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CS4500 – Operating Systems

December 8, 2011

Plan of attack.

For this project, we plan to implement the Best-fit memory allocation algorithm. To do so, we must alter the slob.c file located in the Linux source code. We must also change the kernel configuration to utilize the slob allocator. To show the difference between the best fit and first fit algorithms we utilize a system call to print the statistics.

Our understanding is that the algorithm does not need to find the overall smallest block(large enough to store the requested size) but it should find the first block that satisfies the Best-Fit condition. Since the slob\_alloc function attempts to allocate memory in the first page that has an amount of memory available greater than or equal to the size requested, we will not to alter this function. Instead we will make changes to the slob\_page\_alloc function.

In slob\_page\_alloc, we will first iterate through the page to find the smallest block which is greater than or equal to the size requested. If a block of this size is not found, the function will return null and slob\_alloc will find another page or allocate a new page. Otherwise, the function will fragment the block and insert it into the linked list or in the unlikely case where the size is exact fit, it will simply add the block to the list. Upon success, the function will return the allocated block to the slob\_alloc function which ends execution until called again. To accomplish this, the original for loop will be changed to loop for the smallest block that matches the best fit conditions. If a block is found, the current and previous pointers are saved to different variables. After iterating though the intire page, if a block is not found, NULL is returned. If a block is found, then the internal code of the original for loop is executed.

The syscalls are implemented with two variables and two methods. To get the amount of the claimed blocked, slob.c increments a counter for the number of blocks allocated in the page\_slob\_alloc and decrements the same counter when the blocks are freed. The amount of free blocks is determined by subtracting the amount of claimed blocks from the total amount of block in all pages. The total amount of blocks in all pages is incremented when a new page is allocated in the slob\_alloc function. When blocks are freed, if there is no remaining claimed blocks in the page, the page is freed. When this happens, the total number of blocks in all pages is decremented.