

Verifying Robustness of Programs Under Structural Perturbations

Clay Thomas and Jacob Bond

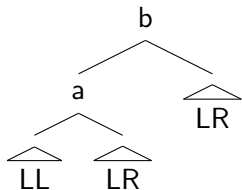
November 27, 2017

Motivation

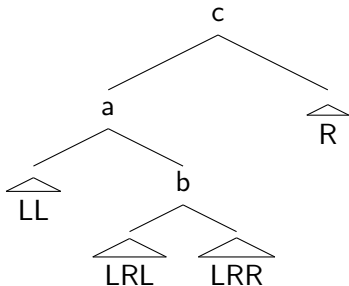
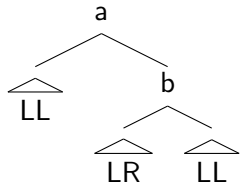
Lists

asdf

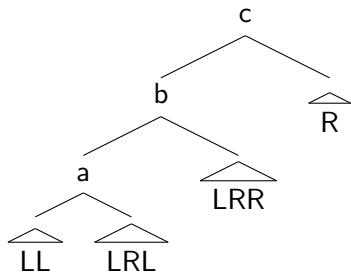
Binary Search Trees



rotate
→



flatten
→



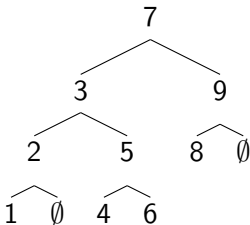
Binary Search Trees

It suffices to show

- Every tree can be transformed into a “normal form” (i.e. list)
- Every operation is reversible

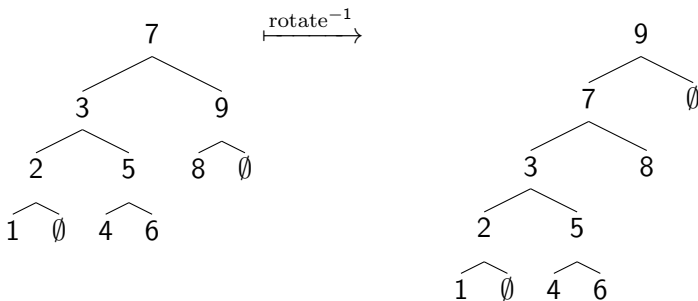
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



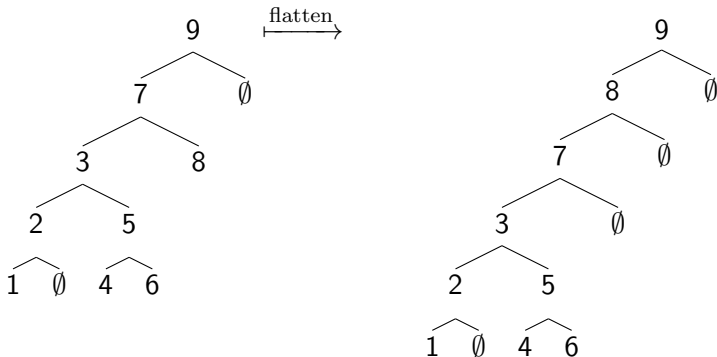
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



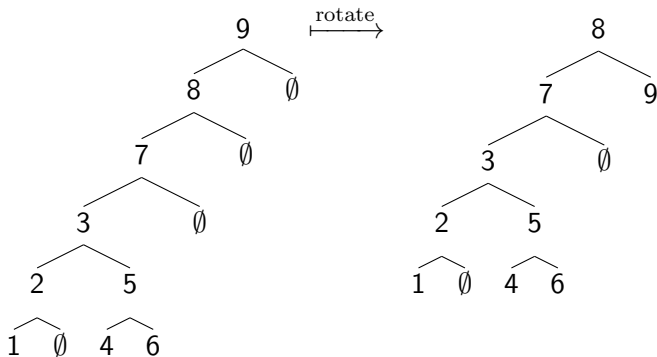
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



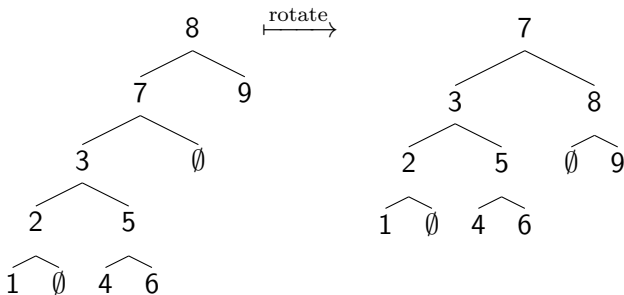
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



