

Introduction

The Red-Black tree is a self-balancing binary search tree where each node is either red or black. The tree maintains balance through several properties that ensure it remains approximately balanced.

Step-by-Step Process

The following figures illustrate the Red-Black tree at various stages of the insertion and balancing process:



Figure 1: Step 1

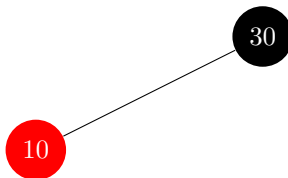


Figure 2: Step 2

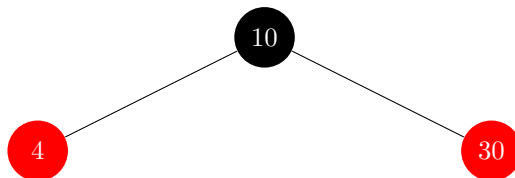


Figure 3: Step 3

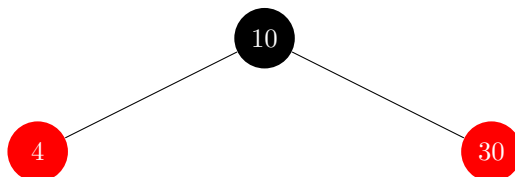


Figure 4: Step 4

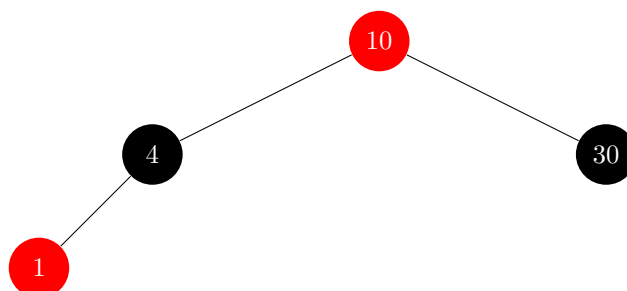


Figure 5: Step 5

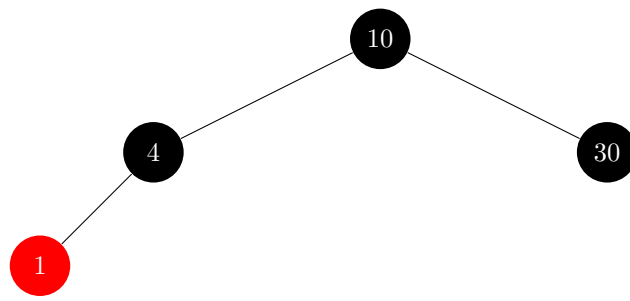


Figure 6: Step 6