

malloc()

Worked Example

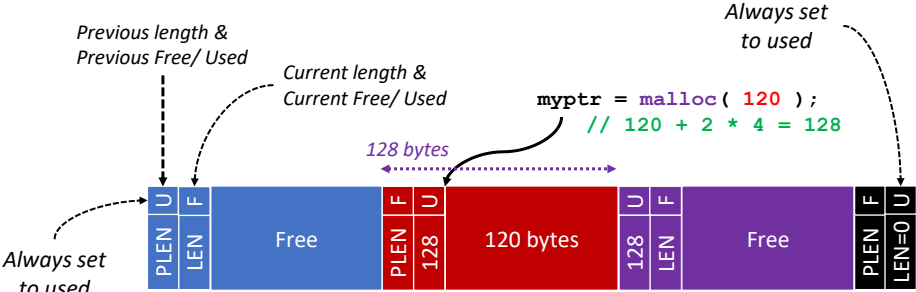
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Reviewing the Structure I

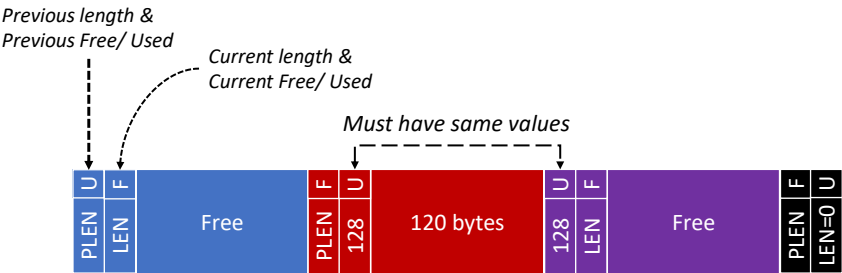
- Maintain metadata for coalescing
- ‘Bookend’ structure with used flags
 - Don’t need special case checks for end of memory



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Reviewing the Structure II

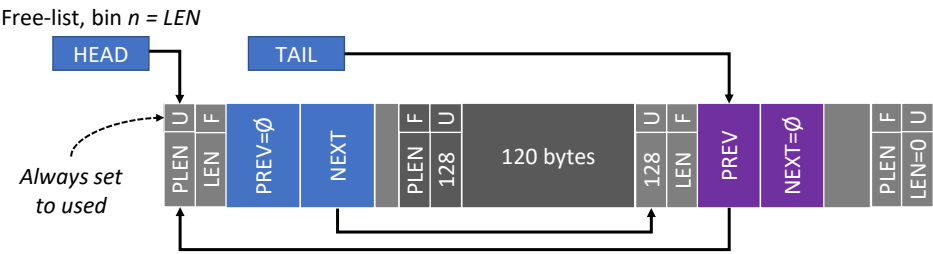
- When updating length and free flag
 - Update in current block
 - Update previous length/ used in next block



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Reviewing the Structure III

- Maintain doubly-linked free list
 - Fast access to free space, no searching
- Ideally multiple free-lists, ordered by free size



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malloc() Allocation Example

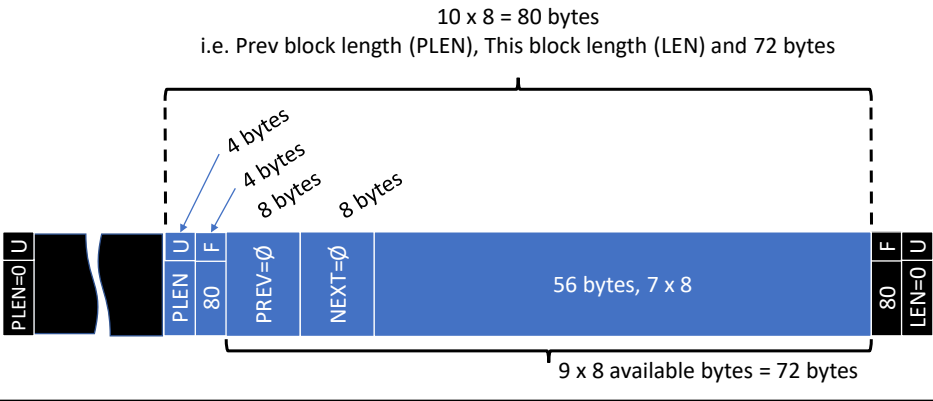
As we must return space suitably aligned for pointers, we use multiples of 8 bytes
-- lower 3 bits of returned address must be 0

