EXPERIMENT NO. 09

PAGING SCHEME – LOGICAL TO PHYSICAL ADDRESS TRANSLATION

Objective

To write a program to simulate paging scheme of logical to physical address translation.

Theory

In a paging memory management scheme, the logical address space is divided into fixed-size pages, and the physical memory is divided into blocks of the same size called frames. Each logical address consists of a page number and an offset. The operating system maintains a page table that maps logical page numbers to physical frame numbers.

Algorithm Steps

1. Accept number of pages and frame mappings.
2. Accept logical address: page number and offset.
3. Use the page number to look up the corresponding frame number in the page table.
4. Calculate physical address as: (frame number * frame size) + offset.
5. Display the resulting physical address.

Program Code (C Language)

```c
#include <stdio.h>

int main() {
    int pageTable[20], pageNumber, offset, frameNumber;
    int logicalAddress, frameSize, physicalAddress, i, n;

    printf("Enter number of pages: ");
    scanf("%d", &n);

    printf("Enter the frame size: ");
    scanf("%d", &frameSize);

    printf("Enter the page table (frame number for each page):\n");
    for(i = 0; i < n; i++) {
```

```
        printf("Page %d: ", i);
        scanf("%d", &pageTable[i]);
    }

    printf("Enter the logical address (page number and offset):\n");
    printf("Page number: ");
    scanf("%d", &pageNumber);
    printf("Offset: ");
    scanf("%d", &offset);

    if(pageNumber >= n || offset >= frameSize) {
        printf("Invalid page number or offset.\n");
    } else {
        frameNumber = pageTable[pageNumber];
        physicalAddress = frameNumber * frameSize + offset;
        printf("Physical Address: %d\n", physicalAddress);
    }

    return 0;
}
```

Sample Output

Enter number of pages: 4

Enter the frame size: 100

Enter the page table (frame number for each page):

Page 0: 5

Page 1: 3

Page 2: 2

Page 3: 7

Enter the logical address (page number and offset):

Page number: 2

Offset: 20

Physical Address: 220

Conclusion

This program simulates how logical addresses are translated into physical addresses using paging. It demonstrates the role of page tables and how offset and page numbers contribute to finding exact locations in memory.