

ICS'13 Homework 12 Solution

Problem 1:

False fragmentation is a phenomenon where there is a lot of available free memory chopped up into small, unusable free blocks.

solution	advantage	disadvantage
Immediate coalescing	Coalescing fast	Not fit for repeated and frequent operations
Deferred coalescing	Fit for repeated and frequent operations	Coalescing on demand

Problem 2:

Request	Block Size(decimal)	Block Header(hex)
malloc(3)	8	0x9
malloc(11)	16	0x11
malloc(20)	24	0x19
malloc(21)	32	0x21

Problem 3:

Example code:

```
static void *find_fit(size_t asize)
{
    /* First fit search */
    void *bp;

    for (bp = heap_listp; GET_SIZE(HDRP(bp)) > 0; bp = NEXT_BLKP(bp)) {
        if (!GET_ALLOC(HDRP(bp)) && (asize <= GET_SIZE(HDRP(bp)))) {
            return bp;
        }
    }
    return NULL; /* No fit */
}
```

Problem 4:

(1) {1025 ~ 2048 } size class

(2) The application makes numerous allocation and free requests to the first size class, followed by numerous allocation and free requests to the second size class, followed by numerous allocation and free requests to the third size class, and so on.

Problem 5:

$T_{avg \text{ rotation}} = 0.5 * 60 / 20000 * 1000 = 1.5 \text{ ms}$

$T_{avg \text{ transfer}} = 60 / 20000 * 1 / 1000 * 1000 = 0.003 \text{ ms}$

$T_{avg \text{ access}} = 1.5 + 10 + 0.003 = 11.503 \text{ ms} \approx 11.5 \text{ ms}$