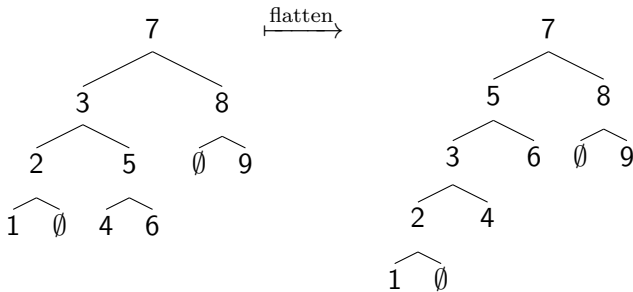
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



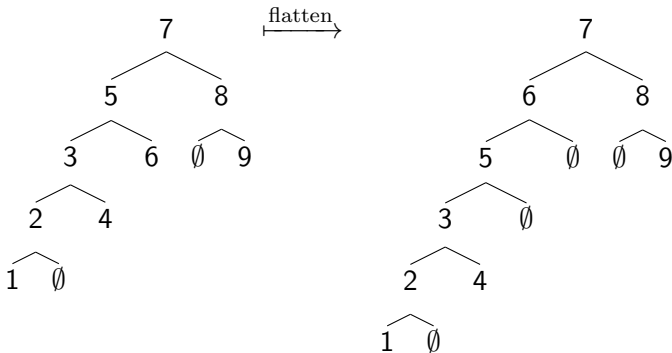
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



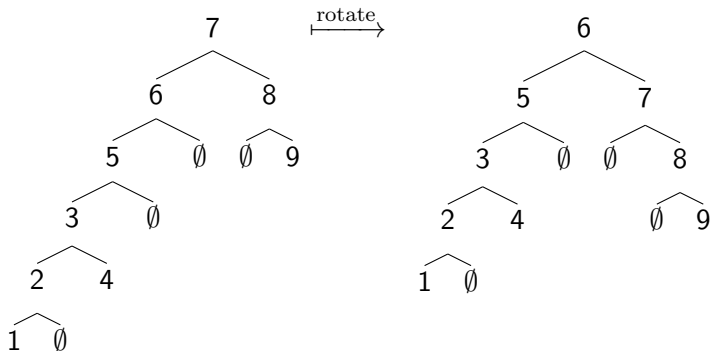
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



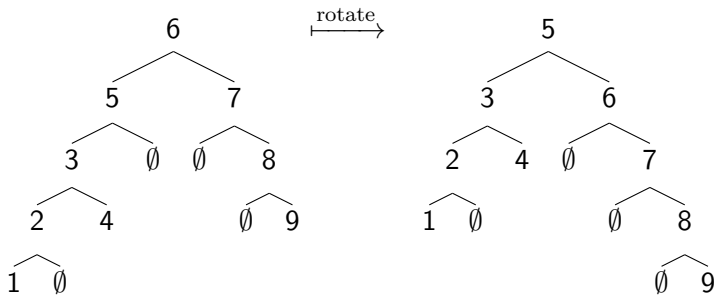
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



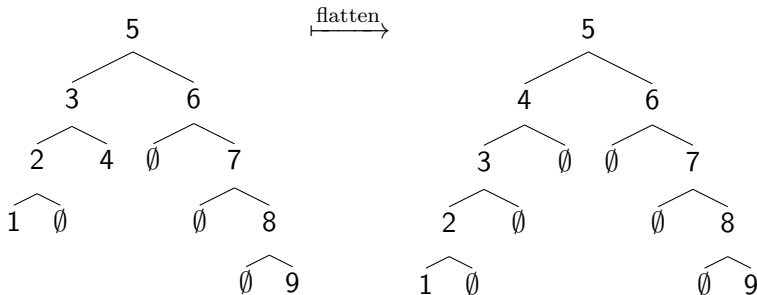
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



