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1  #include <stdio.h>
2  #define MAX_MEMORY 1000
3  int memory[MAX_MEMORY];
4  void initializeMemory() {
5      for(int i=0;i<MAX_MEMORY;i++)
6          memory[i]=-1;
7  }
8  void displayMemory() {
9      int count=0;
10     printf("\nMemory Status:\n");
11     for(int i=0;i<MAX_MEMORY;i++){
12         if(memory[i]==-1){
13             int j=i;
14             while(j<MAX_MEMORY && memory[j]==-1) j++;
15             printf("Free memory block %d-%d\n", i, j-1);
16             i=j-1;
17             count++;
18         }
19     }
20     if(count==0)
21         printf("No free memory available.\n");
22 }
23 void allocateMemory(int processId,int size){
24     int start=-1, blockSize=0;
25     int bestStart=-1, bestSize=MAX_MEMORY+1;
26     for(int i=0;i<MAX_MEMORY;i++){
27         if(memory[i]==-1){
28             if(blockSize==0) start=i;
29             blockSize++;
30         } else {
31             if(blockSize>=size && blockSize<bestSize){
32                 bestSize=blockSize;
33                 bestStart=start;
34             }

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35         blockSize=0;
36     }
37 }
38 if(blockSize>=size && blockSize<bestSize){
39     bestStart=start;
40     bestSize=blockSize;
41 }
42 if(bestSize>=size){
43     for(int i=bestStart;i<bestStart+size;i++)
44         memory[i]=processId;
45     printf("Allocated memory block %d-%d to Process %d\n", bestStart, bestStart+size-1, processId);
46 } else {
47     printf("Memory allocation for Process %d failed (not enough contiguous memory).\n", processId);
48 }
49 }
50 void deallocateMemory(int processId){
51     for(int i=0;i<MAX_MEMORY;i++){
52         if(memory[i]==processId) memory[i]=-1;
53     }
54     printf("Memory released by Process %d\n", processId);
55 }
56 int main(){
57     initializeMemory();
58     displayMemory();
59     allocateMemory(1,200);
60     displayMemory();
61     allocateMemory(2,300);
62     displayMemory();
63     deallocateMemory(1);
64     displayMemory();
65     allocateMemory(3,400);
66     displayMemory();
67     return 0;
68 }

```

Memory Status:

Free memory block 0-999

Allocated memory block 0-199 to Process 1

Memory Status:

Free memory block 200-999

Allocated memory block 200-499 to Process 2

Memory Status:

Free memory block 500-999

Memory released by Process 1

Memory Status:

Free memory block 0-199

Free memory block 500-999

Allocated memory block 500-899 to Process 3

Memory Status:

Free memory block 0-199

Free memory block 900-999

Process exited after 9.474 seconds with return value 0

Press any key to continue . . .