**Lab 8: Page Replacement Algorithms**

**Write a program to calculate page faults Using the following algorithms:**

1. **Optimal replacement**

#include <stdio.h>

int main() {

int no\_of\_frames, no\_of\_pages, frames[10], ref\_string[30], temp[10], flag1, flag2, flag3; int i, j, k, pos, max, faults = 0;

int flag = 0; // for hit if flag = 1 ; then hit else fault

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", &ref\_string[i]);

}

for(i = 0; i < no\_of\_frames; ++i){

frames[i] = -1;

}

printf("\n==================================================== ==========================\n" );

for(int i=0;i<no\_of\_frames; i++)

printf("frame[%d]\t",i );

printf("page fault" );

printf("\n==================================================== ==========================" );

for(i = 0; i < no\_of\_pages; ++i){

flag1 = flag2 = 0;

for(j = 0; j < no\_of\_frames; ++j){ if(frames[j] == ref\_string[i]){ flag1 = flag2 = 1;

flag = 1;

break;

}

}

if(flag1 == 0){

for(j = 0; j < no\_of\_frames; ++j){ if(frames[j] == -1){

faults++;

frames[j] = ref\_string[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] == ref\_string[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] = ref\_string[i];

faults++;

}

printf("\n");

for(j = 0; j < no\_of\_frames; ++j){

printf("%4d\t\t", frames[j]);

}

if (flag == 0)

printf(" F" );

