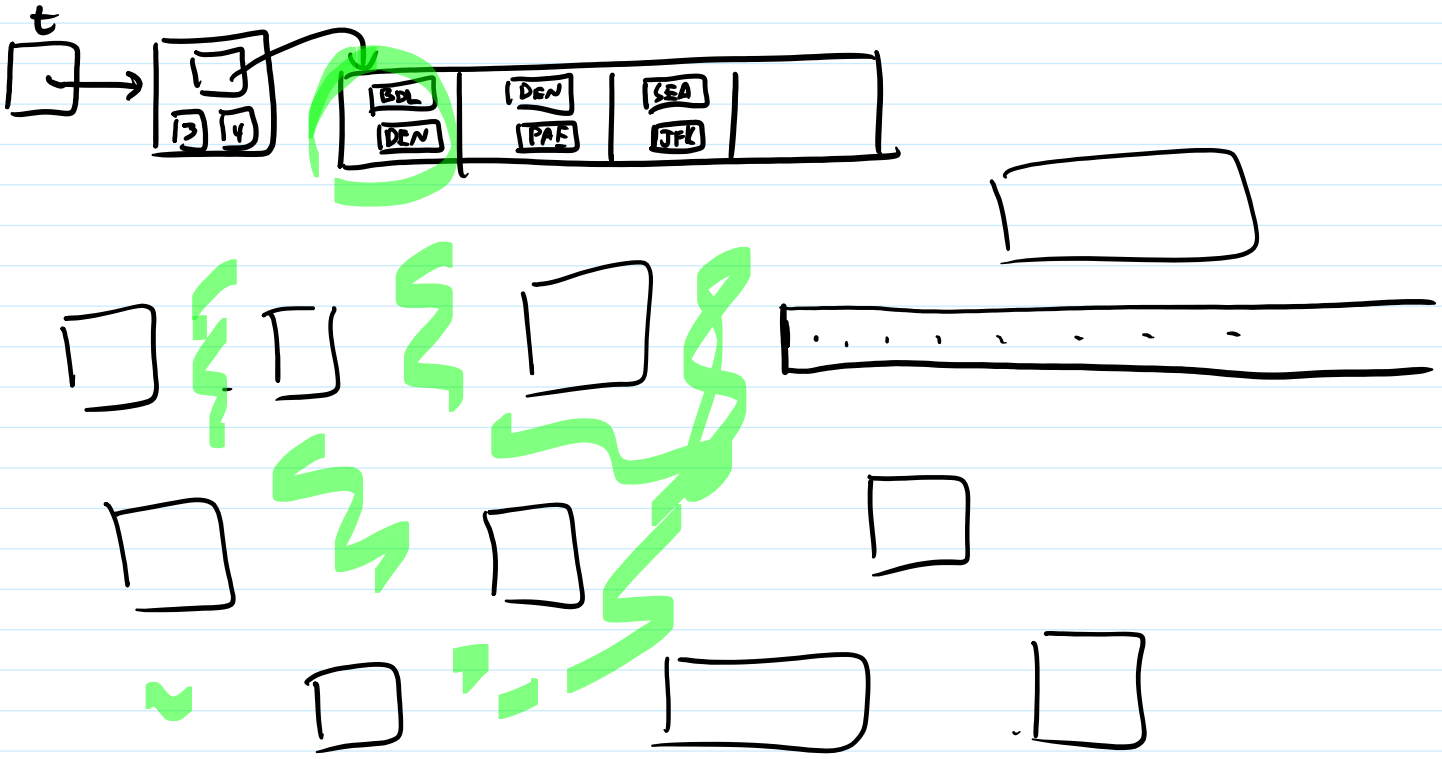
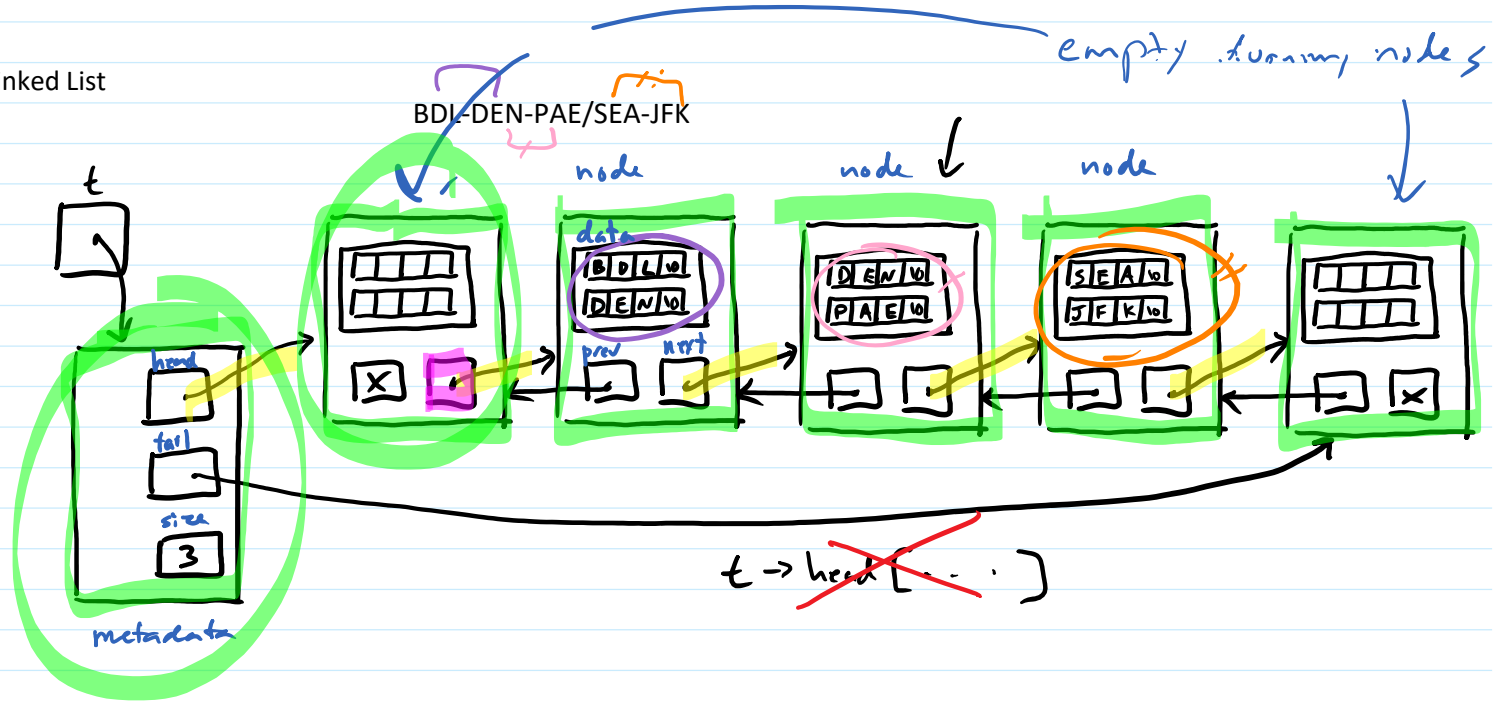
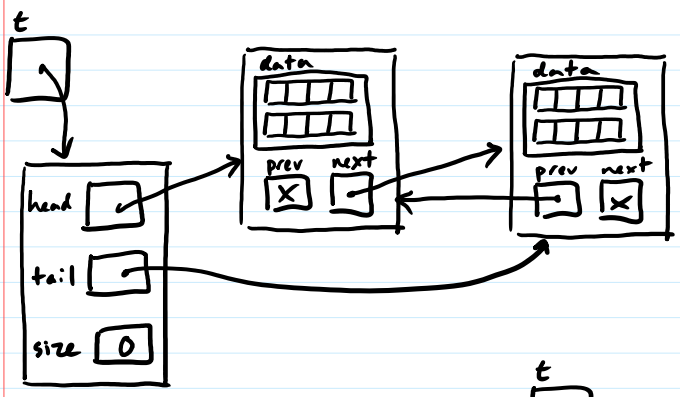
BDL-DEN-PAE/SEA-JFK