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HEAD

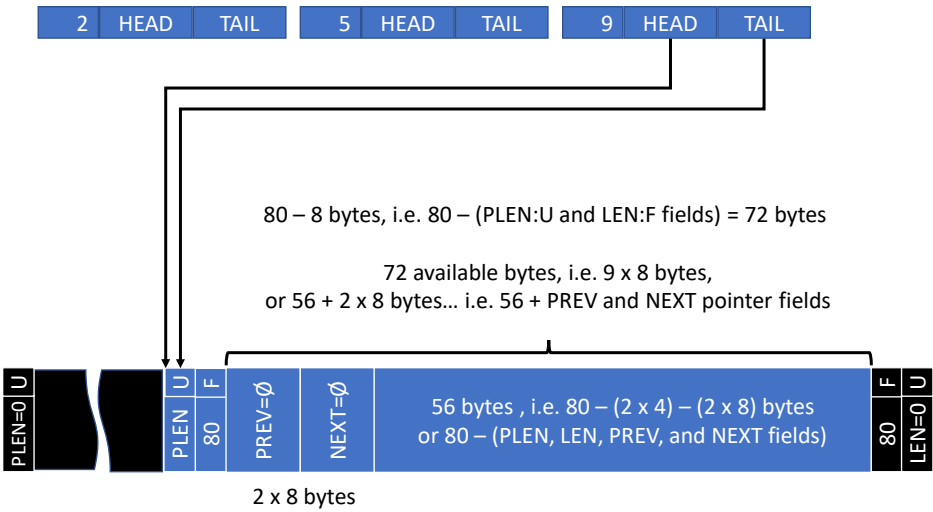
TAIL

Free-list, bin for $9 \times 8 = 72$ available bytes

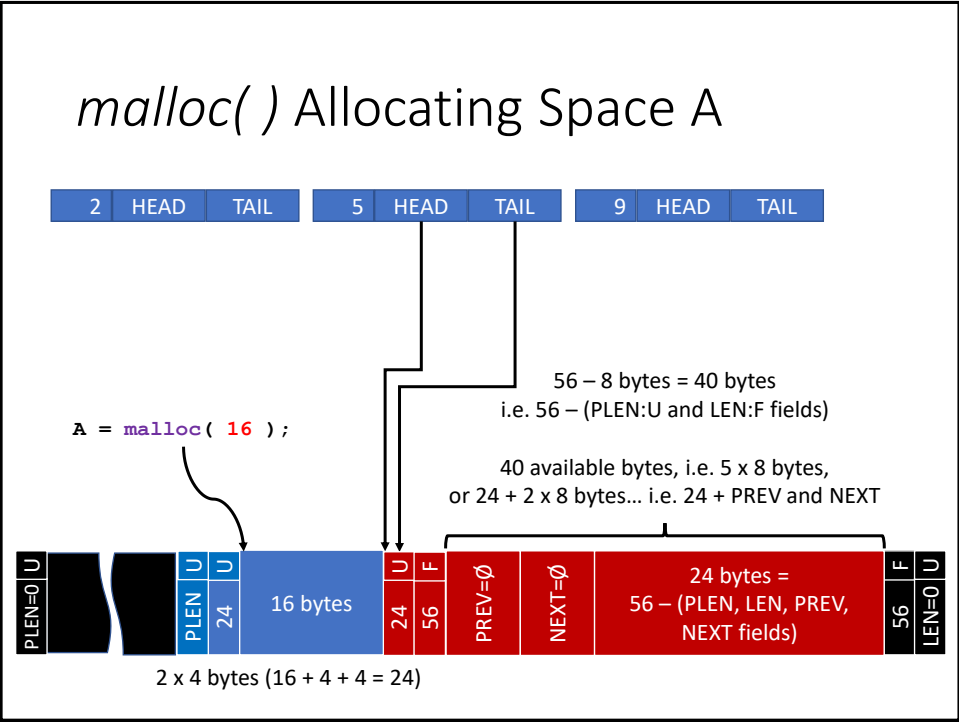


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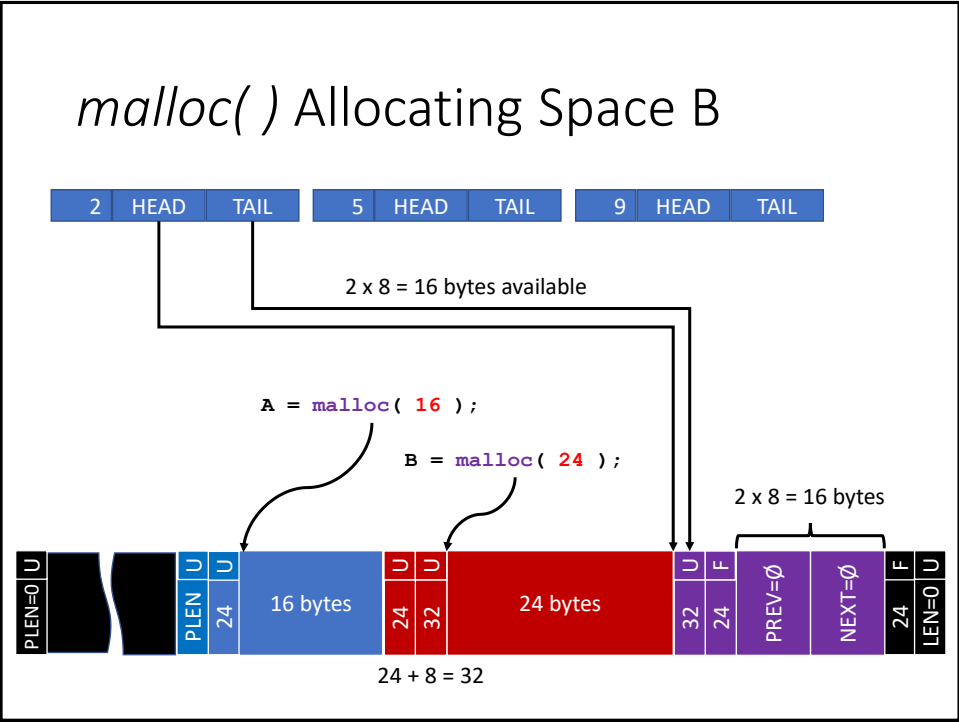
