Public Service Announcement I

"Do you like working with kids? Do you like making a positive impact on our youth? Do you like meeting amazing and congenial people? Join OASES now!

As an organization of 150 mentors, we tutor elementary school kids in Oakland. This is an fantastic opportunity serve as an important role model for under-resourced children. From playing recess to helping them with homework, every moment makes a difference! You will also meet new and like-minded people eager to mold our youth! Also, you can earn either an Education field studies unit or an Asian American Studies unit!

Drop-in Info-sessions from Tuesday, Sept 5th to Friday, Sept 8th (3:00 PM–6:30 PM at the Free Speech Movement Cafe)

Questions? Contact leadcoords.oases@gmail.com. We're also on Facebook: www.facebook.com/OasesAtUcBerkeley/."

Public Service Announcement II

"Apply to join the Berkeley Political Review! Berkeley Political Review, UC Berkeley's only non-partisan undergraduate political journal, is holding our last info session, next Tuesday September 5th (8pm, location TBD–see FB event for more details). BPR is recruiting writers, business and marketing professionals, tech experts, and designers—come find your place in the BPR family! Applications are due September 7th. Apply online at https://bpr.berkeley.edu/apply/."

Recreation

Prove that for every acute angle $\alpha > 0$,

$$\tan\alpha + \cot\alpha \geq 2$$

CS61B Lecture #5: Simple Pointer Manipulation

Announcement

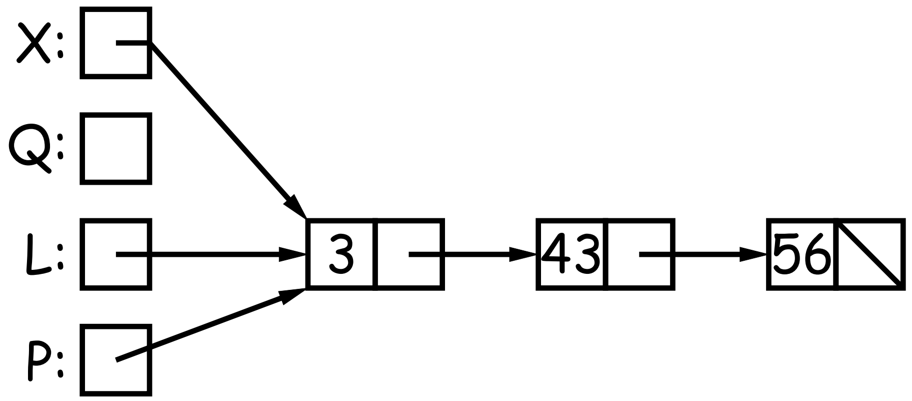
- **Today:** More pointer hacking.
- **Handing in labs and homework:** We'll be lenient about accepting late homework and labs for the first few. Just get it done: part of the point is getting to understand the tools involved. We will *not* accept submissions by email.

Destructive Incrementing

Destructive solutions may modify objects in the original list to save time or space:

```
/** Destructively add N to L's items. */
static IntList dincrList(IntList P, int n) {
  if (P == null)
    return null;
  else {
    P.head += n;
    P.tail = dincrList(P.tail, n);
    return P;
  }
}
/** Destructively add N to L's items. */
static IntList dincrList(IntList L, int n)
{
  // 'for' can do more than count!
  for (IntList p = L; p != null; p = p.tail)
    p.head += n;
  return L;
}
```

```
X = IntList.list(3, 43, 56);
/* IntList.list from HW #1 */
Q = dincrList(X, 2);
```



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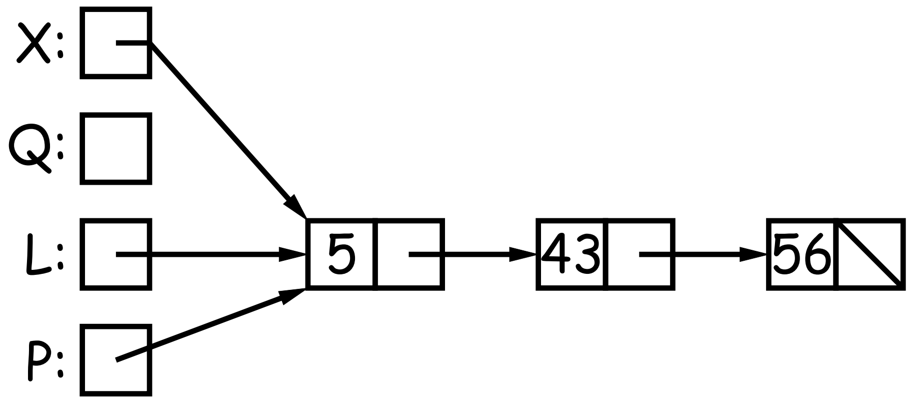

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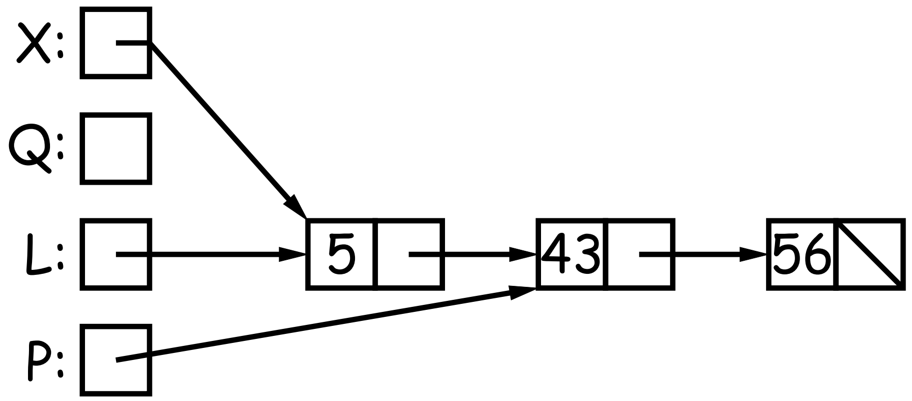

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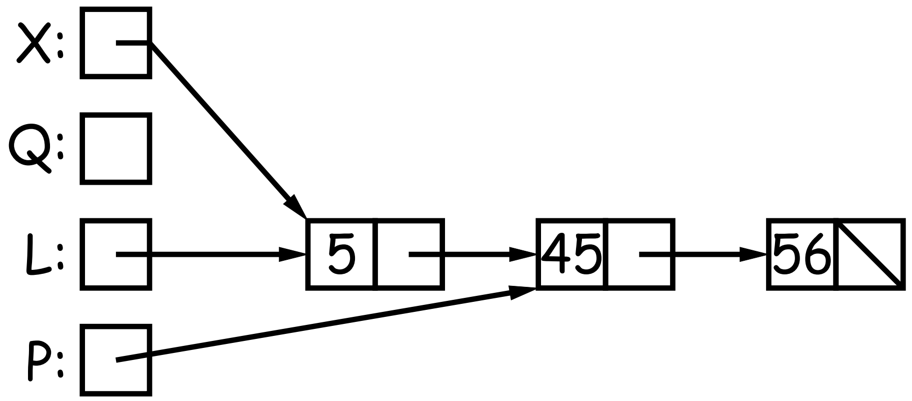

