import java.util.\*;

class TreeNode {

    int val;

    TreeNode left, right;

    TreeNode(int val) {

        this.val = val;

        this.left = this.right = null;

    }

}

public class Task8 {

    public String serialize(TreeNode root) {

        if (root == null) return "null";

        return root.val + "," + serialize(root.left) + "," + serialize(root.right);

    }

    public TreeNode deserialize(String data) {

        Queue<String> nodes = new LinkedList<>(Arrays.asList(data.split(",")));

        return buildTree(nodes);

    }

    private TreeNode buildTree(Queue<String> nodes) {

        String val = nodes.poll();

        if (val.equals("null")) return null;

        TreeNode node = new TreeNode(Integer.parseInt(val));

        node.left = buildTree(nodes);

        node.right = buildTree(nodes);

        return node;

    }

    public static void main(String[] args) {

 Task8 serializer = new Task8();

        TreeNode root = new TreeNode(1);

        root.left = new TreeNode(2);

        root.right = new TreeNode(3);

        root.right.left = new TreeNode(4);

        root.right.right = new TreeNode(5);

        String serialized = serializer.serialize(root);

        System.out.println("Serialized: " + serialized);

        TreeNode deserialized = serializer.deserialize(serialized);

        System.out.println("Deserialization completed.");

    }

}