ITMO UNIVERSITY

How to Win Coding Competitions: Secrets of Champions

Week 2: Computational complexity. Linear data structures
Lecture 4: List

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Accessing element by its index can be implemented in linear time.

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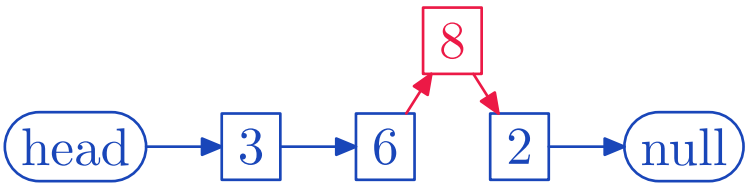

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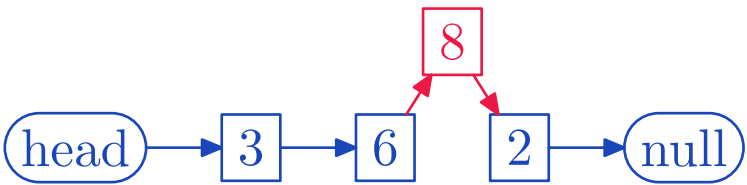

Note

- we need to have a link to an element after which we want to insert a new one

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Note

- we need to have a link to an element previous to an element we want to delete

C++ code example

```
template <typename T>
struct list_node {
  list_node *next;
  T value;
};
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struct list_node {
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Java code example

```
class ListNode <T> {
  ListNode next;
  T value;
}
```

```
insert(p, new)
  new.next ← p.next
  p.next ← new
```

```
insert(p, new)
  new.next ← p.next
  p.next ← new


delete_next(p)
  p.next ← p.next.next
```

You should be very careful with potential `null` references while implementing this data structure.

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List can also be doubly linked.

- each node store links to next and previous nodes

Thank you
for your attention!