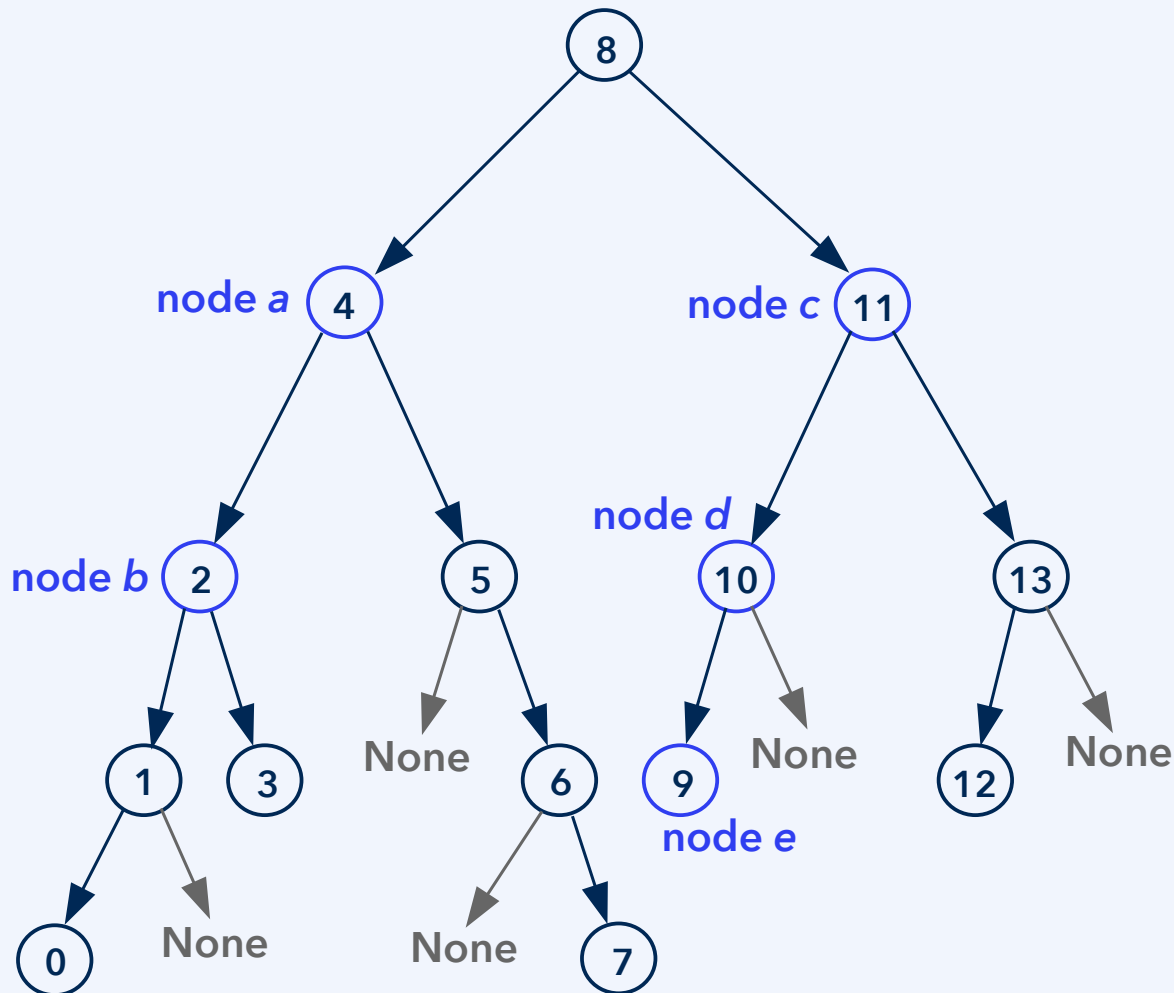


Tutorial 3.1 discussion

Deleting an element from a binary search tree



Example task

