LRU

Aim:

To write a c program to implement LRU page replacement algorithm.

Algorithm:

1: Start the process
2: Declare the size
3: Get the number of pages to be inserted
4: Get the value
5: Declare counter and stack
6: Select the least recently used page by counter value
7: Stack them according the selection.
8: Display the values
9: Stop the process

Program Code:

```c
#include < stdio.h>
int isHit (int page, int frame[], int size){
    for( int i =0; i< size ; i++){
        if (frame[i] == page)
            return 1;
    }
    return 0;
}

int findLRU( int frame[], int index, int stream[],
    int i, int size){
    int max = -1, pos =-1;
    for( int j =0; j< size; j++){
        for( int k= i-1; k>=0; k--){
            if( stream[k] == frame[j]){
                if( k >max) {
                    max = k;
                    pos = j;
                }
                break;
            }
        }
    }
    return pos;
```

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```c
int main() {
    int stream[] = {1, 2, 3, 2, 1, 5, 2, 1, 6, 2, 5, 6, 3, 1, 3};
    int n = sizeof(stream)/sizeof(stream[0]);
    int frame[3] = {-1, -1, -1};
    int faults = 0, filled = 0;
    printf("Page\t Frames \n");
    for(int i = 0; i < n; i++) {
        int page = stream[i];
        printf("%d\t", page);

        if(isHit(page, frame, filled)) {
        }
        else {
            if(filled < 3) {
                frame[filled++] = page;
            } else {
                int lru = findLRU(frame, filled, stream, i, 3);
                frame[lru] = page;
            }
            faults++;
        }
        for(int j = 0; j < 3; j++) {
            if(frame[j] != -1)
                printf("%d ", frame[j]);
            else
                printf("- ");
        }
        printf("\n");
    }
    printf("\n Total page faults : %d \n", faults);
    return 0;
}
```

Output:

Page	Frames
1	1 – –
2	1 2 –
3	1 2 3
2	1 2 3
1	1 2 3
5	1 2 5
2	1 2 5
1	1 2 5
6	1 2 6
2	1 2 6
5	5 2 6
6	5 2 6
3	5 3 6
1	1 3 6
3	1 3 6

Page faults : 8.

Sample 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

Result: A C program is implemented for LRU page replacement algorithm.