

## 1.Multithreaading:

```
main.c  [Icons]  Share  Run  Output  Clear

1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <pthread.h>
4
5 void* print_message(void* thread_id) {
6     long tid = (long)thread_id;
7     printf("Hello from thread %ld\n", tid);
8     pthread_exit(NULL);
9 }
10
11 int main() {
12     pthread_t threads[2];
13     int rc;
14     long t;
15
16     for (t = 0; t < 2; t++) {
17         printf("Creating thread %ld\n", t);
18         rc = pthread_create(&threads[t], NULL, print_message, (void*)t);
19         if (rc) {
20             printf("Error:unable to create thread, %d\n", rc);
21             exit(-1);
22         }
23     }
24
25     for (t = 0; t < 2; t++) {
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```
Creating thread 0
Creating thread 1
Hello from thread 0
Hello from thread 1
Main thread exiting.

=== Code Execution Successful ===
```

## 2. FIFO Paging:

```
main.c 🔍 ⚙️ 🔗 Share 🏃 Run Output Clear

1 #include <stdio.h>
2
3 #define MAX 100
4
5 void fifoPageReplacement(int pages[], int n, int capacity) {
6     int frames[capacity];
7     int front = 0, rear = 0, count = 0;
8     int pageFaults = 0;
9     int i, j, found;
10
11     for (i = 0; i < n; i++) {
12         found = 0;
13
14         // Check if page is already in a frame
15         for (j = 0; j < count; j++) {
16             if (frames[j] == pages[i]) {
17                 found = 1;
18                 break;
19             }
20         }
21
22         if (!found) {
23             // If frames not full, add page at rear
24             if (count < capacity) {
25                 frames[rear] = pages[i];
26                 rear = (rear + 1) % capacity;
```

```
Enter number of pages: 12
Enter the page reference string:
1 3 0 3 5 6 3 0 1 2 1 2
Enter number of frames: 3
Step 1: 1 (Page Fault)
Step 2: 1 3 (Page Fault)
Step 3: 1 3 0 (Page Fault)
Step 4: 1 3 0 (No Page Fault)
Step 5: 3 0 5 (Page Fault)
Step 6: 0 5 6 (Page Fault)
Step 7: 5 6 3 (Page Fault)
Step 8: 6 3 0 (Page Fault)
Step 9: 3 0 1 (Page Fault)
Step 10: 0 1 2 (Page Fault)
Step 11: 0 1 2 (No Page Fault)
Step 12: 0 1 2 (No Page Fault)
```

Total Page Faults: 9

=== Code Execution Successful ===

```
26         rear = (rear + 1) % capacity;
27         count++;
28     } else {
29         // Replace the oldest page (FIFO)
30         frames[front] = pages[i];
31         front = (front + 1) % capacity;
32         rear = (rear + 1) % capacity;
33     }
34     pageFaults++;
35 }
36
37 // Display current frame state
38 printf("Step %d: ", i + 1);
39 for (j = 0; j < count; j++) {
40     printf("%d ", frames[(front + j) % capacity]);
41 }
42 if (found)
43     printf(" (No Page Fault)");
44 else
45     printf(" (Page Fault)");
46 printf("\n");
47 }
48
49 printf("\nTotal Page Faults: %d\n", pageFaults);
50 }
```

```
Enter number of pages: 12
Enter the page reference string:
1 3 0 3 5 6 3 0 1 2 1 2
Enter number of frames: 3
Step 1: 1 (Page Fault)
Step 2: 1 3 (Page Fault)
Step 3: 1 3 0 (Page Fault)
Step 4: 1 3 0 (No Page Fault)
Step 5: 3 0 5 (Page Fault)
Step 6: 0 5 6 (Page Fault)
Step 7: 5 6 3 (Page Fault)
Step 8: 6 3 0 (Page Fault)
Step 9: 3 0 1 (Page Fault)
Step 10: 0 1 2 (Page Fault)
Step 11: 0 1 2 (No Page Fault)
Step 12: 0 1 2 (No Page Fault)
```

Total Page Faults: 9

=== Code Execution Successful ===

```
50 }
51
52 int main() {
53     int pages[MAX], n, capacity, i;
54
55     printf("Enter number of pages: ");
56     scanf("%d", &n);
57
58     printf("Enter the page reference string:\n");
59     for (i = 0; i < n; i++) {
60         scanf("%d", &pages[i]);
61     }
62
63     printf("Enter number of frames: ");
64     scanf("%d", &capacity);
65
66     fifoPageReplacement(pages, n, capacity);
67
68     return 0;
69 }
```