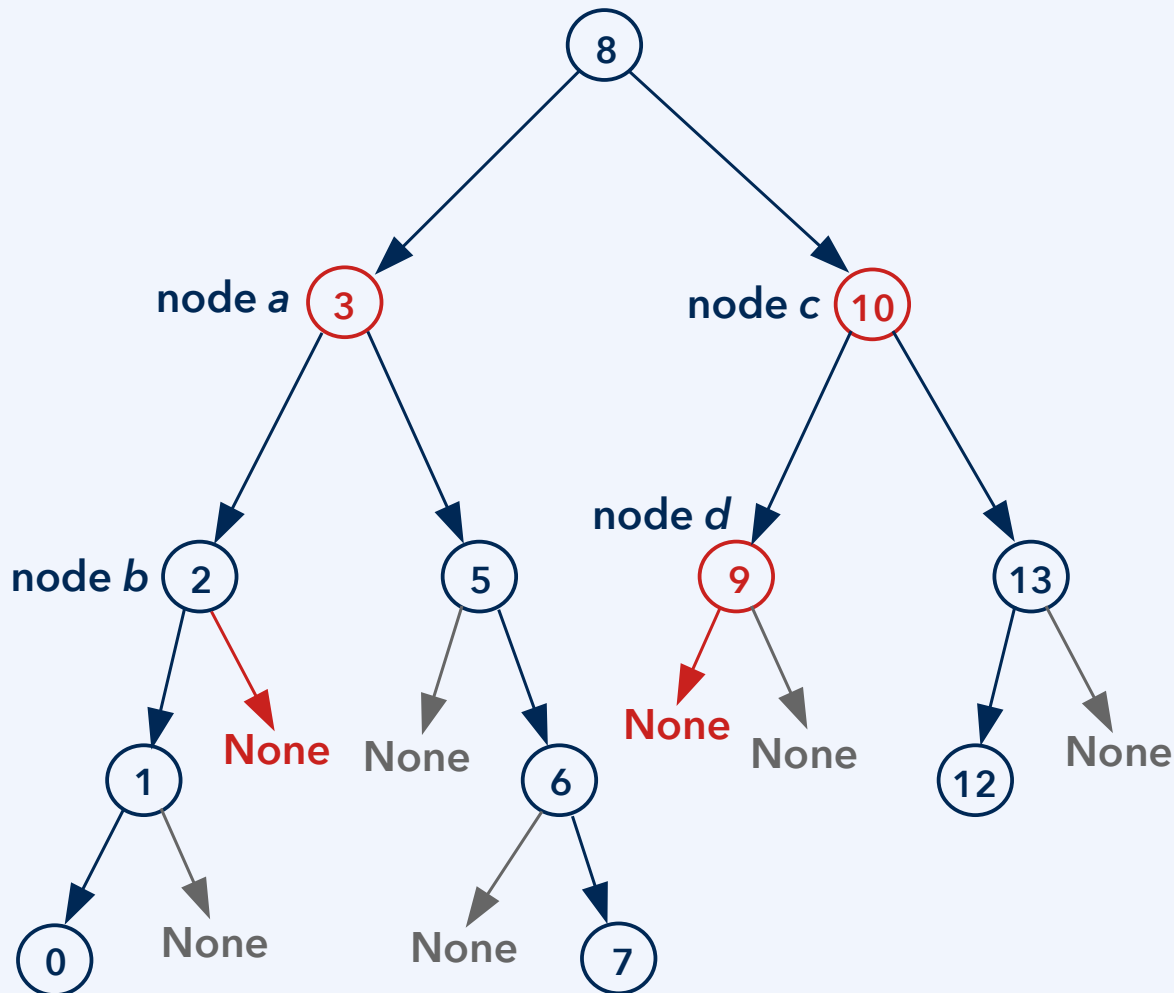
Delete 4 from the tree:

- Replace the label of node a, which is initially 4, with 3

Delete 11 from the tree:

