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Praktikum Progdas 2

Modul 5

BinaryTreeNode.java

```java
public class BinaryTreeNode {

BinaryTreeNode parent;
BinaryTreeNode left;
BinaryTreeNode right;
int data;

BinaryTreeNode(int new_data) {
  this.data = new_data;
  this.parent = null;
   this.left = null;
   this.right = null;
 }


 void set_parent(BinaryTreeNode other) {
   this.parent = other;
   if (other != null) {
     if (other.data > this.data) {
       other.left = this;
     } else {
       other.right = this;
     }
   }
 }

 void set_left(BinaryTreeNode other) {
   this.left = other;
   if (other != null) {
     other.parent = this;
   }
 }

 void set_right(BinaryTreeNode other) {
   this.right = other;
   if (other != null) {
     other.parent = this;
   }
 }
 boolean is_left() {
   return this.parent != null && parent.left == this;
 }

 boolean is_right() {
    return this.parent != null && parent.right == this;
  }

  boolean has_right_and_left() {
    return this.left != null && this.right != null;
  }

  boolean only_has_left() {
    return this.left != null && this.right == null;
  }

  boolean only_has_right() {
    if (this.right != null || this.left == null) {

    }
    return this.right != null && this.left == null;
  }

  boolean has_no_child() {
    return this.left == null && this.right == null;
  }
  void unset_parent() {
    if (this.is_left()) {
      parent.left = null;
      this.parent = null;

    } else if (this.is_right()) {
      parent.right = null;
      this.parent = null;

    }
  }


  BinaryTreeNode most_left_child() {
    BinaryTreeNode child = this.left;
    while (child.left != null) {
      child = child.left;

    }
    return child;
  }

  BinaryTreeNode most_right_child() {
    BinaryTreeNode child = this.right;
    while (child.right != null) {
      child = child.right;
    }
    return child;
  }

  void print(String spaces, String label) {
     System.out.println(spaces + label + this.data);
     if (this.left != null) {
       this.left.print(spaces +"  ", " LEFT ");
     }
    if (this.right != null) {
      this.right.print(spaces+ "  ", " RIGHT ");
    }
  }

  void print() {
    this.print(" ", "NODE ");
  }

  void infix() {
    System.out.print("( ");
    if (this.left != null) {
      left.infix();
    } else {
      System.out.print("null");
    }
    System.out.print(" " + this.data + " ");
    if (this.right != null) {
      right.infix();
    } else {
      System.out.print("null");
    }
    System.out.print(")");
  }

  void prefix() {
    System.out.print(this.data + "(");
    if (this.left != null) {
      left.prefix();
    } else {
      System.out.print("null");
    }
    System.out.print(" ");
    if (this.right != null) {
      right.prefix();
    } else {
      System.out.print("null");
    }
    System.out.print(") ");
  }
  void postfix() {
    System.out.print("( ");
    if (this.left != null) {
      left.postfix();
    } else {
      System.out.print("null");
    }
    System.out.print(" ");
    if (this.right != null) {
      right.postfix();
    } else {
      System.out.print("null");
    }
    System.out.print(")" + this.data);
  }
}
```

BinaryTree .java

```java
public class BinaryTree {

  BinaryTreeNode root;

  public BinaryTree() {
    this.root = null;
  }

  void print() {
    if (this.root != null) {
      this.root.print();
    }
  }

  void prefix() {
    if (this.root != null) {
      this.root.prefix();
    }
    System.out.println("");
  }

  void infix() {
    if (this.root != null) {
      this.root.infix();
    }
    System.out.println("");
  }
  void postfix() {
    if (this.root != null) {
      this.root.postfix();
    }
    System.out.println("");
  }
  void push(BinaryTreeNode new_node) {
    if (this.root == null) {
      this.root = new_node;
    } else {
      BinaryTreeNode current = this.root;
      while (current != null) {
```