### 3. LRU Paging:

```
main.c Run Output Clear
1 #include <stdio.h>
2
3 #define MAX 100
4
5 // Function to find the least recently used page
6 int findLRU(int time[], int n) {
7     int i, minimum = time[0], pos = 0;
8     for (i = 1; i < n; i++) {
9         if (time[i] < minimum) {
10             minimum = time[i];
11             pos = i;
12         }
13     }
14     return pos;
15 }
16
17 void lruPageReplacement(int pages[], int n, int capacity) {
18     int frames[capacity], time[capacity];
19     int pageFaults = 0, counter = 0;
20     int i, j, pos, flag1, flag2;
21
22     for (i = 0; i < capacity; i++) {
23         frames[i] = -1;
24     }
25
26     for (i = 0; i < n; i++) {
27         int page = pages[i];
28         int found = 0;
29         for (j = 0; j < capacity; j++) {
30             if (frames[j] == page) {
31                 found = 1;
32                 break;
33             }
34         }
35         if (found == 0) {
36             pageFaults++;
37             pos = findLRU(time, counter);
38             frames[pos] = page;
39             time[counter] = i;
40             counter++;
41         }
42     }
43     printf("Total Page Faults: %d\n", pageFaults);
44 }
```

```

26- for (i = 0; i < n; i++) {
27-     flag1 = flag2 = 0;
28-
29-     // Check if page is already in frame
30-     for (j = 0; j < capacity; j++) {
31-         if (frames[j] == pages[i]) {
32-             counter++;
33-             time[j] = counter;
34-             flag1 = flag2 = 1;
35-             break;
36-         }
37-     }
38-
39-     // If page not found, insert it
40-     if (flag1 == 0) {
41-         for (j = 0; j < capacity; j++) {
42-             if (frames[j] == -1) {
43-                 counter++;
44-                 pageFaults++;
45-                 frames[j] = pages[i];
46-                 time[j] = counter;
47-                 flag2 = 1;
48-                 break;
49-             }
50-         }

```

```

^ Enter number of pages: 12
Enter the page reference string:
1 3 0 3 5 6 3 0 1 2 1 2
Enter number of frames: 3
Step 1: 1 (Page Fault)
Step 2: 1 3 (Page Fault)
Step 3: 1 3 0 (Page Fault)
Step 4: 1 3 0 (No Page Fault)
Step 5: 5 3 0 (Page Fault)
Step 6: 5 3 6 (Page Fault)
Step 7: 5 3 6 (No Page Fault)
Step 8: 0 3 6 (Page Fault)
Step 9: 0 3 1 (Page Fault)
Step 10: 0 2 1 (Page Fault)
Step 11: 0 2 1 (No Page Fault)
Step 12: 0 2 1 (No Page Fault)

Total Page Faults: 8

=== Code Execution Successful ===

```

```

68     printf("(Page Fault)");
69     printf("\n");
70 }
71
72     printf("\nTotal Page Faults: %d\n", pageFaults);
73 }
74
75 int main() {
76     int pages[MAX], n, capacity, i;
77
78     printf("Enter number of pages: ");
79     scanf("%d", &n);
80
81     printf("Enter the page reference string:\n");
82     for (i = 0; i < n; i++) {
83         scanf("%d", &pages[i]);
84     }
85
86     printf("Enter number of frames: ");
87     scanf("%d", &capacity);
88
89     lruPageReplacement(pages, n, capacity);
90
91     return 0;
92 }

```

```

* Enter number of pages: 12
Enter the page reference string:
1 3 0 3 5 6 3 0 1 2 1 2
Enter number of frames: 3
Step 1: 1 (Page Fault)
Step 2: 1 3 (Page Fault)
Step 3: 1 3 0 (Page Fault)
Step 4: 1 3 0 (No Page Fault)
Step 5: 5 3 0 (Page Fault)
Step 6: 5 3 6 (Page Fault)
Step 7: 5 3 6 (No Page Fault)
Step 8: 0 3 6 (Page Fault)
Step 9: 0 3 1 (Page Fault)
Step 10: 0 2 1 (Page Fault)
Step 11: 0 2 1 (No Page Fault)
Step 12: 0 2 1 (No Page Fault)

Total Page Faults: 8

=== Code Execution Successful ===