- Replace the label of node c with 10

Deleting an element from a binary search tree



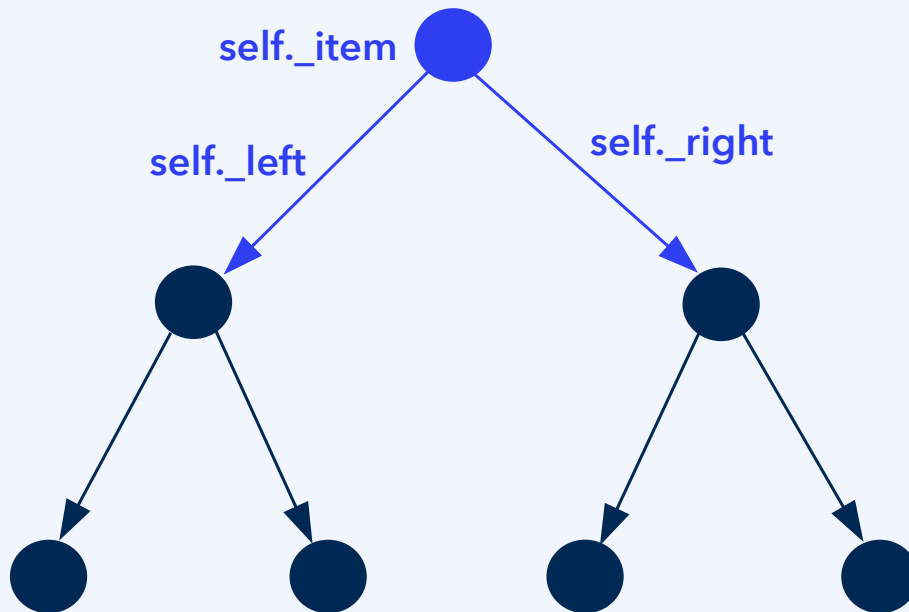
Example task

- Delete 4 from the tree:
- Replace the label of node *a*, which is initially 4, with 3
 - Then delete 3 from the subtree/node *b*

- Delete 11 from the tree:
- Replace the label of node *c* with 10
 - Then delete 10 from node *d*, by writing 9 to node *d* and erasing node *e*

Deleting an element from a binary search tree

See the Jupyter Notebook **bst-with-deletion**.



Method `delete(self, value)`:

Is value smaller than `self._item`?

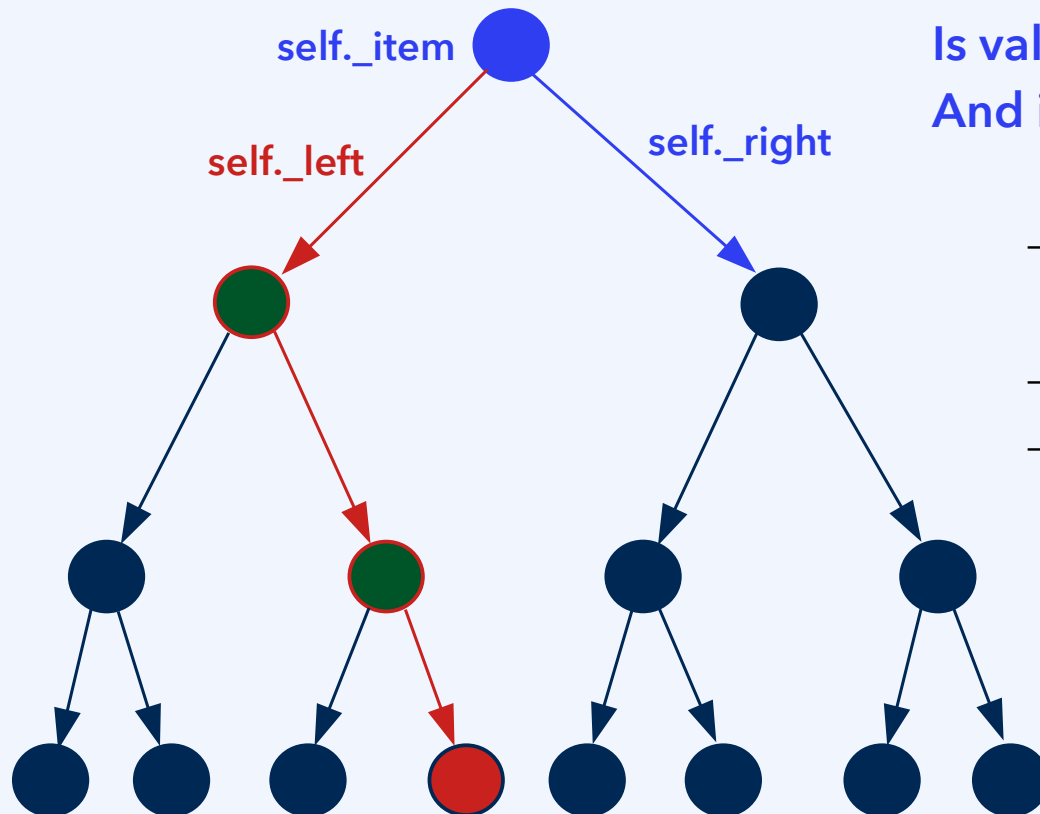
- If `self._left` is `None`, return
- `self._left.delete(value)`
- If `self._left._item` is now `None`, detach via `self._left = None`

Is value greater than `self._item`?