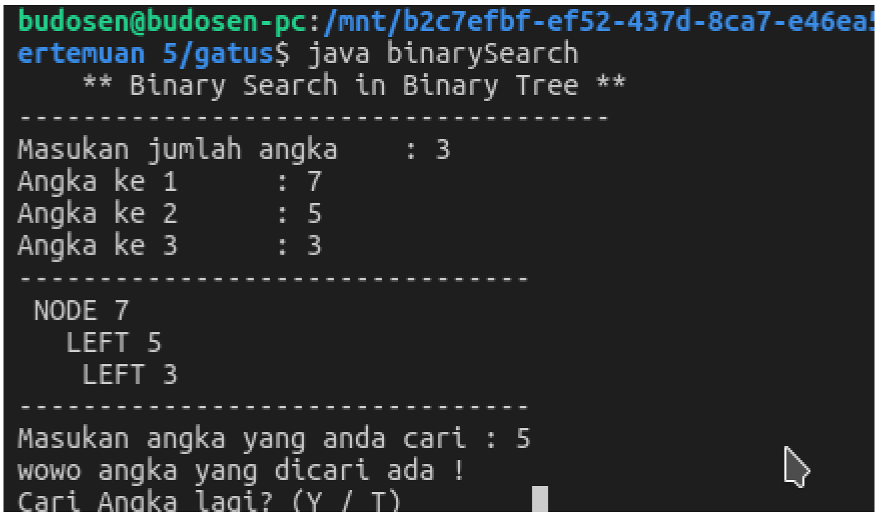
```
      if (new_node.data > current.data) {
        if (current.right == null) {
          current.set_right(new_node);
          break;
        } else {
          current = current.right;
        }
      } else {
        if (current.left == null) {
          current.set_left(new_node);
          break;
        } else {
          current = current.left;
        }
      }
    }
  }
}

void delete(BinaryTreeNode deleted) {
  if (this.root != null) {
    if (deleted.has_no_child()) {
      if (deleted == this.root) {
        this.root = null;
      } else {
        deleted.unset_parent();
      }
    } else if (deleted.only_has_left() || deleted.only_has_right()) {
      BinaryTreeNode replacement = null;
      if (deleted.only_has_left()) {
        replacement = deleted.left;
      } else {
        replacement = deleted.right;
      }
      if (deleted == this.root) {
        this.root = replacement;
        this.root.unset_parent();

      } else if (deleted.is_left()) {
        deleted.parent.set_left(replacement);
        deleted.unset_parent();

      } else if (deleted.is_right()) {
        deleted.parent.set_right(replacement);
        deleted.unset_parent();

      }
    } else {
      BinaryTreeNode replacement = deleted.left;
      if (replacement.right != null) {
        replacement = replacement.most_right_child();
      }
```

```
        BinaryTreeNode parent_of_replacement = replacement.parent;
        if (replacement.only_has_right()) {
          parent_of_replacement.set_left(replacement.right);
        }
        replacement.unset_parent();
        replacement.set_left(deleted.left);
        replacement.set_right(deleted.right);
      if (deleted == this.root) {
          this.root = replacement;
        } else if (deleted.is_left()) {
          deleted.parent.set_left(replacement);
        } else if (deleted.is_right()) {
          deleted.parent.set_right(replacement);
        }
      }
    }
  }

  void caricari(int key) {
    if (this.root == null) {
      System.out.println("Binary Tree Kosong");
    } else {
      BinaryTreeNode current = this.root;
      while (current != null) {
        if (key == current.data) {
          System.out.println("wowo angka yang dicari ada !");
          break;
        }
        if (key > current.data) {
          current = current.right;
        } else {
          current = current.left;
        }
        }
    }

  }

}
```

binarySearch.java

```java
import java.util.Scanner;

public class binarySearch {

  public static void main(String[] args) {
    BinaryTree bt = new BinaryTree();
    Scanner sc = new Scanner(System.in);
    int angka = 0, jumangka, cari;
    char ulang = 'y';

    System.out.println("    ** Binary Search in Binary Tree **");
    System.out.println("-------------------------------------");
    System.out.print("Masukan jumlah angka\t: ");
    jumangka = sc.nextInt();
    for (int i = 0; i < jumangka; i++) {
      System.out.print("Angka ke " + (i + 1) + "\t: ");
      angka = sc.nextInt();
      bt.push(new BinaryTreeNode(angka));
    }
    System.out.println("--------------------------------");
    bt.print();
    do {
      System.out.println("--------------------------------");
      System.out.print("Masukan angka yang anda cari : ");
      cari = sc.nextInt();
      bt.caricari(cari);
      do {
        System.out.print("Cari Angka lagi? (Y / T)\t");
        ulang = sc.next().charAt(0);
      } while (ulang != 't' && ulang != 'y');

    } while (ulang == 'y');

  }

}
```

output :



```
budosen@budosen-pc:/mnt/b2c7efbf-ef52-437d-8ca7-e46ea
ertemuan 5/gatus$ java binarySearch
    ** Binary Search in Binary Tree **
-------------------------------------
Masukan jumlah angka    : 3
Angka ke 1      : 7
Angka ke 2      : 5
Angka ke 3      : 3
--------------------------------
 NODE 7
   LEFT 5
    LEFT 3
--------------------------------
Masukan angka yang anda cari : 5
wowo angka yang dicari ada !
Cari Angka lagi? (Y / T)
```

Terimakasih