```



## 4. Optimal Paging:

main.c

Share

Run

Output

Clear

```
1 #include <stdio.h>
2 #define MAX 100
3 int predict(int pages[], int frames[], int n, int index, int
  capacity) {
4     int res = -1, farthest = index;
5     for (int i = 0; i < capacity; i++) {
6         int j;
7         for (j = index; j < n; j++) {
8             if (frames[i] == pages[j]) {
9                 if (j > farthest) {
10                     farthest = j;
11                     res = i;
12                 }
13                 break;
14             }
15         }
16         if (j == n) {
17             return i;
18         }
19     }
20     return (res == -1) ? 0 : res;
21 }
22
23 void optimalPageReplacement(int pages[], int n, int capacity) {
24     int frames[capacity];
25     int count = 0, pageFaults = 0;
```

```
Enter number of pages: 12
Enter the page reference string:
1 3 0 3 5 6 3 0 1 2 1 2
Enter number of frames: 3
Step 1: 1 (Page Fault)
Step 2: 1 3 (Page Fault)
Step 3: 1 3 0 (Page Fault)
Step 4: 1 3 0 (No Page Fault)
Step 5: 5 3 0 (Page Fault)
Step 6: 6 3 0 (Page Fault)
Step 7: 6 3 0 (No Page Fault)
Step 8: 6 3 0 (No Page Fault)
Step 9: 1 3 0 (Page Fault)
Step 10: 1 2 0 (Page Fault)
Step 11: 1 2 0 (No Page Fault)
Step 12: 1 2 0 (No Page Fault)

Total Page Faults: 7

=== Code Execution Successful ===
```

main.c

Share

Run

Output

Clear

```
25 int count = 0, pageFaults = 0;
26 int i, j, k, flag;
27 for (i = 0; i < capacity; i++) {
28     frames[i] = -1;
29 }
30 for (i = 0; i < n; i++) {
31     flag = 0;
32     for (j = 0; j < count; j++) {
33         if (frames[j] == pages[i]) {
34             flag = 1;
35             break;
36         }
37     }
38
39     if (!flag) {
40         if (count < capacity) {
41             frames[count++] = pages[i];
42         } else {
43             int pos = predict(pages, frames, n, i + 1, capacity);
44             frames[pos] = pages[i];
45         }
46         pageFaults++;
47     }
48     printf("Step %d: ", i + 1);
```

```
Enter number of pages: 12
Enter the page reference string:
1 3 0 3 5 6 3 0 1 2 1 2
Enter number of frames: 3
Step 1: 1 (Page Fault)
Step 2: 1 3 (Page Fault)
Step 3: 1 3 0 (Page Fault)
Step 4: 1 3 0 (No Page Fault)
Step 5: 5 3 0 (Page Fault)
Step 6: 6 3 0 (Page Fault)
Step 7: 6 3 0 (No Page Fault)
Step 8: 6 3 0 (No Page Fault)
Step 9: 1 3 0 (Page Fault)
Step 10: 1 2 0 (Page Fault)
Step 11: 1 2 0 (No Page Fault)
Step 12: 1 2 0 (No Page Fault)

Total Page Faults: 7

=== Code Execution Successful ===
```

```

main.c  [Icons]  Share  Run  Output  Clear
51     }
52     if (!flag)
53         printf(" (Page Fault)");
54     else
55         printf(" (No Page Fault)");
56     printf("\n");
57 }
58
59 printf("\nTotal Page Faults: %d\n", pageFaults);
60 }
61
62 int main() {
63     int pages[MAX], n, capacity, i;
64
65     printf("Enter number of pages: ");
66     scanf("%d", &n);
67
68     printf("Enter the page reference string:\n");
69     for (i = 0; i < n; i++) {
70         scanf("%d", &pages[i]);
71     }
72
73     printf("Enter number of frames: ");
74     scanf("%d", &capacity);
75
76     optimalPageReplacement(pages, n, capacity);

```

```

Enter number of pages: 12
Enter the page reference string:
1 3 0 3 5 6 3 0 1 2 1 2
Enter number of frames: 3
Step 1: 1 (Page Fault)
Step 2: 1 3 (Page Fault)
Step 3: 1 3 0 (Page Fault)
Step 4: 1 3 0 (No Page Fault)
Step 5: 5 3 0 (Page Fault)
Step 6: 6 3 0 (Page Fault)
Step 7: 6 3 0 (No Page Fault)
Step 8: 6 3 0 (No Page Fault)
Step 9: 1 3 0 (Page Fault)
Step 10: 1 2 0 (Page Fault)
Step 11: 1 2 0 (No Page Fault)
Step 12: 1 2 0 (No Page Fault)

Total Page Faults: 7

=== Code Execution Successful ===

