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End-Semester Practical Exam

Question – 1

Description:- In this question, the use of binary semaphores with variable flags and threads is done. Here we use the flag variable as a counter. Now we have created 3 threads which are t1,t2,t3. Now we are using here different functions for threads t1,t2,t3 respectively.

Question – 2 (b)

Memory Allocation

Explanation: -

The buddy's algorithm for memory allocation can be defined as: A list of free nodes, of the different various powers of 2, is kept up with consistently (So assuming that complete memory size is 1 MB, we would 20 free lists to follow one for squares of size 1 byte, 1 for 2 bytes, next for 4 bytes, etc). At the point when a allocation comes, we search for the smallest block greater than it. Assuming that such a block is found on the free list, the allocation is done (ex: the request is of 9 KB and the free list tracking 16 KB blocks has at least one component in it), else we traverse the free list upwards till we track down a big enough block. Then, at that point, we continue to part it in two blocks one for adding to the following free list (of more small size), one to cross down the tree till we arrive at the objective and return the requested memory block to the client. If no such allocation is possible, we simply return null.

Example:-

Let us see how the algorithm proceeds by tracking a memory block of size 128 KB. Initially, the free list is: {}, {}, {}, {}, {}, {}, {}, { (0, 127) }.

Request: 7 bytes

No such block found-split block 32-63 into two blocks, namely 32-47 and 48-63; then split 32-47 into 32-39 and 40-47; finally, return 32-39 to user (internal fragmentation of 1 byte occurs).

List is: {}, {}, {}, { (40, 47) }, { (48, 63) }, {}, { (64, 127) }, {}

Memory Deallocation

Explanation: -

Let us see how the algorithm proceeds by tracking a memory block of size 128 KB. Initially, the free list is: {}, {}, {}, {}, {}, {}, {}, { (0, 127) }

Allocation Request: 16 bytes

Straight-up memory segment 48-63 will be allocated as it already

exists.

List is: {}, {}, {}, {}, {}, {}, { (64, 127) }, {}

Deallocation Request: S_Index = 0

Deallocation will be done but no coalescing is possible as its b_no is 0 and b_add is 16 (via the formula), none of which is in the free list.

List is: {}, {}, {}, {}, { (0, 15) }, {}, { (64, 127) }, {}