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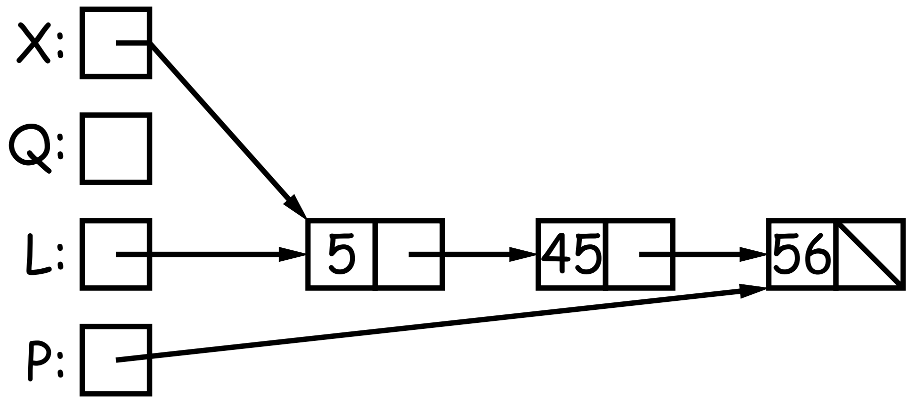

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  for (IntList p = L; p != null; p = p.tail)
    p.head += n;
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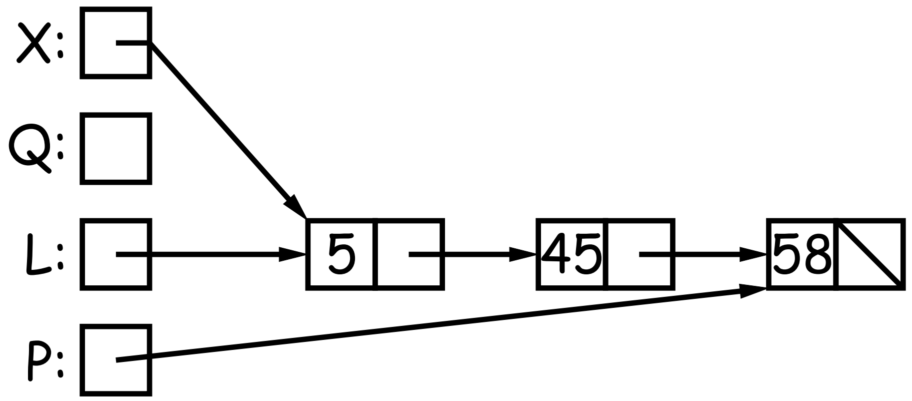

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/** Destructively add N to L's items. */
static IntList dincrList(IntList L, int n)
{
  // 'for' can do more than count!
  for (IntList p = L; p != null; p = p.tail)
    p.head += n;
  return L;
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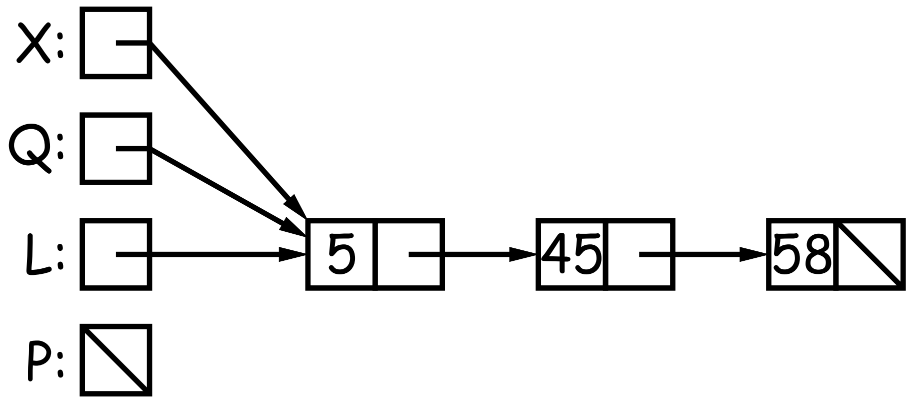

Another Example: Non-destructive List Deletion

If L is the list [2, 1, 2, 9, 2], we want `removeAll(L,2)` to be the new list [1, 9].

```
/** The list resulting from removing all instances of X from L
 *  non-destructively. */
static IntList removeAll(IntList L, int x) {
  if (L == null)
     return /*( null with all x's removed )*/;
  else if (L.head == x)
     return /*( L with all x's removed (L!=null, L.head==x) )*/;
  else
     return /*( L with all x's removed (L!=null, L.head!=x) )*/;
}
```

Another Example: Non-destructive List Deletion

If L is the list [2, 1, 2, 9, 2], we want `removeAll(L,2)` to be the new list [1, 9].

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     return null;
  else if (L.head == x)
     return removeAll(L.tail, x);
  else
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}
```

Another Example: Non-destructive List Deletion

If L is the list [2, 1, 2, 9, 2], we want `removeAll(L,2)` to be the new list [1, 9].

```
/** The list resulting from removing all instances of X from L
 *  non-destructively. */
static IntList removeAll(IntList L, int x) {
  if (L == null)
     return null;
  else if (L.head == x)
     return removeAll(L.tail, x);
  else
     return new IntList(L.head, removeAll(L.tail, x));
}
```

Iterative Non-destructive List Deletion

Same as before, but use front-to-back iteration rather than recursion.

