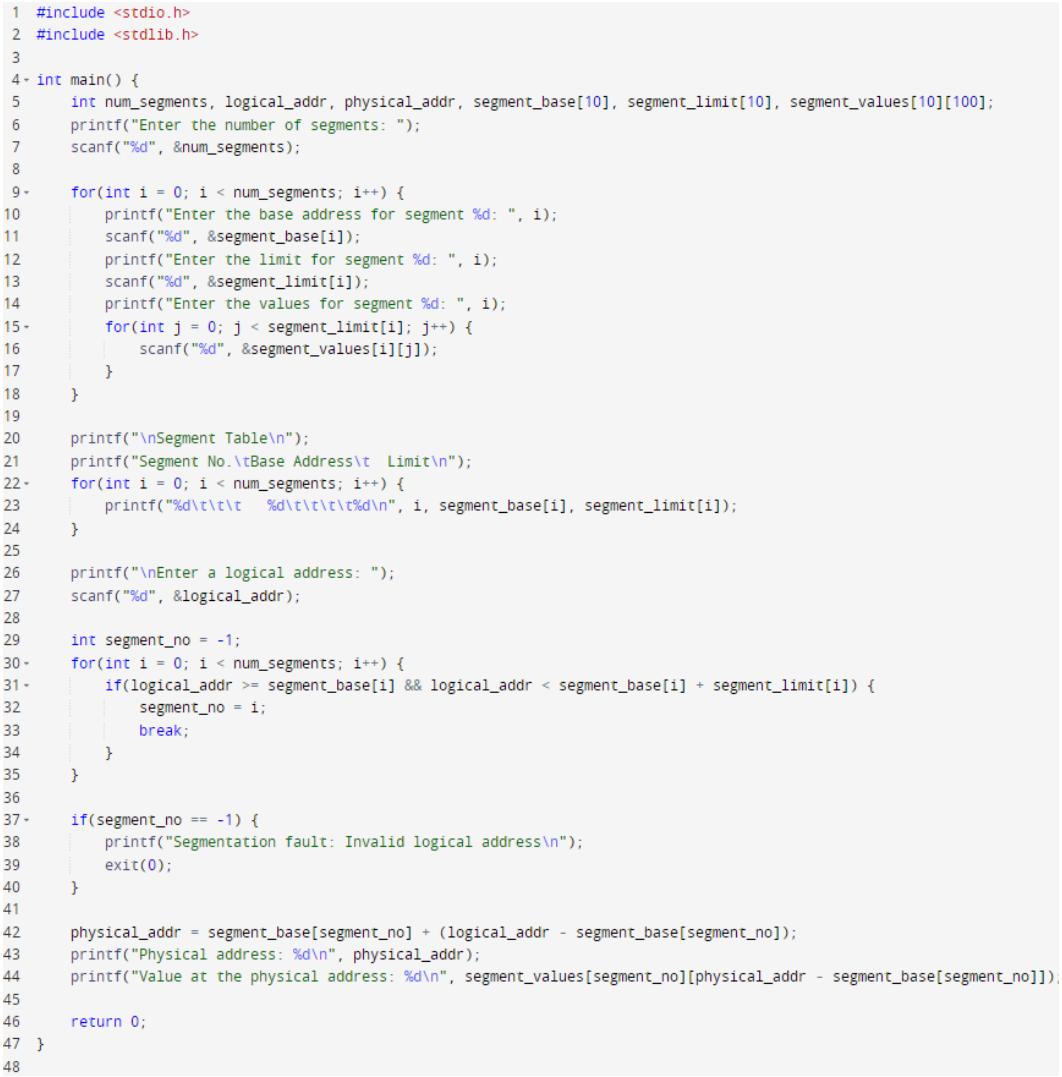
Operating Systems

Assignment 10

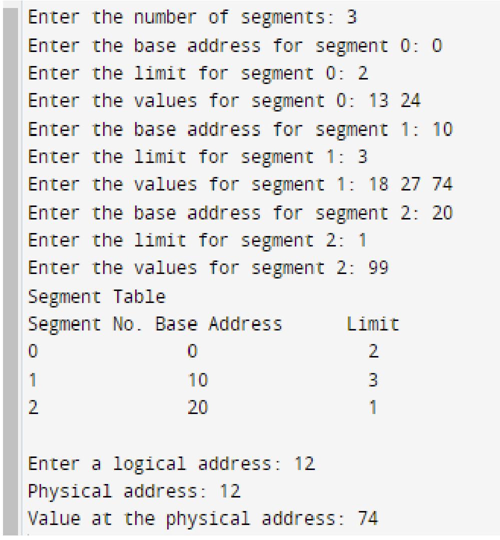
- Implementation of Memory Management Using Segmentation
  - Write a C program to implement the segmentation technique of memory management.
    - Following steps should be implemented in the program.
      - Ask the user to enter the number of segments to be used.
      - Ask the user to enter the base address and limit for each segment.
      - Third, ask the user to enter the values to be stored in that segment.
      - Display the segment table.
      - Ask the user to enter the logical address.
      - Calculate the physical address and display it with its stored value.

Code:



```c
#include <stdio.h>
#include <stdlib.h>

int main() {
    int num_segments, logical_addr, physical_addr, segment_base[10], segment_limit[10], segment_values[10][100];
    printf("Enter the number of segments: ");
    scanf("%d", &num_segments);

    for(int i = 0; i < num_segments; i++) {
        printf("Enter the base address for segment %d: ", i);
        scanf("%d", &segment_base[i]);
        printf("Enter the limit for segment %d: ", i);
        scanf("%d", &segment_limit[i]);
        printf("Enter the values for segment %d: ", i);
        for(int j = 0; j < segment_limit[i]; j++) {
            scanf("%d", &segment_values[i][j]);
        }
    }

    printf("\nSegment Table\n");
    printf("Segment No.\tBase Address\t  Limit\n");
    for(int i = 0; i < num_segments; i++) {
        printf("%d\t\t\t   %d\t\t\t\t%d\n", i, segment_base[i], segment_limit[i]);
    }

    printf("\nEnter a logical address: ");
    scanf("%d", &logical_addr);

    int segment_no = -1;
    for(int i = 0; i < num_segments; i++) {
        if(logical_addr >= segment_base[i] && logical_addr < segment_base[i] + segment_limit[i]) {
            segment_no = i;
            break;
        }
    }

    if(segment_no == -1) {
        printf("Segmentation fault: Invalid logical address\n");
        exit(0);
    }

    physical_addr = segment_base[segment_no] + (logical_addr - segment_base[segment_no]);
    printf("Physical address: %d\n", physical_addr);
    printf("Value at the physical address: %d\n", segment_values[segment_no][physical_addr - segment_base[segment_no]]);

    return 0;
}
```

Output:



```
Enter the number of segments: 3
Enter the base address for segment 0: 0
Enter the limit for segment 0: 2
Enter the values for segment 0: 13 24
Enter the base address for segment 1: 10
Enter the limit for segment 1: 3
Enter the values for segment 1: 18 27 74
Enter the base address for segment 2: 20
Enter the limit for segment 2: 1
Enter the values for segment 2: 99
Segment Table
Segment No. Base Address      Limit
0              0                2
1              10               3
2              20               1

Enter a logical address: 12
Physical address: 12
Value at the physical address: 74
```

Submitted By:

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