malloc() Building the free-list



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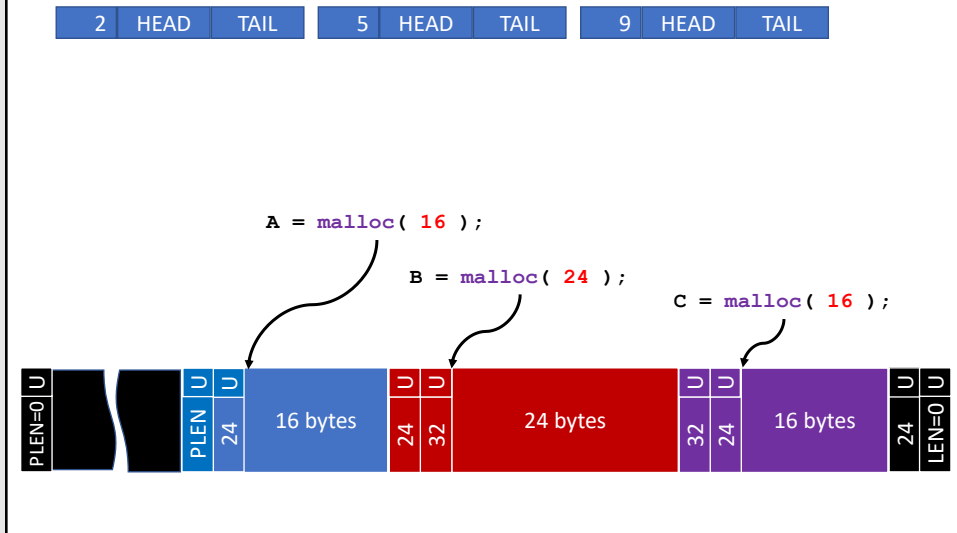


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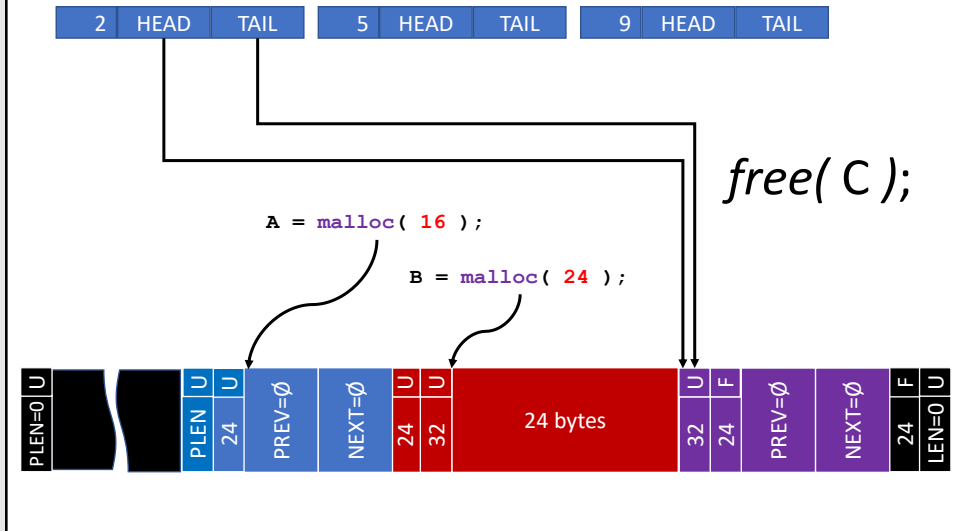
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malloc() Allocating Space C