```
/** The list resulting from removing all instances
 *  of X from L non-destructively. */
static IntList removeAll(IntList L, int x) {
  IntList result, last;
  result = last = null;
  for ( ; L != null; L = L.tail) {
    if (x == L.head)
      continue;
    else if (last == null)
      result = last = new IntList(L.head, null);
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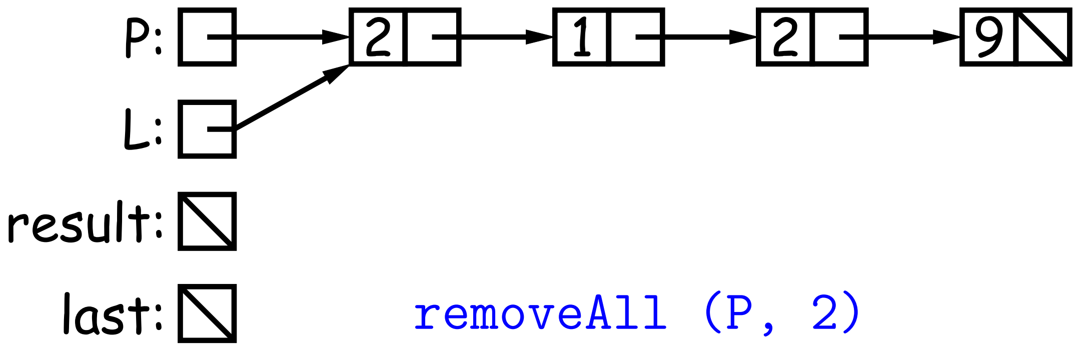
}
```



removeAll (P, 2)

Iterative Non-destructive List Deletion

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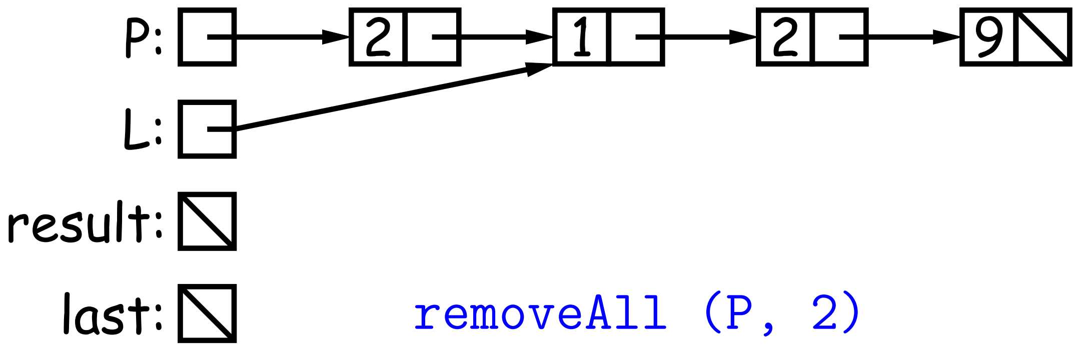
  }
  return result;
}
```



removeAll (P, 2)

P does not change!

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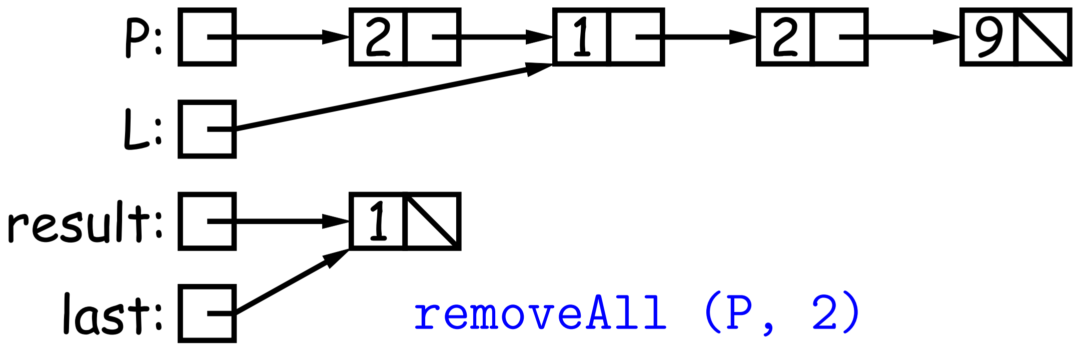

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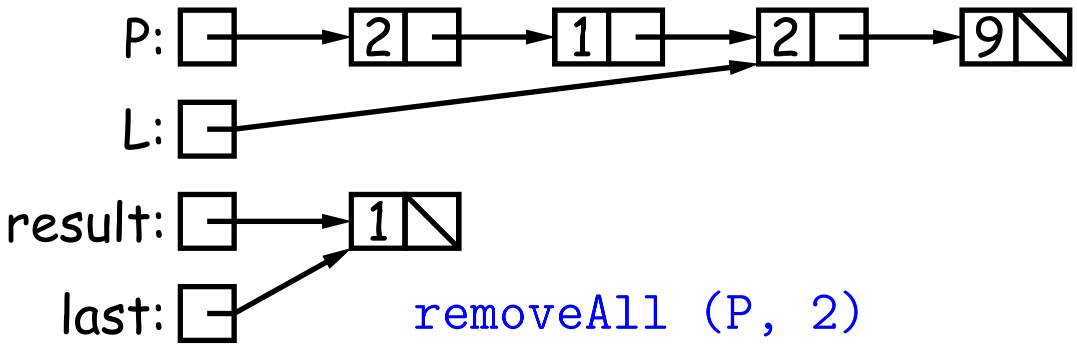

removeAll (P, 2)

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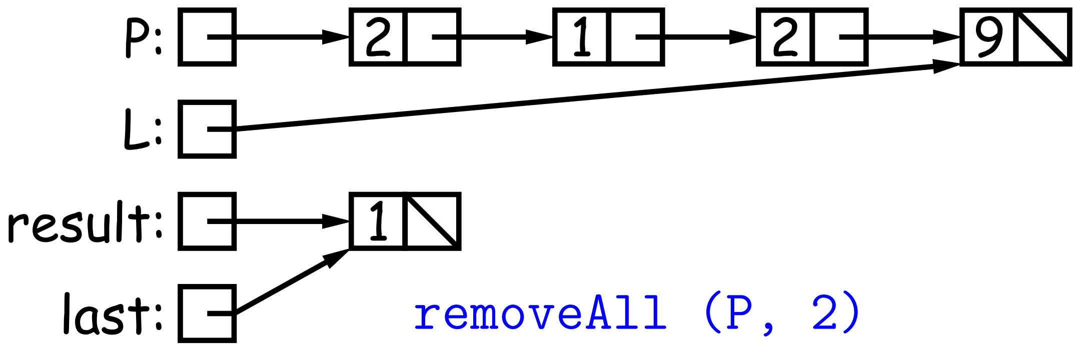

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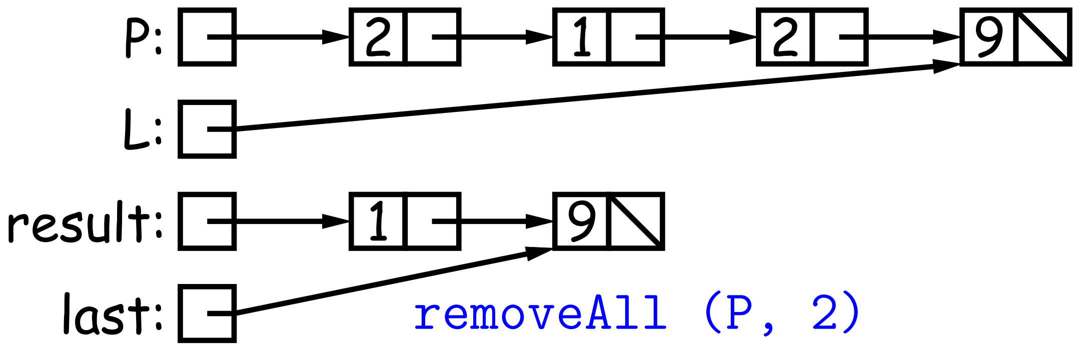

