OS Programming Assignment -3

Exercise #3

Write a program to simulate Segmentation. Compute the physical address
Take as input:

1. Segment number
2. Base address
3. Segment limit

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Code:

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

#define MAX_SEGMENTS 10

typedef struct {
    int base_addr;
    int seg_limit;
} Segment;

int main() {
    int num_segments, segment_num, offset, phys_addr;
    Segment segment_table[MAX_SEGMENTS];

    printf("Enter number of segments: ");
    scanf("%d", &num_segments);

    for (int i = 0; i < num_segments; i++) {
```

```
        printf("Enter base address for segment %d: ", i);
        scanf("%d", &segment_table[i].base_addr);
        printf("Enter segment limit for segment %d: ", i);
        scanf("%d", &segment_table[i].seg_limit);
    }

    printf("Enter segment number: ");
    scanf("%d", &segment_num);
    printf("Enter offset: ");
    scanf("%d", &offset);

    if (segment_num >= num_segments) {
        printf("Error: invalid segment number.\n");
        return 1;
    }

    if (offset > segment_table[segment_num].seg_limit) {
        printf("Error: offset exceeds segment limit.\n");
        return 1;
    }

    phys_addr = segment_table[segment_num].base_addr + offset;
    printf("Physical address: %d\n", phys_addr);

    return 0;
}
```

Output Screenshots:

```
atharva@atharva-VirtualBox:~$ gcc os3.c
atharva@atharva-VirtualBox:~$ ./a.out
Enter number of segments: 3
Enter base address for segment 0: 12
Enter segment limit for segment 0: 13
Enter base address for segment 1: 13
Enter segment limit for segment 1: 14
Enter base address for segment 2: 14
Enter segment limit for segment 2: 15
Enter segment number: 3
Enter offset: 15
Error: invalid segment number.
```

```
atharva@atharva-VirtualBox:~$ ./a.out
Enter number of segments: 3
Enter base address for segment 0: 12
Enter segment limit for segment 0: 13
Enter base address for segment 1: 14
Enter segment limit for segment 1: 15
Enter base address for segment 2: 16
Enter segment limit for segment 2: 17
Enter segment number: 2
Enter offset: 3
Physical address: 19
```

```
atharva@atharva-VirtualBox:~$ ./a.out
Enter number of segments: 3
Enter base address for segment 0: 12
Enter segment limit for segment 0: 13
Enter base address for segment 1: 14
Enter segment limit for segment 1: 15
Enter base address for segment 2: 16
Enter segment limit for segment 2: 17
Enter segment number: 1
Enter offset: 18
Error: offset exceeds segment limit.
```

```
atharva@atharva-VirtualBox:~$ ./a.out
Enter number of segments: 4
Enter base address for segment 0: 10
Enter segment limit for segment 0: 11
Enter base address for segment 1: 20
Enter segment limit for segment 1: 21
Enter base address for segment 2: 30
Enter segment limit for segment 2: 31
Enter base address for segment 3: 40
Enter segment limit for segment 3: 41
Enter segment number: 2
Enter offset: 12
Physical address: 42
atharva@atharva-VirtualBox:~$
```