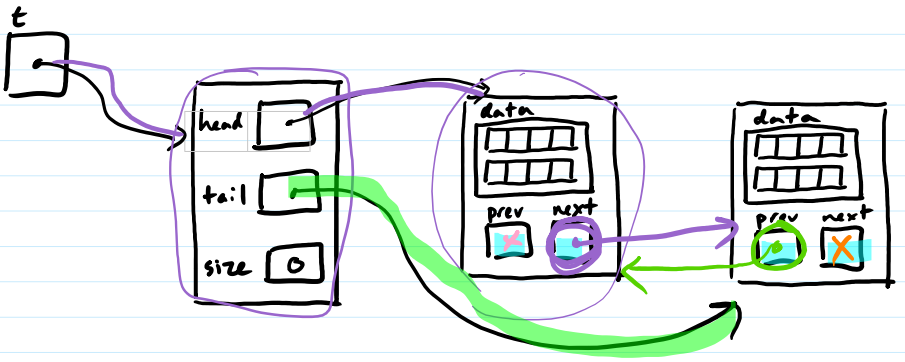


Linked List


empty dummy nodes
BDL-DEN-PAE/SEA-JFK
t
node
node
node
data
BDL
DEN
DEN
PAE
SEA
JFK
prev
next
head
tail
size
3
metadata
t -> head [. . .]