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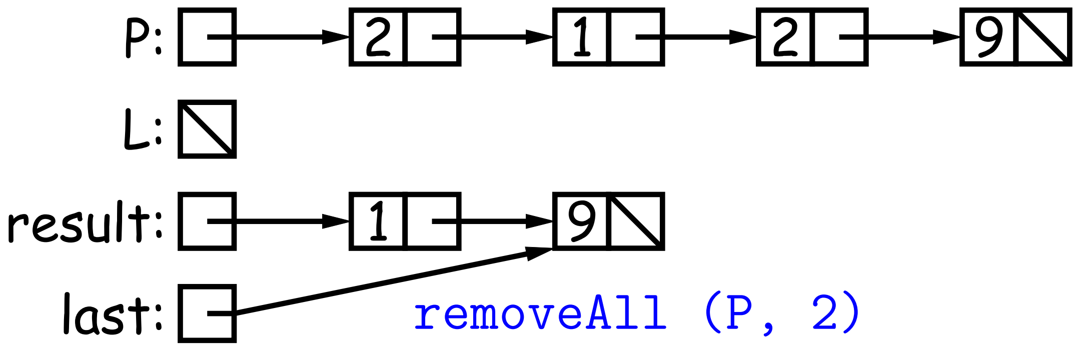

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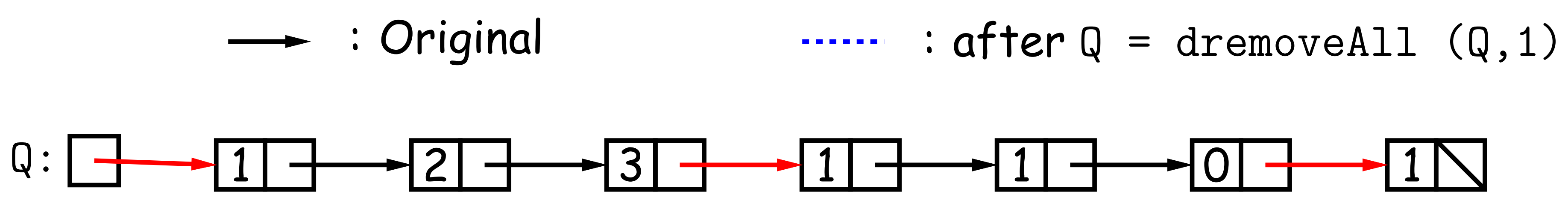
Destructive Deletion



```
/** The list resulting from removing all instances of X from L.
 *  The original list may be destroyed. */
static IntList dremoveAll(IntList L, int x) {
  if (L == null)
     return /*( null with all x's removed )*/;
  else if (L.head == x)
     return /*( L with all x's removed (L != null) )*/;
  else {
     /*{ Remove all x's from L's tail. }*/;
     return L;
  }
}
```

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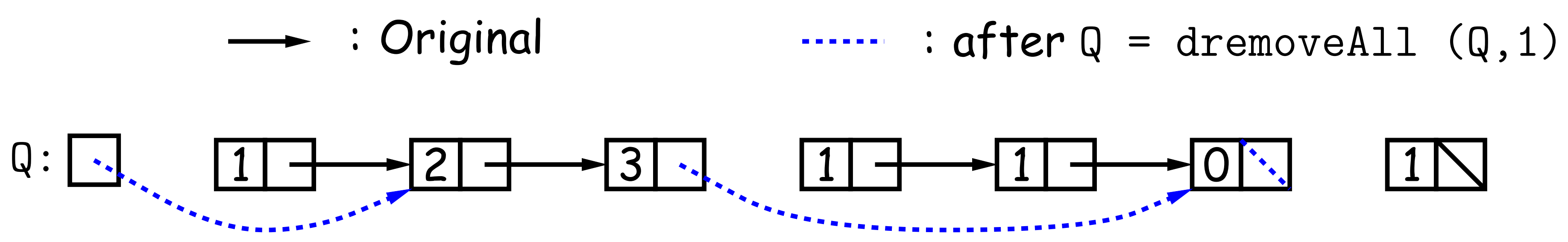

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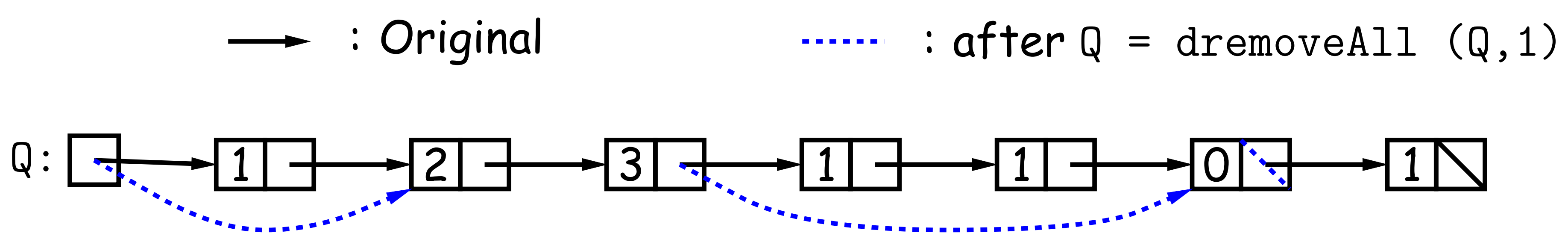

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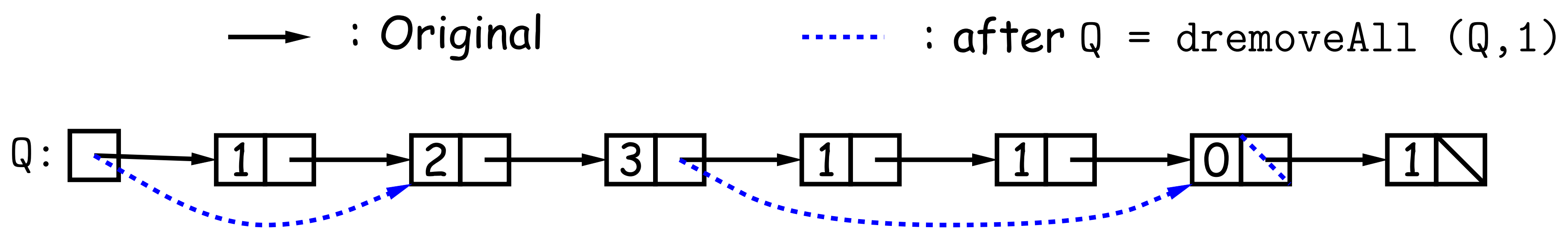

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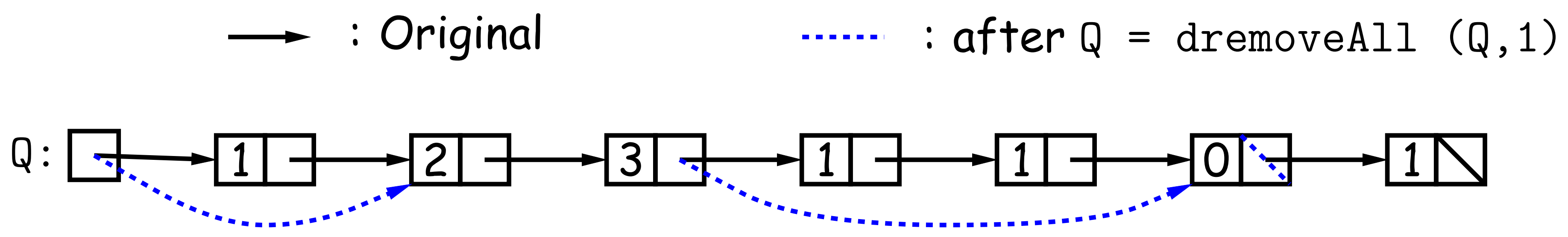

