#include <stdio.h>

int main()
{
        int pages;
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        printf("Enter the number of pages\n");
        scanf("%d", &pages);
        int page_arr[pages];

        int frame_size;
        printf("Enter the frame size\n");
        scanf("%d", &frame_size);
        int frames[frame_size];
```

```
        for(int i=0;i<frame_size;i++)
        {
                frames[i]=0;
        }

        float page_faults=0;

        printf("Enter the pages");
        for (int i = 0; i < pages; i++)
        {
                scanf("%d", &page_arr[i]);
        }
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        int x=0;
        for(int i=0;i<pages;i++)
        {
                int flag=0;
                for (int j=0;j<frame_size;j++)
                {
                        if(page_arr[i]==frames[j])
                        {
                                flag=1;
                        }
                }

                if(flag==0)
                {
                        page_faults++;
                        frames[x]=page_arr[i];
                        x=(x+1)%frame_size;
                }

                printf("Page:%d\n",page_arr[i]);

                printf("Sequence:\n");
                for (int i = 0; i < frame_size; i++)
                {
                        printf("%d ", frames[i]);
                }
                printf("\n");
        }
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        printf("Total page faults : %f\n", page_faults);
        printf("Page Fault ratio : %f\n", page_faults / pages);
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
}
```

Output

```
abhishek-jadhav@abhishek-jadhav-ubuntu:~/Codes/OS Assignments/33232$ ./a.out
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Enter the number of pages
5
Enter the frame size
3
Enter the pages2
3
5
2
3
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Page:2
Sequence:
2 0 0
Page:3
Sequence:
2 3 0
Page:5
Sequence:
2 3 5
Page:2
Sequence:
2 3 5
Page:3
Sequence:
2 3 5
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total page faults : 3.000000
Page Fault ratio : 0.600000
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
abhishek-jadhav@abhishek-jadhav-ubuntu:~/Codes/OS Assignments/33232$
```

6b - LRU

Code

6b.c

```c
/*
Problem Statement - Implement the C program for Page Replacement Algorithms: LRU
for frame size as minimum three.
*/

#include <stdio.h>

int main()
{
        int pages;
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        printf("Enter the number of pages:");
        scanf("%d", &pages);
        int page_arr[pages];

        int frame_size;
        printf("Enter the frame size:");
        scanf("%d", &frame_size);
        int frames[frame_size];

        for (int i = 0; i < frame_size; i++)
        {
                frames[i] = 0;
        }

        float page_faults = 0;

        printf("Enter the pages:");
        for (int i = 0; i < pages; i++)
        {
                scanf("%d", &page_arr[i]);
        }

        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        int z = 0;
        int j = 0;

        for (int i = 0; i < pages; i++)
        {
                int flag = 0;
                for (int j = 0; j < frame_size; j++)
                {

                        if (page_arr[i] == frames[j])
                        {
                                flag = 1;
                        }
                }
```

```
                if (flag == 0)
                {

                        page_faults++;
                        if (j < frame_size)
                        {
                                frames[j] = page_arr[i];
                                j++;
                        }
                        else
                        {
                                int min = i - 1;
                                int x = -1;
                                for (int k = 0; k < frame_size; k++)
                                {
                                        for (int j = i - 1; j >= 0; j--)
                                        {
                                                if (page_arr[j] == frames[k])
                                                {
                                                        if (min > j)
                                                        {
                                                                min = j;
                                                                x = k;
                                                        }
                                                        break;
                                                }
                                        }
                                }
                                z = x;
                                frames[z] = page_arr[i];
                        }
                }

                printf("Page:%d\n", page_arr[i]);

                printf("Sequence:\n");
                for (int i = 0; i < frame_size; i++)
                {
                        printf("%d ", frames[i]);
                }
                printf("\n");
        }
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        printf("Total page faults : %f\n", page_faults);
        printf("Page Fault ratio : %f\n", page_faults / pages);
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
}
```

Output

```
abhishek-jadhav@abhishek-jadhav-ubuntu:~/Codes/OS Assignments/33232$ ./a.out
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Enter the number of pages:5
Enter the frame size:3
Enter the pages:2
3
5
2
3
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Page:2
Sequence:
2 0 0
Page:3
Sequence:
2 3 0
Page:5
Sequence:
2 3 5
Page:2
Sequence:
2 3 5
Page:3
Sequence:
2 3 5
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total page faults : 3.000000
Page Fault ratio : 0.600000
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
abhishek-jadhav@abhishek-jadhav-ubuntu:~/Codes/OS Assignments/33232$
```

6c - Optimal

Code

6c.c

```
/*
Problem Statement - Implement the C program for Page Replacement Algorithms:
Optimal frame size for frame size as minimum three.
```

```
*/

#include <stdio.h>

int main()
{
        int pages;
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        printf("Enter the number of pages\n");
        scanf("%d", &pages);
        int page_arr[pages];

        int frame_size;
        printf("Enter the frame size\n");
        scanf("%d", &frame_size);
        int frames[frame_size];

        for (int i = 0; i < frame_size; i++)
        {
                frames[i] = 0;
        }

        float page_faults = 0;

        printf("Enter the pages");
        for (int i = 0; i < pages; i++)
        {
                scanf("%d", &page_arr[i]);
        }

        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        int z = 0;
        int j = 0;

        for (int i = 0; i < pages; i++)
        {
                int flag = 0;
                for (int j = 0; j < frame_size; j++)
                {

                        if (page_arr[i] == frames[j])
                        {
                                flag = 1;
                        }
                }

                if (flag == 0)
                {
                        page_faults++;
                        int flag1 = 0;
```

```
                        if (j < frame_size)
                        {
                                frames[j] = page_arr[i];
                                j++;
                        }
                        else
                        {
                                int max = i + 1;
                                int x = -1;

                                for (int k = 0; k < frame_size; k++)
                                {
                                        int j;
                                        for (j = i + 1; j < pages; j++)
                                        {
                                                if (page_arr[j] == frames[k])
                                                {
                                                        if (max < j)
                                                        {
                                                                max = j;
                                                                x = k;
                                                        }
                                                        break;
                                                }
                                        }
                                        if (j == pages)
                                        {
                                                flag1 = 1;
                                                z = k;
                                                break;
                                        }
                                }
                                if (flag1 != 1)
                                {
                                        z = x;
                                }
                                frames[z] = page_arr[i];
                        }

                        printf("Page:%d\n", page_arr[i]);

                        printf("Sequence:\n");
                        for (int i = 0; i < frame_size; i++)
                        {
                                printf("%d ", frames[i]);
                        }
                        printf("\n");
                }
        }
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
```

```
        printf("Total page faults : %f\n", page_faults);
        printf("Page Fault ratio : %f\n", page_faults / pages);
        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
}
```

Output

```
abhishek-jadhav@abhishek-jadhav-ubuntu:~/Codes/OS Assignments/33232$ ./a.out
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Enter the number of pages
5
Enter the frame size
3
Enter the pages2
3
5
2
3
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Page:2
Sequence:
2 0 0
Page:3
Sequence:
2 3 0
Page:5
Sequence:
2 3 5
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total page faults : 3.000000
Page Fault ratio : 0.600000
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
abhishek-jadhav@abhishek-jadhav-ubuntu:~/Codes/OS Assignments/33232$
```