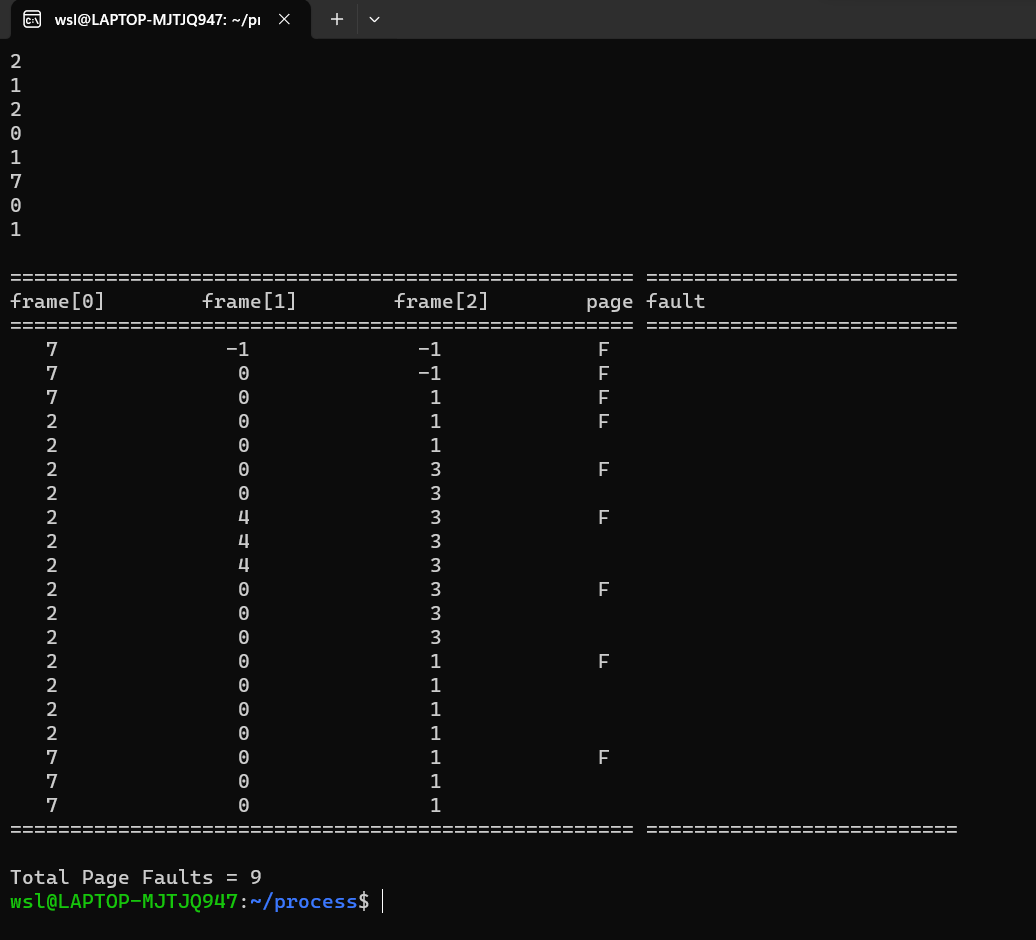
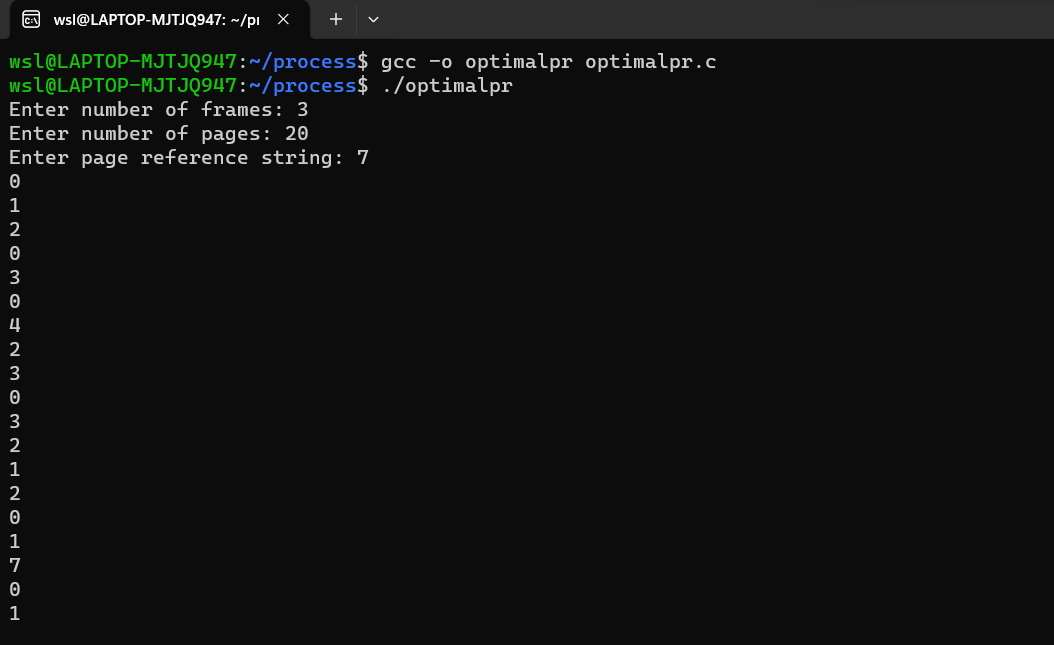
flag = 0;

}

printf("\n==================================================== ==========================" );

printf("\n\nTotal Page Faults = %d\n", faults);

return 0;

}  
 

**2. FIFO replacement**

#include <stdio.h>

int main() {

 int num\_pages, num\_frames, page\_faults = 0;

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

 scanf("%d", &num\_pages);

 int pages[num\_pages];

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

 for (int i = 0; i < num\_pages; i++) {

 scanf("%d", &pages[i]);

 }

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

 scanf("%d", &num\_frames);

 int frames[num\_frames];

 for (int i = 0; i < num\_frames; i++) {

 frames[i] = -1;

 }

 int oldest\_frame = 0;

 for (int i = 0; i < num\_pages; i++) {

 int page = pages[i];

 int page\_found = 0;

 for (int j = 0; j < num\_frames; j++) {

 if (frames[j] == page) {

 page\_found = 1;

 break;