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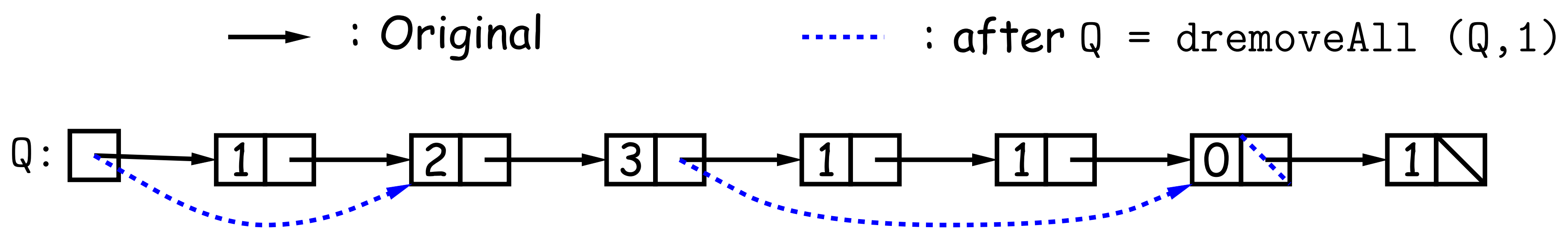

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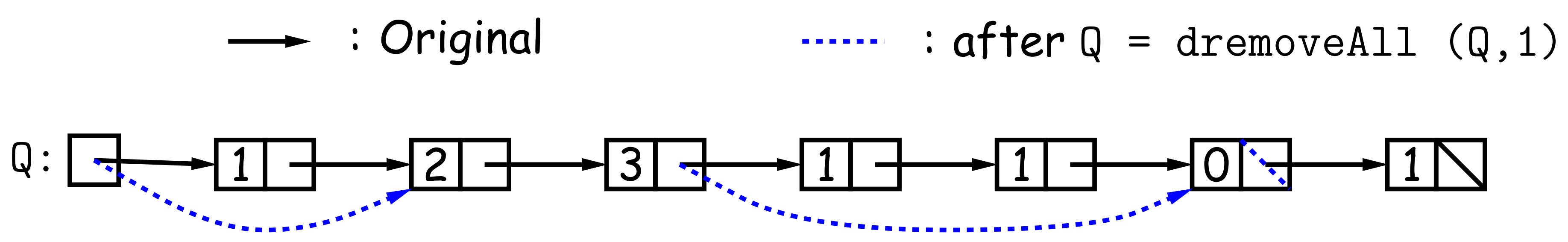

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  else {
     L.tail = dremoveAll(L.tail, x);
     return L;
  }
}
```

Iterative Destructive Deletion

