

**Dynamic Memory Allocation**

**9.6** Determine the block sizes and header values that would result from the following sequence of `malloc` requests. Assume that the allocator maintains **double-word** alignment and uses an **implicit** free list with the block format from fig 9.35 in CSAPP (or slide 11 of the allocator lecture). The **word size is 4** (not 8), and block sizes are rounded up to **nearest multiple of 8 bytes**.

Request	Block size allocated (bytes, in decimal)	Block header (in hex)
<code>malloc(1)</code>		
<code>malloc(5)</code>		
<code>malloc(12)</code>		
<code>malloc(13)</code>		

**9.7** Determine the minimum block size for each of the following combinations of alignment requirements and block formats. Assume **implicit** free list, payloads must have non-zero size, the **word size is 4**, and header and footers are each stored in **4-byte words**.

Alignment	Allocated block	Free block	Minimum block size (bytes)
Single word	Header, footer	Header, footer	
Single word	Header, NO footer	Header, footer	
Double word	Header, footer	Header, footer	
Double word	Header, NO footer	Header, footer	

(Review problems for the Remembrallocator assignment: CSAPP Practice Problems 9.6 & 9.7, Homework Problems 9.15 & 9.16)

**9.15** Determine the block sizes and header values that would result from the following sequence of `malloc` requests. Assume that the allocator maintains **double-word** alignment and uses an **implicit** free list with the block format from fig 9.35 in CSAPP (or slide 11 of the allocator lecture). The **word size is 4** (not 8), and block sizes are rounded up to **nearest multiple of 8 bytes**.

Request	Block size allocated (bytes, in decimal)	Block header (in hex)
<code>malloc(3)</code>		
<code>malloc(11)</code>		
<code>malloc(20)</code>		
<code>malloc(21)</code>		

**9.16** Determine the minimum block size for each of the following combinations of alignment requirements and block formats. Assume **explicit** free list, **4-byte pred and succ pointers in each free block**, payloads must have non-zero size, and header and footers are each stored in **4-byte words**.

Alignment	Allocated block	Free block	Minimum block size (bytes)
Single word	Header, footer	Header, footer	
Single word	Header, NO footer	Header, footer	
Double word	Header, footer	Header, footer	
Double word	Header, NO footer	Header, footer	