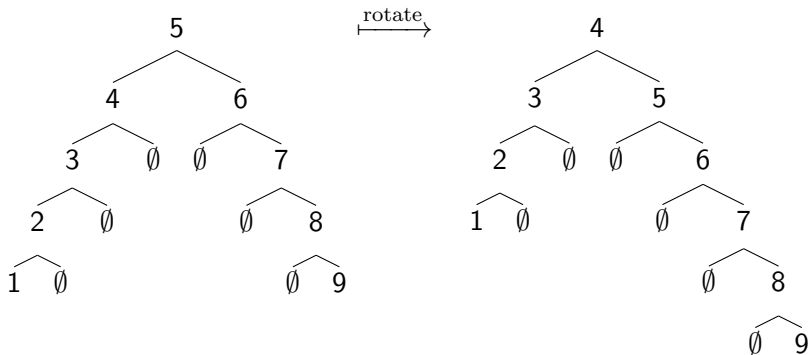
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



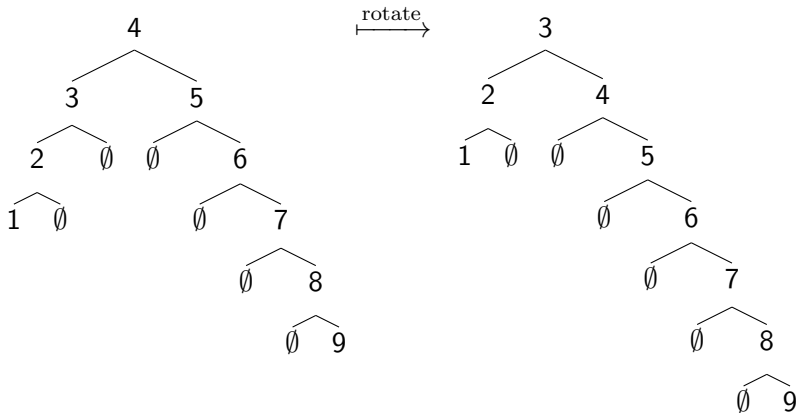
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



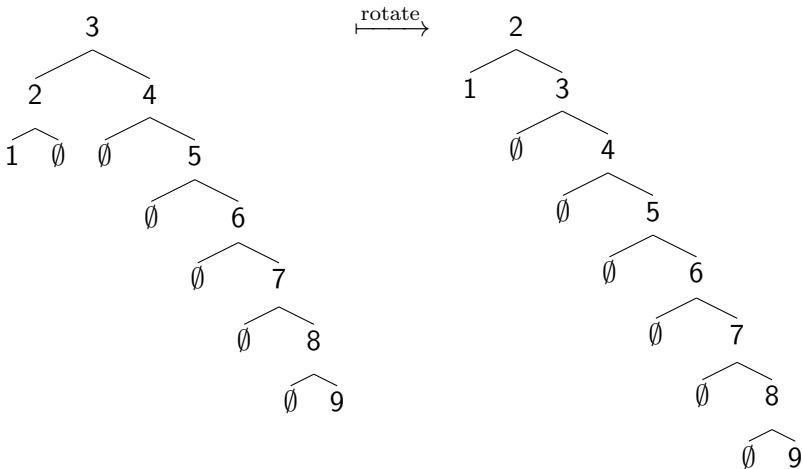
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



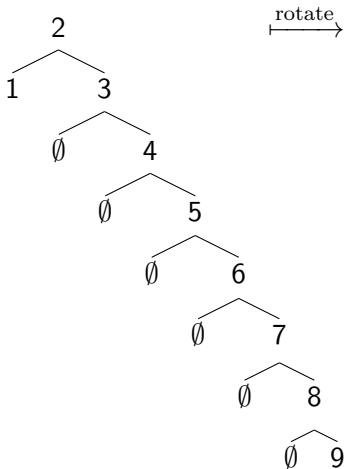
Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)

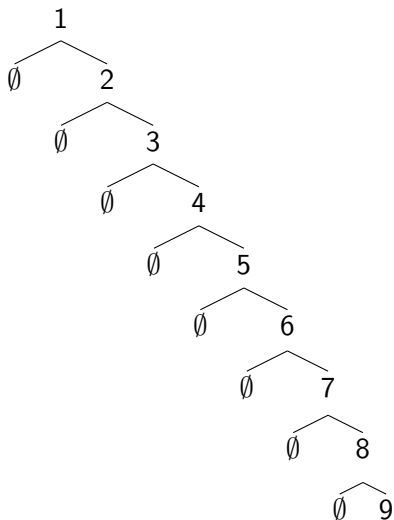


Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)



rotate \longrightarrow



Binary Search Trees – Proof by example

- Every tree can be transformed into a “normal form” (i.e. list)