```
/** The list resulting from removing all X's from L
 *  destructively. */
static IntList dremoveAll(IntList L, int x) {
  IntList result, last;
  result = last = null;
  while (L != null) {
    IntList next = L.tail;
    if (x != L.head) {
      if (last == null)
        result = last = L;
      else
        last = last.tail = L;
      L.tail = null;
    }
    L = next;
  }
  return result;
}
```

Iterative Destructive Deletion

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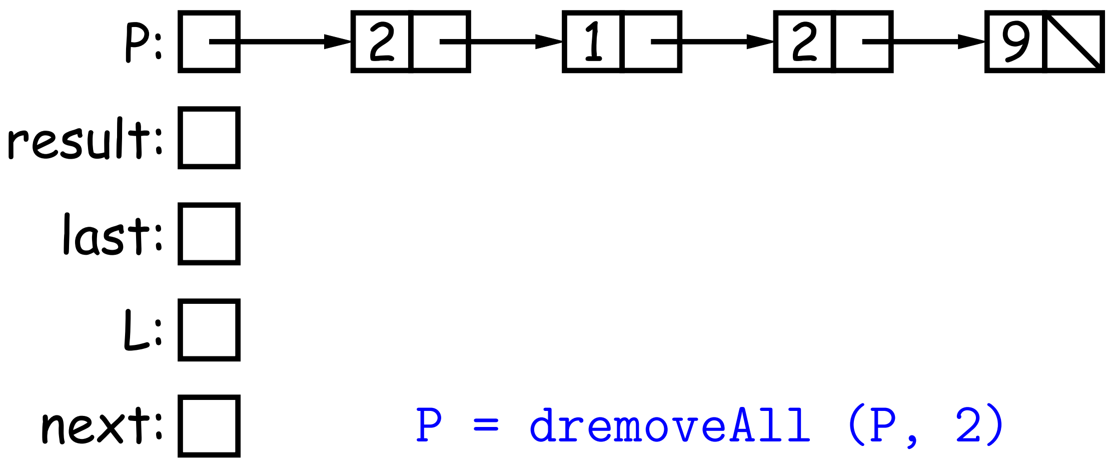
    L = next;
  }
  return result;
}
```



```
P = dremoveAll (P, 2)
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Iterative Destructive Deletion

