...for a complete human being

Texas
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Lab No: 9 **Date: 2082/**

Title: Write a program to display the process allocation for user input free blocks and incoming process using First fit allocation.

The First Fit algorithm allocates the first available memory block that is large enough to satisfy a process's request. It is simple and fast because it stops searching as soon as a suitable block is found. However, it may lead to external fragmentation over time.

Algorithm:

Step 1: Start with a list of memory blocks and a list of processes with their sizes.

Step 2: Select the first process from the list of processes.

Step 3: Scan the memory blocks from the beginning to the end.

Step 4: Find the first memory block that is large enough to accommodate the selected process.

Step 5: Allocate the process to that memory block.

Step 6: Reduce the available size of the memory block by the size of the allocated process.

Step 7: If no suitable block is found, mark the process as unallocated.

Step 8: Repeat Steps 2–7 for all remaining processes.

Step 9: Stop when all processes are allocated or attempted for allocation.

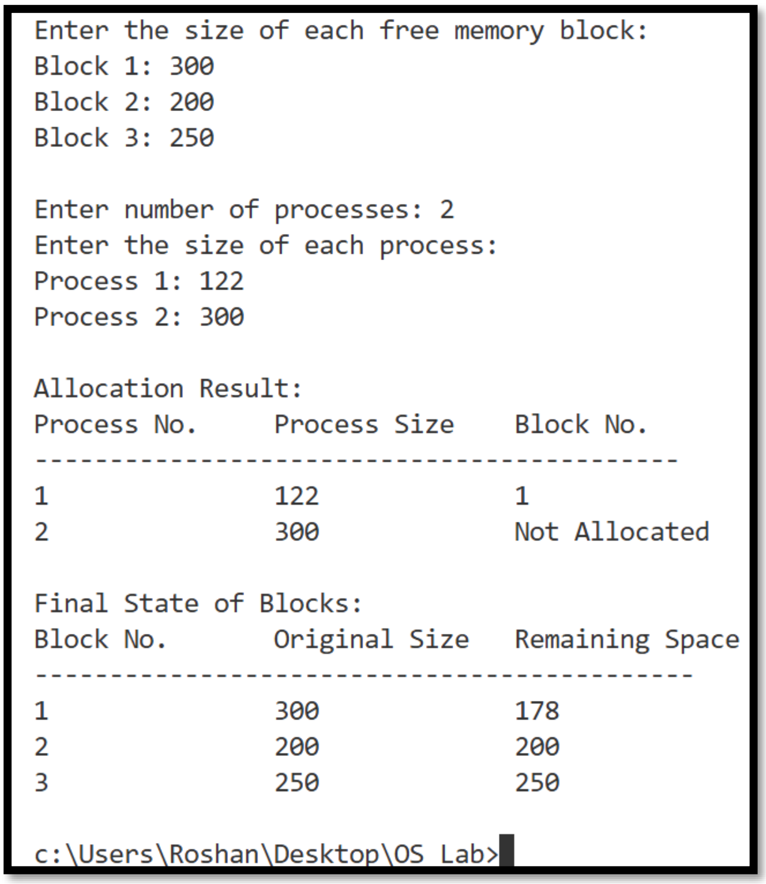
Language: C++

IDE: VS Code

Code:

```
#include <iostream>

#include <vector>

using namespace std;


void worstFit(vector<int>& blockSize, const vector<int>& processSize) {

    int n = processSize.size(); // number of processes

    int m = blockSize.size();   // number of blocks

    vector<int> allocation(n, -1);

    // Keep original block sizes for later display

    vector<int> blockSizeBefore = blockSize;

    for (int i = 0; i < n; i++) {

        int worstIdx = -1;

        for (int j = 0; j < m; j++) {

            if (blockSize[j] >= processSize[i]) {

                if (worstIdx == -1 || blockSize[j] > blockSize[worstIdx]) {

                    worstIdx = j;

                }

            }

        }

        if (worstIdx != -1) {

            allocation[i] = worstIdx;

            blockSize[worstIdx] -= processSize[i]; // Allocate

        }

    }

    // Final output without Remaining Space

    cout << "\nAllocation Result:\n";

    cout << "Process No.\tProcess Size\tBlock No.\n";

    cout << "------------------------------------------\n";

    for (int i = 0; i < n; i++) {
        cout << i + 1 << "\t\t" << processSize[i] << "\t\t";
        if (allocation[i] != -1) {
            cout << allocation[i] + 1;
        } else {
            cout << "Not Allocated";
        }
        cout << endl;
    }
    // Show final state of all blocks
    cout << "\nFinal State of Blocks:\n";
    cout << "Block No.\tOriginal Size\tRemaining Space\n";
    cout << "-----------------------------------------------\n";
    for (int j = 0; j < m; j++) {
        cout << j + 1 << "\t\t" << blockSizeBefore[j] << "\t\t" << blockSize[j] << endl;
    }
}
int main() {
    int m, n;
    cout << "Enter number of free memory blocks: ";
    cin >> m;
    vector<int> blockSize(m);
    cout << "Enter the size of each free memory block:\n";
    for (int i = 0; i < m; i++) {
        cout << "Block " << i + 1 << ": ";
        cin >> blockSize[i];
    }
    cout << "\nEnter number of processes: ";
    cin >> n;
    vector<int> processSize(n);
    cout << "Enter the size of each process:\n";
    for (int i = 0; i < n; i++) {
        cout << "Process " << i + 1 << ": ";
        cin >> processSize[i];
    }
    worstFit(blockSize, processSize);
    return 0;
}
```

Output:



```
Enter the size of each free memory block:
Block 1: 300
Block 2: 200
Block 3: 250

Enter number of processes: 2
Enter the size of each process:
Process 1: 122
Process 2: 300

Allocation Result:
Process No.     Process Size    Block No.
-------------------------------------------
1               122             1
2               300             Not Allocated

Final State of Blocks:
Block No.       Original Size   Remaining Space
--------------------------------------------
1               300             178
2               200             200
3               250             250

c:\Users\Roshan\Desktop\OS Lab>
```

Conclusion:

First Fit allocates each process to the first suitable memory block. It is simple and fast but can cause external fragmentation. It works well for quick allocation in small to medium systems.