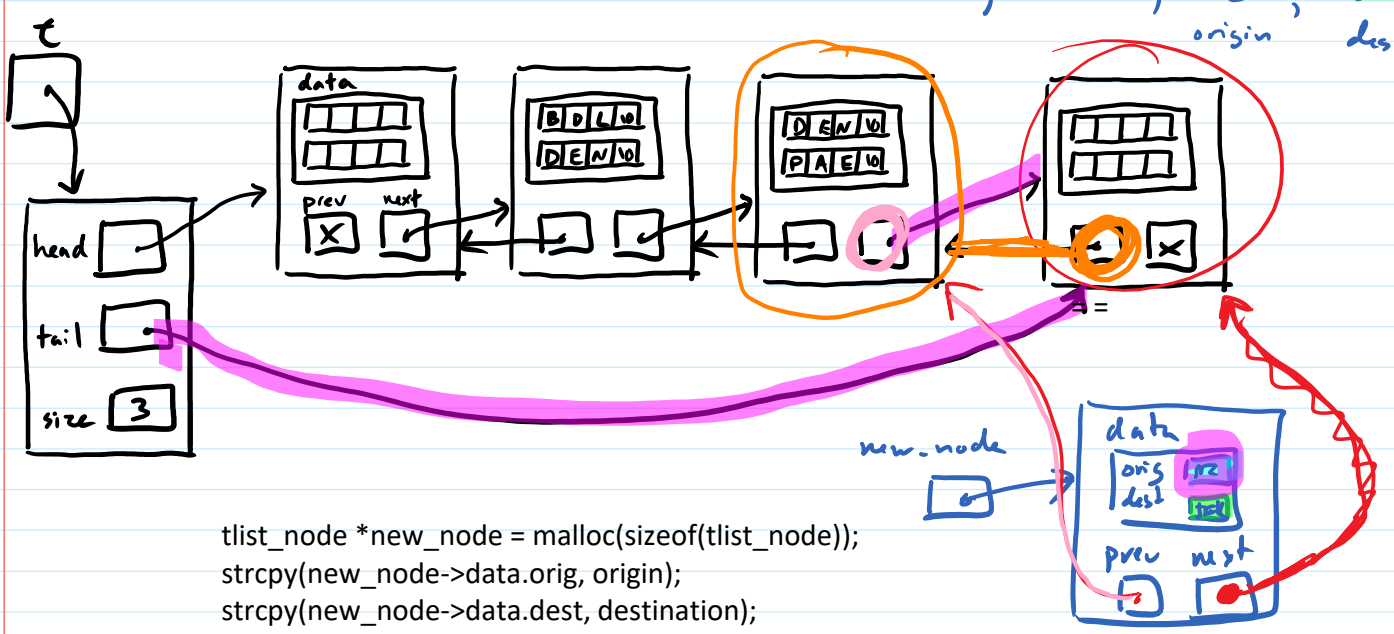
Create





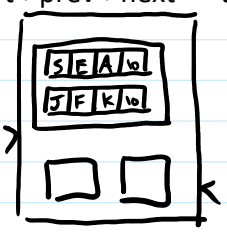

```
t->head->next = t->tail
t->head->prev = NULL;
t->tail->next = NULL;
t->tail->prev = t->head;
```

