

Assignment Project Exam Help

COMP0020 Functional Programming

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Pointer increment

- Ideal world :
 - ▶ all allocated memory would be at one end
 - ▶ All free memory at other end
 - Single pointer to boundary
 - To allocate a block of size N, increment the boundary pointer by N and then allocate the block
 - Problems : to achieve an “ideal world” may be costly
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- value of

Free list : sequential fits

- Assume all free blocks chained together into a linked list.
 - ▶ A pointer holds the start of this chain
 - ▶ Freed blocks either added to start (LIFO) or end (FIFO) of chain, or inserted into chain in order of address (AO)
- First fit allocation
 - ▶ Larger blocks near start of list tend to be wasted
- Next fit allocation
 - ▶ Tends to increase fragmentation in practice
- Best fit allocation
 - ▶ Tiny fragments? Not in practice.
 - ▶ Slow? Not always.
- Worst fit? Good fit?

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t start of list

Segregated free lists

- Set of free lists
 - ▶ each for blocks of a specific size
 - ▶ or for a range of sizes
 - ★ Use first-fit or next-fit etc with
- “Good fit”
 - ▶ Or even “worst fit”
- Use an array of pointers to the free lists
- Or a tree of pointers to the free lists

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Buddy systems

- Variant of segregated free lists
 - ▶ Aimed to optimize splitting and coalescing
- A free area may only be merged with its buddy
- When block freed - (unique) buddy found
 - ▶ wholly in use, or wholly free (so can merge)
- Binary buddies
 - ▶ problem with internal frags (25%)
- Double buddies
 - ▶ uses powers-of-two (2, 4, 8...) AND double-from-three (3, 6, 12...)
 - ▶ Better frags (12.5%) but restricted coalescing

Summary

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