 }

 }

 if (!page\_found) {

 frames[oldest\_frame] = page;

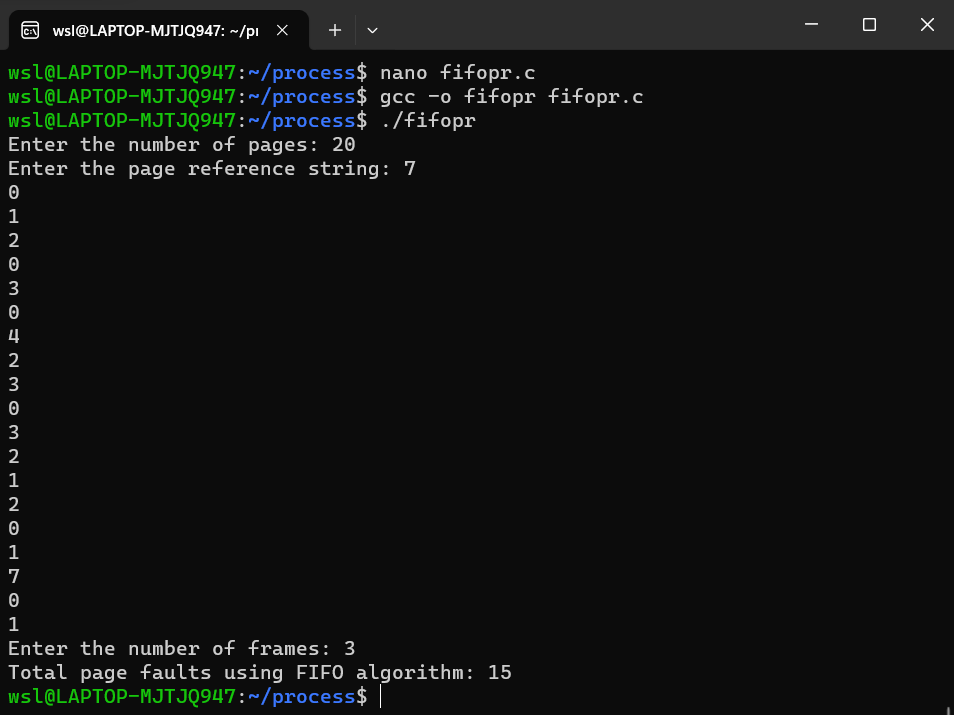
 oldest\_frame = (oldest\_frame + 1) % num\_frames;  page\_faults++;

 }

 }

 printf("Total page faults using FIFO algorithm: %d\n", page\_faults);  return 0;

}



**3. LRU replacement**

#include <stdio.h>

int main() {

 int num\_pages, num\_frames, page\_faults = 0;

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

 scanf("%d", &num\_pages);

 int pages[num\_pages];

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

 for (int i = 0; i < num\_pages; i++) {

 scanf("%d", &pages[i]);

 }

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

 scanf("%d", &num\_frames);

 int frames[num\_frames];

 int last\_used[num\_frames];

 for (int i = 0; i < num\_frames; i++) {

 frames[i] = -1;

 last\_used[i] = -1;

 }

 for (int i = 0; i < num\_pages; i++) {

 int page = pages[i];

 int page\_found = 0;

 for (int j = 0; j < num\_frames; j++) {

 if (frames[j] == page) {

 page\_found = 1;

 last\_used[j] = i;

 break;

 }

 }

 if (!page\_found) {

 int lru\_frame = 0;

 for (int j = 0; j < num\_frames; j++) {

 if (last\_used[j] < last\_used[lru\_frame]) {

 lru\_frame = j;

 }

 }

 frames[lru\_frame] = page;

 last\_used[lru\_frame] = i;

 page\_faults++;

 }

 }

 printf("Total page faults using LRU algorithm: %d\n", page\_faults);  return 0;

}