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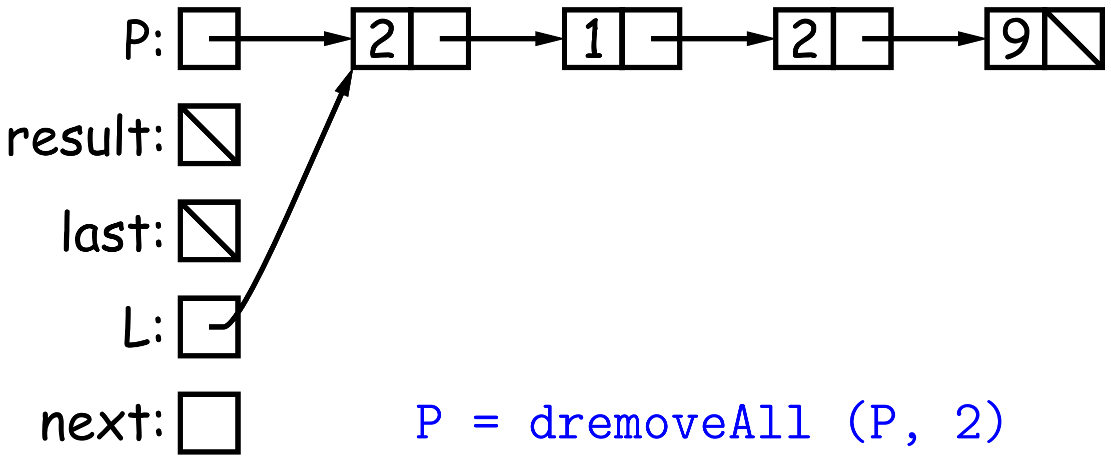

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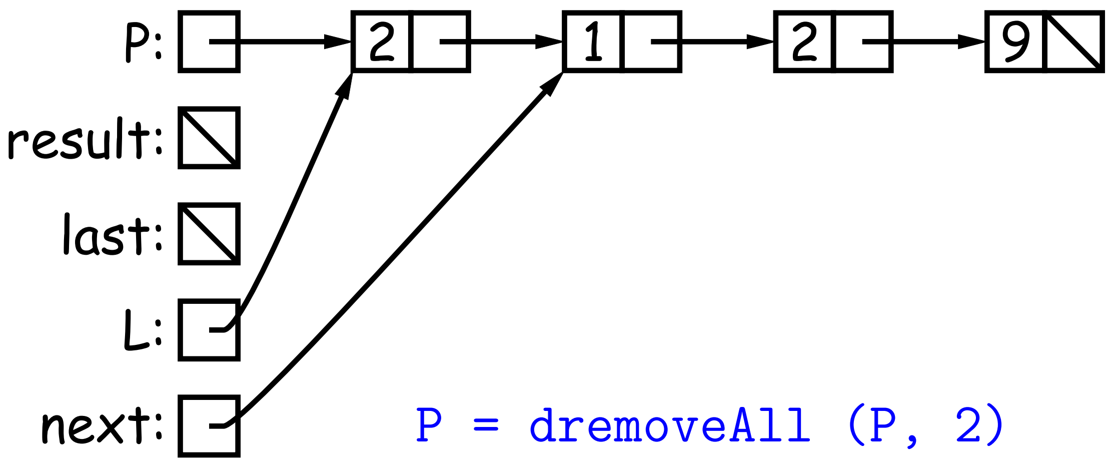

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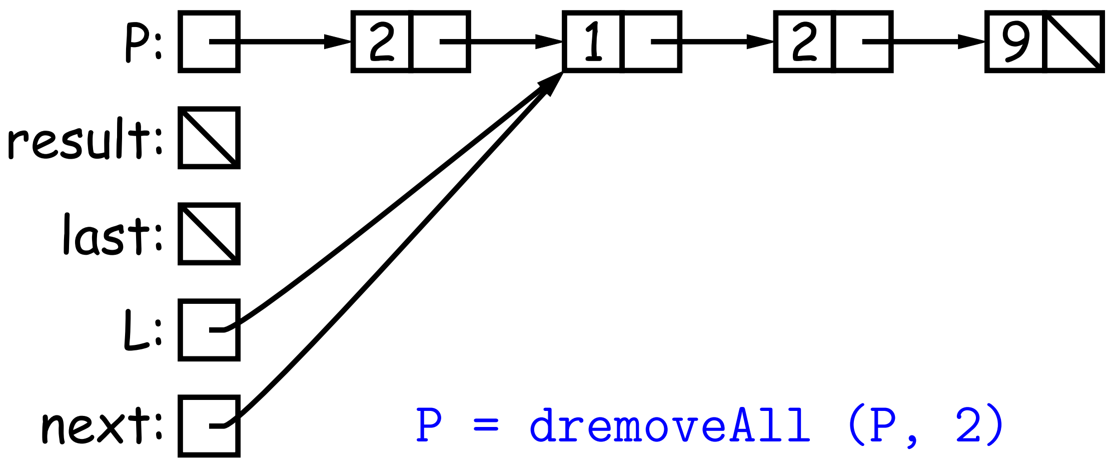

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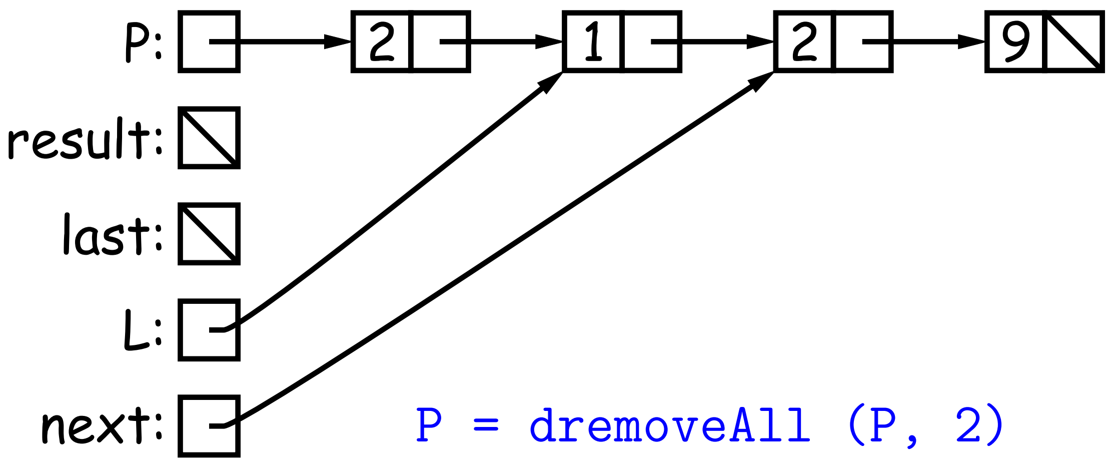

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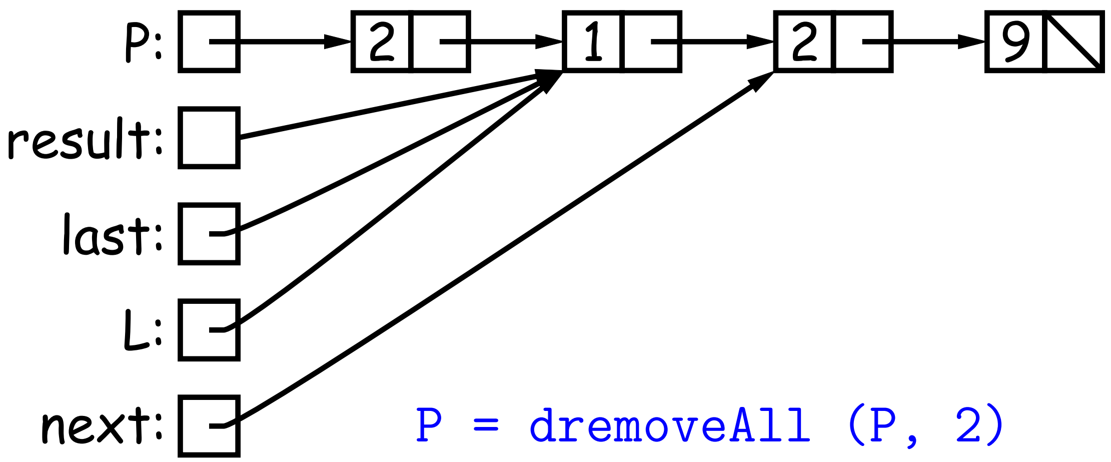

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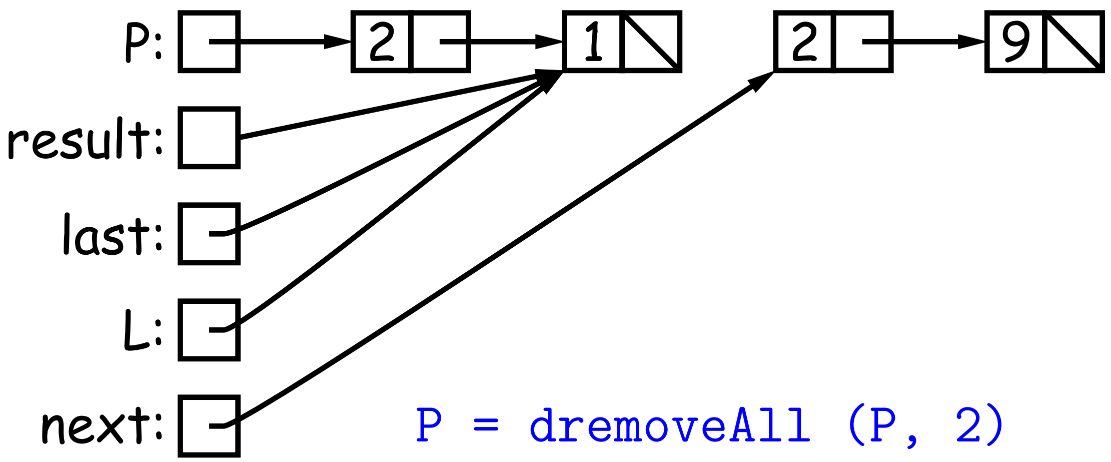

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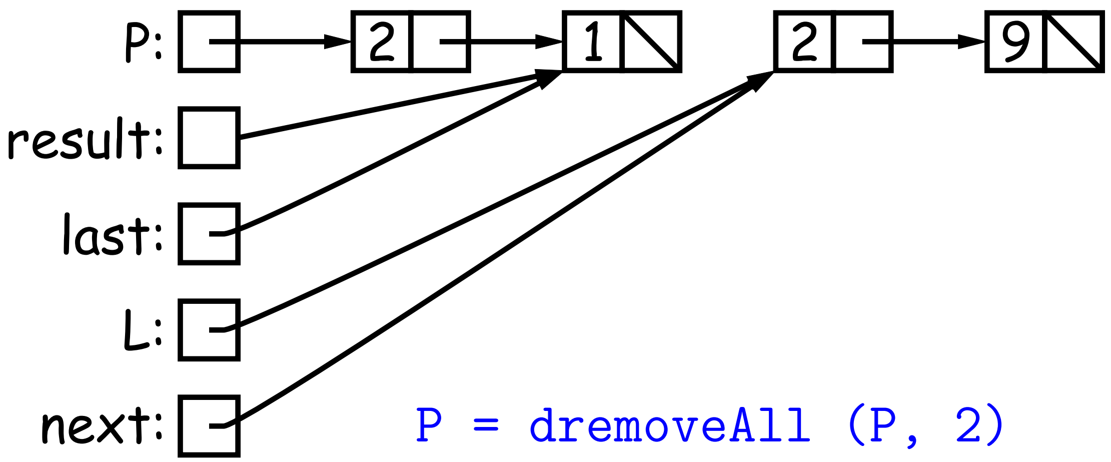