Add

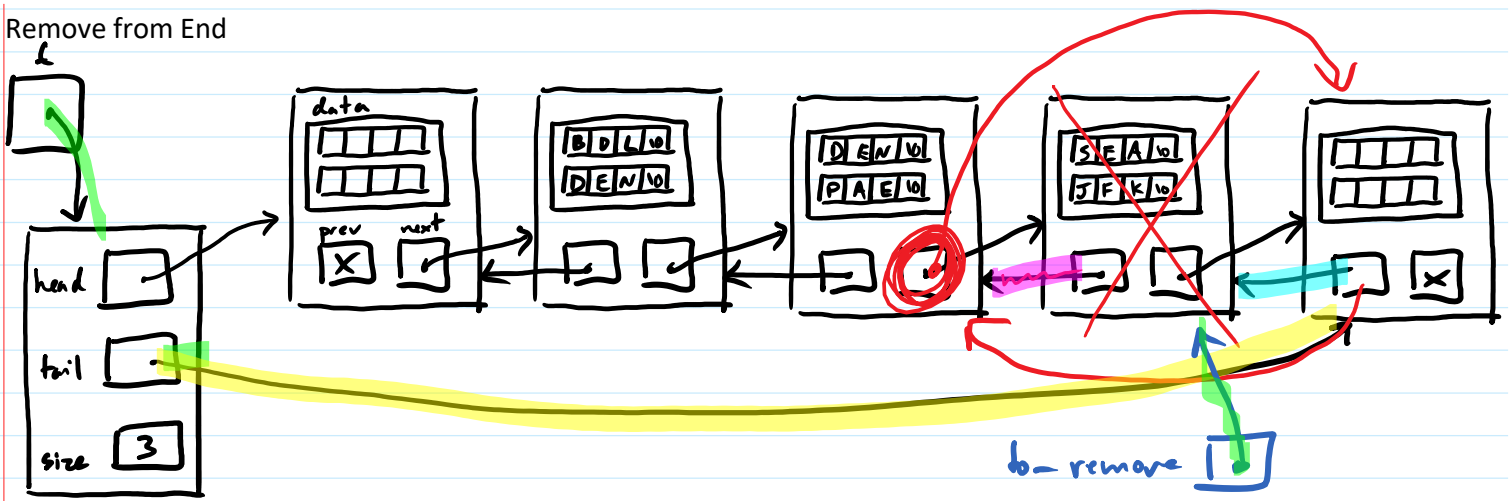



```
tlist_node *new_node = malloc(sizeof(tlist_node));
strcpy(new_node->data.orig, origin);
strcpy(new_node->data.dest, destination);
new_node->next = t->tail;
new_node->prev = t->tail->prev;
t->tail->prev = new_node;
new_node->prev->next = new_node;
t->size++;
```

invariant: t->next->prev == t
t->prev->next == t



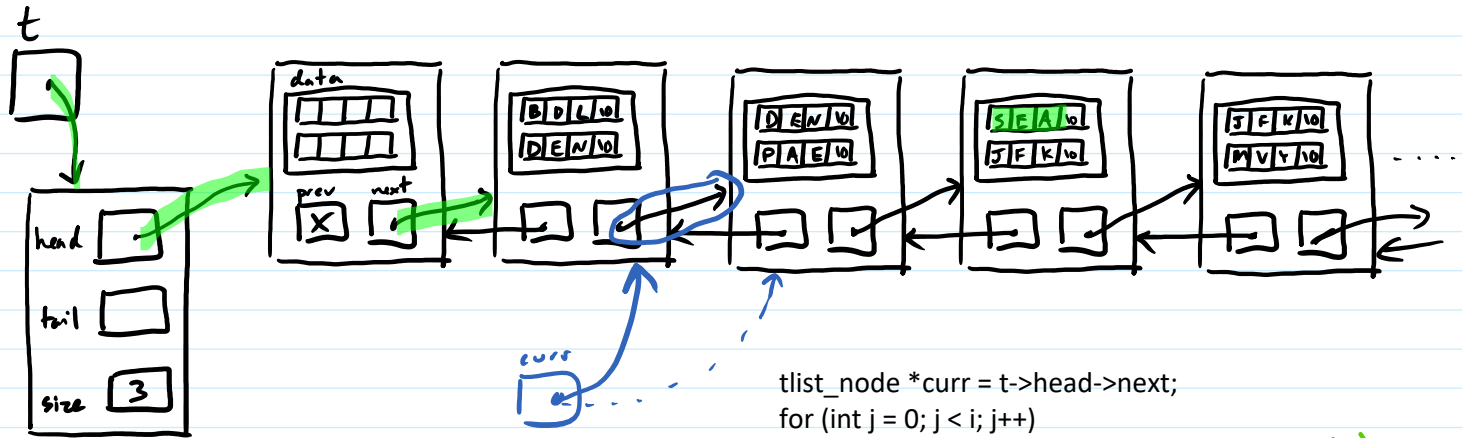
Remove from End




```
tlist_node *to_remove = t->tail->prev;
to_remove->prev->next = t->tail;
t->tail->prev = to_remove->prev;
free(to_remove);
t->size--;
```

Get

origin = tlist_get_origin_by_index(t, 2)
i




```
tlist_node *curr = t->head->next;
for (int j = 0; j < i; j++)
{
    curr = curr->next;
}
return curr->data.orig;
```

O(n)

O(n) iterations
O(n) iterations

```
for (int i = 0; i < tlist_size(t); i++)
{
    whatever = tlist_get(t, i);
    process(whatever);
}
```

O(1) O(n) for linked list

O(n) total
O(n²) total

iterator: position in a list (index for an array; pointer to the node for a linked list)

operations: create an iterator at the beginning of a list
retrieve current item
move to next item
at end?

```
tlist_iterator *i = tlist_iterator_create(t);
while (! iterator_at_end(i))
{
    whatever = iterator_get();
    process(whatever);
    iterator_move_next(i);
}
```