- If `self._right` is `None`, return
- `self._right.delete(value)`
- If `self._right._item` is now `None`, detach via `self._right = None`

Deleting an element from a binary search tree

See the Jupyter Notebook [bst-with-deletion](#).

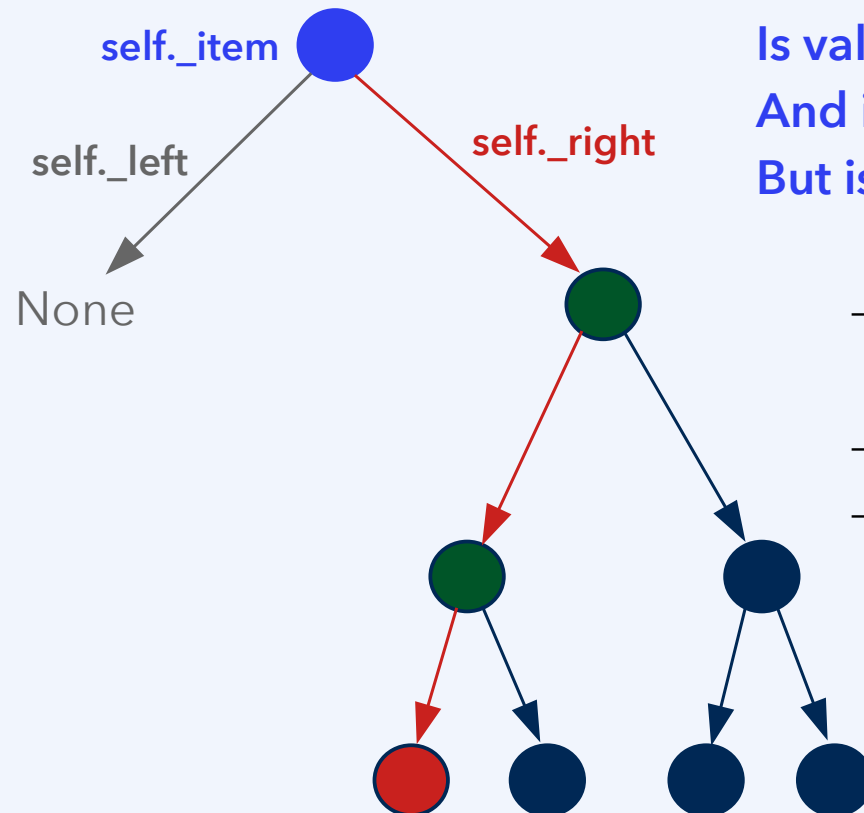


Is value the same as `self._item`?
And is `self._left` not `None`?

- Find the greatest element x from the left branch, set `self._item = x`
- Now, `self._left.delete(x)`
- If `self._left._item` is now `None`, detach via `self._left = None`

Deleting an element from a binary search tree

See the Jupyter Notebook [bst-with-deletion](#).

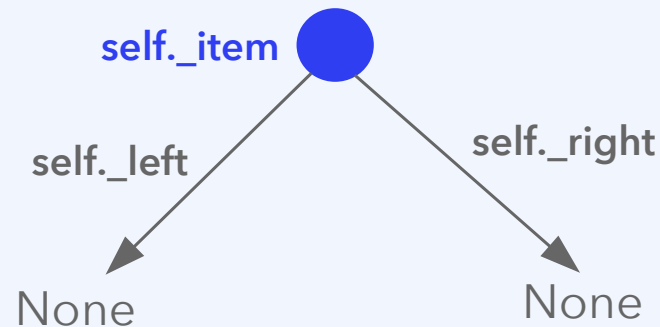


Is value the same as `self._item`?
And is `self._left` `None`?
But is `self._right` not `None`?

- Find the smallest element `x` from the right branch, set `self._item = x`
- Now, `self._right.delete(x)`
- If `self._right._item` is now `None`, detach via `self._right = None`

Deleting an element from a binary search tree

See the Jupyter Notebook [bst-with-deletion](#).



Is value the same as `self._item`?
And is `self` a leaf?

- Delete value by setting `self._item = None`