

ICS'13 Homework 12

Problem 1: Memory coalescing

What is false-fragmentation? List the two solutions and their advantages and disadvantages.

Problem 2: Block Structure

Determine the block sizes and header values that would result from the following sequence of malloc requests. Assumptions: (1) The allocator maintains double-word alignment, and uses an implicit free list with the block format from Figure 9.35. (2) Block sizes are rounded up to the nearest multiple of 8 bytes.

Request	Block Size(decimal)	Block Header(hex)
malloc(3)		
malloc(11)		
malloc(20)		
malloc(21)		

Problem 3: First fit

Implement a find first fit function for the example allocator.

```
static void *find_first_fit (size_t asize)
```

it should perform a first fit search of the implicit free list. write down your code. (if needed, add some comments)

Problem 4: Segregated Free Lists

Now we organize the memory with "size classes", partition the block sizes by powers of two, while each block has the largest size of the size class (Simple Segregated Storage) Answer the following questions:

- (1) Now mem_alloc with size 1025, which size class will the returned block belong to ?
- (2) Describe a scenario in which severe external fragmentation will occur with above mechanism.

Problem 5: Disk Operation

Estimate the average time (in ms) to access a sector on the following disk:

Parameter	Value
Rotational rate	20,000 RPM
Tavg seek	10ms
Average # sectors/track	1000