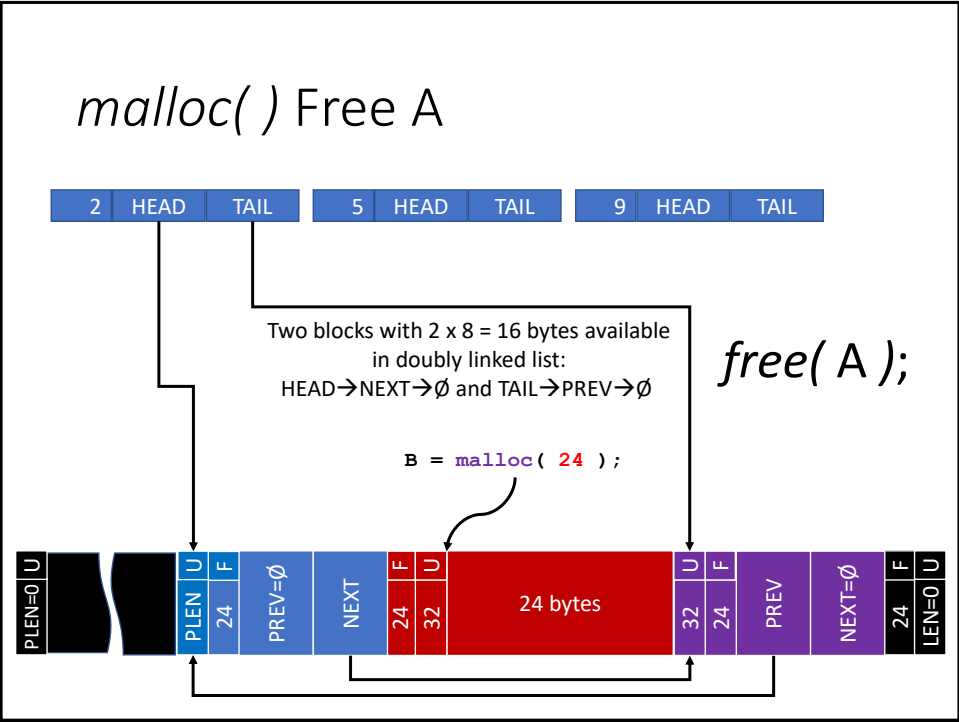


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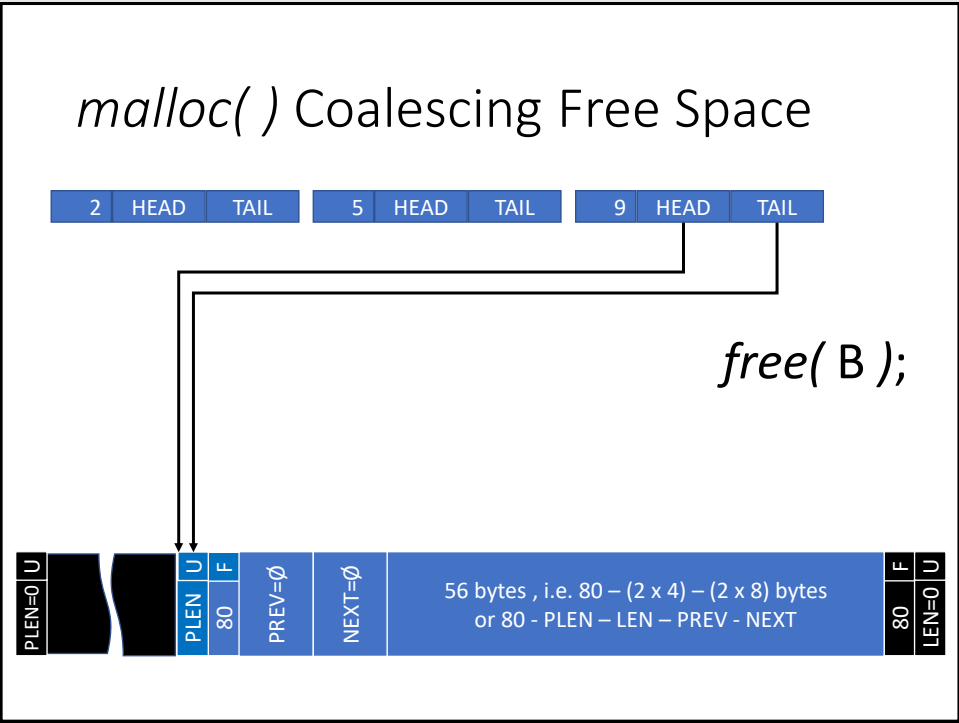
malloc() Free C



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