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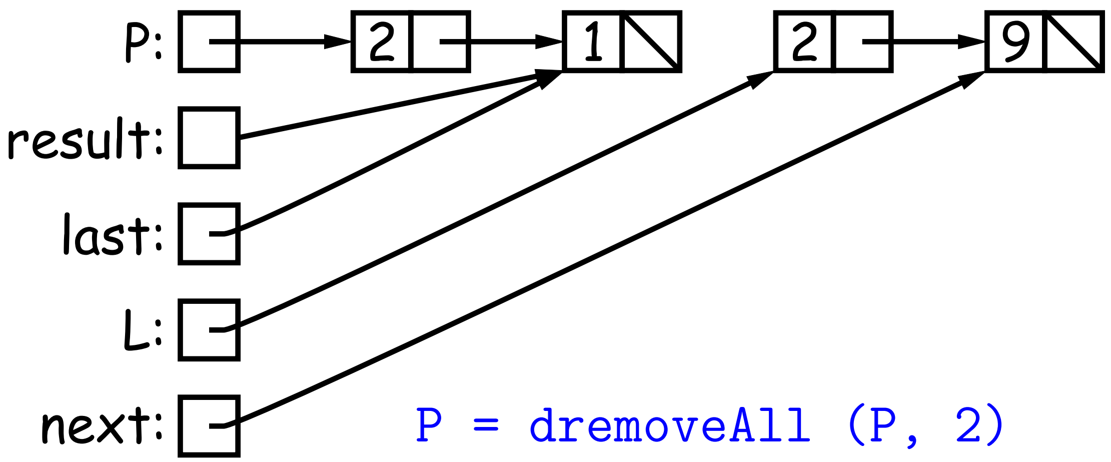

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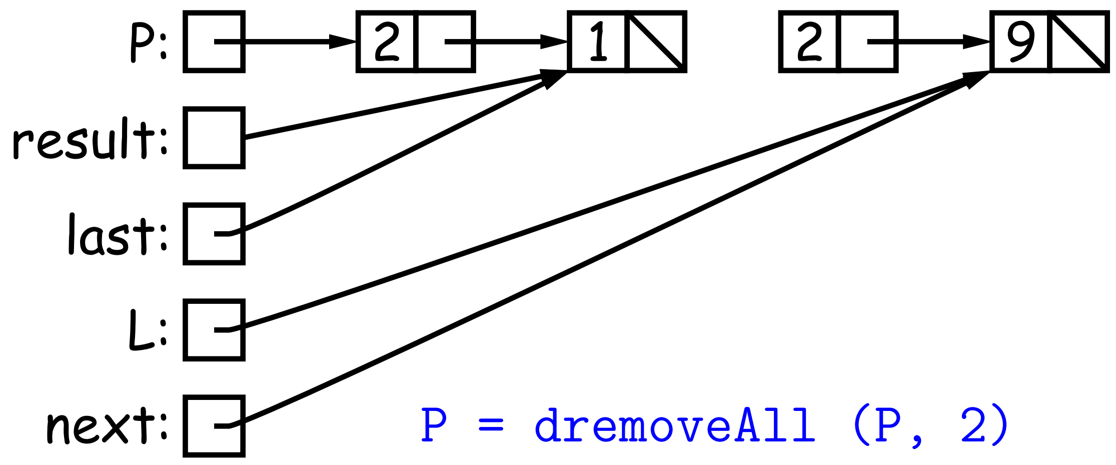

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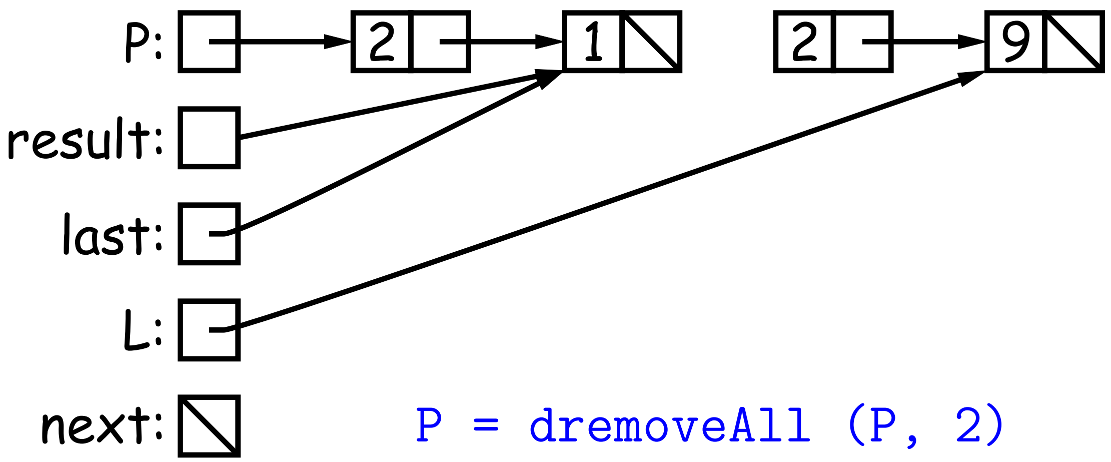

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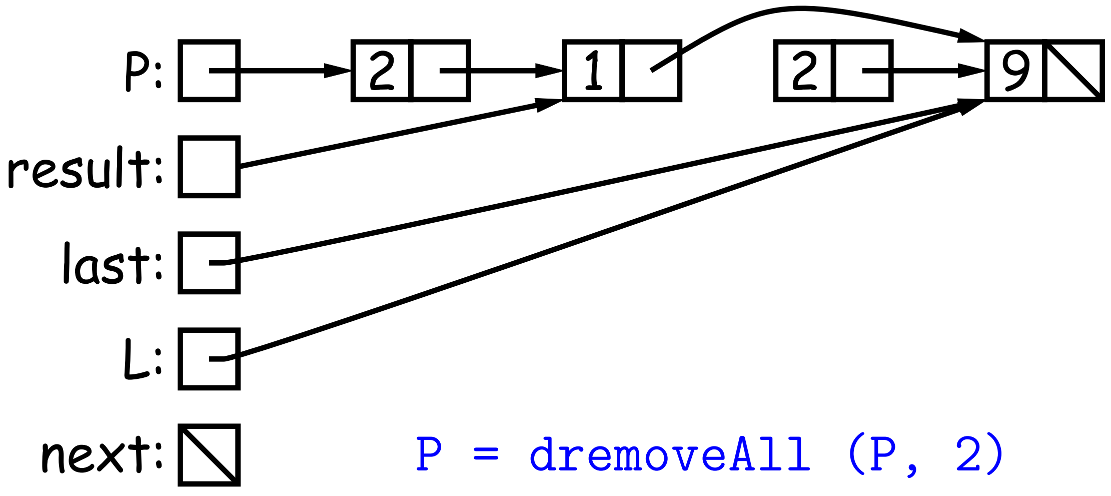

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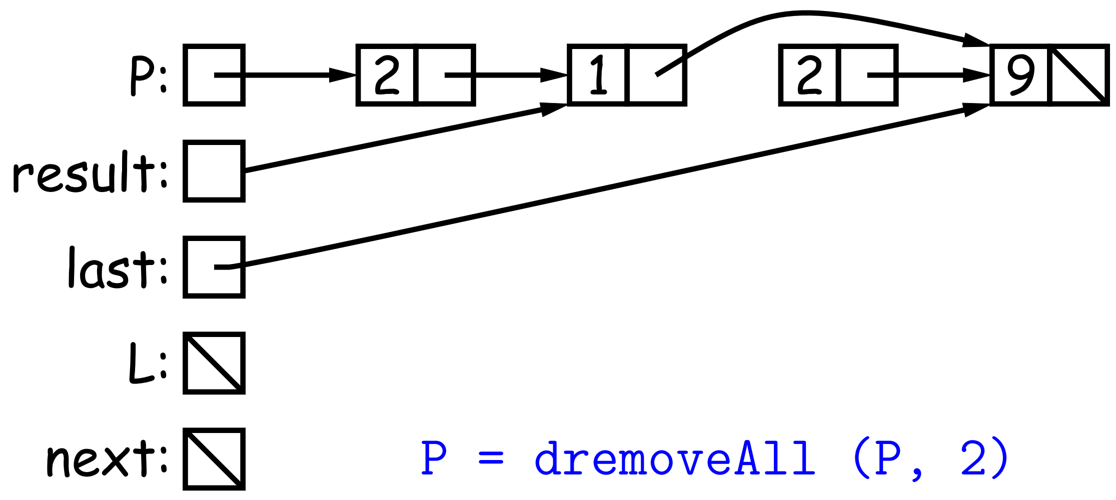

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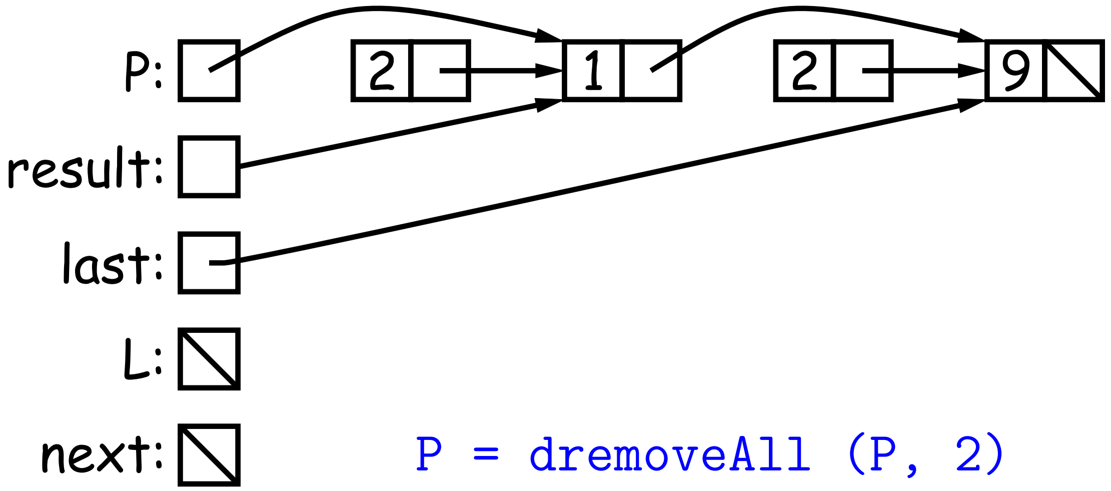

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