

Siva Shirish-192324016

23. Construct a C program to implement the first fit algorithm of memory management.

Aim

To implement the First Fit memory allocation algorithm to allocate memory to processes based on their requirements.

Algorithm

1. **Input:**
 - Number of memory blocks and their sizes.
 - Number of processes and their memory requirements.
2. For each process, traverse the memory blocks list sequentially.
3. Assign the process to the first memory block that is large enough to satisfy its requirement.
4. If a process cannot find a suitable block, it remains unallocated.
5. Display the allocation result for each process.

Procedure

1. Initialize arrays for memory block sizes, process sizes, and allocation status.
2. For each process:
 - Check memory blocks sequentially.
 - If a block can satisfy the process size and is free, allocate the process to the block.
3. Print the allocation results.

Code:

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

```
int main() {
```

```
    int nBlocks, nProcesses;
```

```
    printf("Enter the number of memory blocks: ");
```

```
    scanf("%d", &nBlocks);
```

```
    int blockSize[nBlocks], blockAllocated[nBlocks];
```

```
    printf("Enter the sizes of the memory blocks: ");
```

```
for (int i = 0; i < nBlocks; i++) {  
    scanf("%d", &blockSize[i]);  
    blockAllocated[i] = 0;  
}  
  
printf("Enter the number of processes: ");  
scanf("%d", &nProcesses);  
int processSize[nProcesses], processAllocated[nProcesses];  
printf("Enter the sizes of the processes: ");  
for (int i = 0; i < nProcesses; i++) {  
    scanf("%d", &processSize[i]);  
    processAllocated[i] = -1;  
}  
  
for (int i = 0; i < nProcesses; i++) {  
    for (int j = 0; j < nBlocks; j++) {  
        if (blockSize[j] >= processSize[i] && blockAllocated[j] == 0) {  
            blockAllocated[j] = 1;  
            processAllocated[i] = j;  
            break;  
        }  
    }  
}  
}
```

```

printf("\nProcess\tSize\tBlock Allocated\n");

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

    printf("%d\t%d\t", i + 1, processSize[i]);

    if (processAllocated[i] != -1)

        printf("%d\n", processAllocated[i] + 1);

    else

        printf("Not Allocated\n");

}

return 0;

}

```

Result

- The program outputs the allocation of processes to memory blocks using the First Fit algorithm.

Output:

The screenshot shows the OnlineGDB interface. On the left is a sidebar with the user's name 'Siva Shirish' and navigation links. The main area displays the C code and its execution output. The code defines an array of memory block sizes and processes, then attempts to allocate each process to the first available block of sufficient size. The output shows the input values and the resulting allocation status for each process.

```

main.c
Enter the number of memory blocks: 3
Enter the sizes of the memory blocks: 5
1 2 3 4 5
Enter the number of processes: Enter the sizes of the processes: 3

Process Size    Block Allocated
1      4      1
2      5      Not Allocated
3      3      Not Allocated

...Program finished with exit code 0
Press ENTER to exit console.

```