```

## 5. Sequential File Allocation:

```

main.c  [Icons]  Share  Run  Output  Clear
1  #include <stdio.h>
2
3  #define MAX 100
4
5  int main() {
6      int file[MAX][2]; // Stores start block and length
7      int n, i, j, start, length;
8
9      printf("Enter the number of files: ");
10     scanf("%d", &n);
11
12     printf("Enter starting block and length of each file:\n");
13     for (i = 0; i < n; i++) {
14         printf("File %d:\n", i + 1);
15         printf("Start Block: ");
16         scanf("%d", &file[i][0]);
17         printf("Length: ");
18         scanf("%d", &file[i][1]);
19     }
20
21     printf("\nFile Allocation Table (Sequential Allocation):\n");
22     printf("File\tStart\tLength\tBlocks Occupied\n");
23
24     for (i = 0; i < n; i++) {
25         printf("%d\t%d\t%d\t", i + 1, file[i][0], file[i][1]);
26         for (j = 0; j < file[i][1]; j++) {

```

```

Enter the number of files: 3
Enter starting block and length of each file:
File 1:
Start Block: 5
Length: 3
File 2:
Start Block: 10
Length: 2
File 3:
Start Block: 15
Length: 4

File Allocation Table (Sequential Allocation):
File  Start  Length  Blocks Occupied
1    5    3    5 6 7
2   10    2   10 11
3   15    4   15 16 17 18

=== Code Execution Successful ===

```

```

26         for (j = 0; j < file[i][1]; j++) {
27             printf("%d ", file[i][0] + j);
28         }
29         printf("\n");
30     }
31
32     return 0;
33 }
34
35

```

main.c

Share

Run

51

}

52

if (!flag)

53

printf(" (Page Fault)");

54

else

55

printf(" (No Page Fault)");

56

printf("\n");

57

}

58

59

printf("\nTotal Page Faults: %d\n", pagefaults);

60

}

61

62

int main() {

63

int pages[MAX], n, capacity, i;

64

65

printf("Enter number of pages: ");

66

scanf("%d", &n);

67

68

printf("Enter the page reference string:\n");

69

for (i = 0; i < n; i++) {

70

scanf("%d", &pages[i]);

71

}

72

73

printf("Enter number of frames: ");

74

scanf("%d", &capacity);

75

76

optimalPageReplacement(pages, n, capacity);

Output

Enter number of pages: 12

Enter the page reference string:

1 3 0 3 5 6 3 0 1 2 1 2

Enter number of frames: 3

Step 1: 1 (Page Fault)

Step 2: 1 3 (Page Fault)

Step 3: 1 3 0 (Page Fault)

Step 4: 1 3 0 (No Page Fault)

Step 5: 5 3 0 (Page Fault)

Step 6: 6 3 0 (Page Fault)

Step 7: 6 3 0 (No Page Fault)

Step 8: 6 3 0 (No Page Fault)

Step 9: 1 3 0 (Page Fault)

Step 10: 1 2 0 (Page Fault)

Step 11: 1 2 0 (No Page Fault)

Step 12: 1 2 0 (No Page Fault)

Total Page Faults: 7

=== Code Execution Successful ===

5. Sequential File Allocation:

main.c

Share

Run

1

#include <stdio.h>

2

3

#define MAX 100

4

5

int main() {

6

int file[MAX][2]; // Stores start block and length

7

int n, i, j, start, length;

8

9

printf("Enter the number of files: ");

10

scanf("%d", &n);

11

12

printf("Enter starting block and length of each file:\n");

13

for (i = 0; i < n; i++) {

14

printf("File %d:\n", i + 1);

15

printf("Start Block: ");

16

scanf("%d", &file[i][0]);

17

printf("Length: ");

18

scanf("%d", &file[i][1]);

19

}

20

21

printf("\nFile Allocation Table (Sequential Allocation):\n");

22

printf("File\tStart\tLength\tBlocks Occupied\n");

23

24

for (i = 0; i < n; i++) {

25

printf("%d\t%d\t%d\t", i + 1, file[i][0], file[i][1]);

26

for (j = 0; j < file[i][1]; j++) {

Output

Enter the number of files: 3

Enter starting block and length of each file:

File 1:

Start Block: 5

Length: 3

File 2:

Start Block: 10

Length: 2

File 3:

Start Block: 15

Length: 4

File Allocation Table (Sequential Allocation):

File Start Length Blocks Occupied

1 5 3 5 6 7

2 10 2 10 11

3 15 4 15 16 17 18

=== Code Execution Successful ===

```
26     for (j = 0; j < file[i][1]; j++) {
27         printf("%d ", file[i][0] + j);
28     }
29     printf("\n");
30 }
31
32 return 0;
33 }
34
35
```