CS 2050
Computer Science II

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Agenda

- Binary Trees:
    - Search Trees
    - Expression Trees

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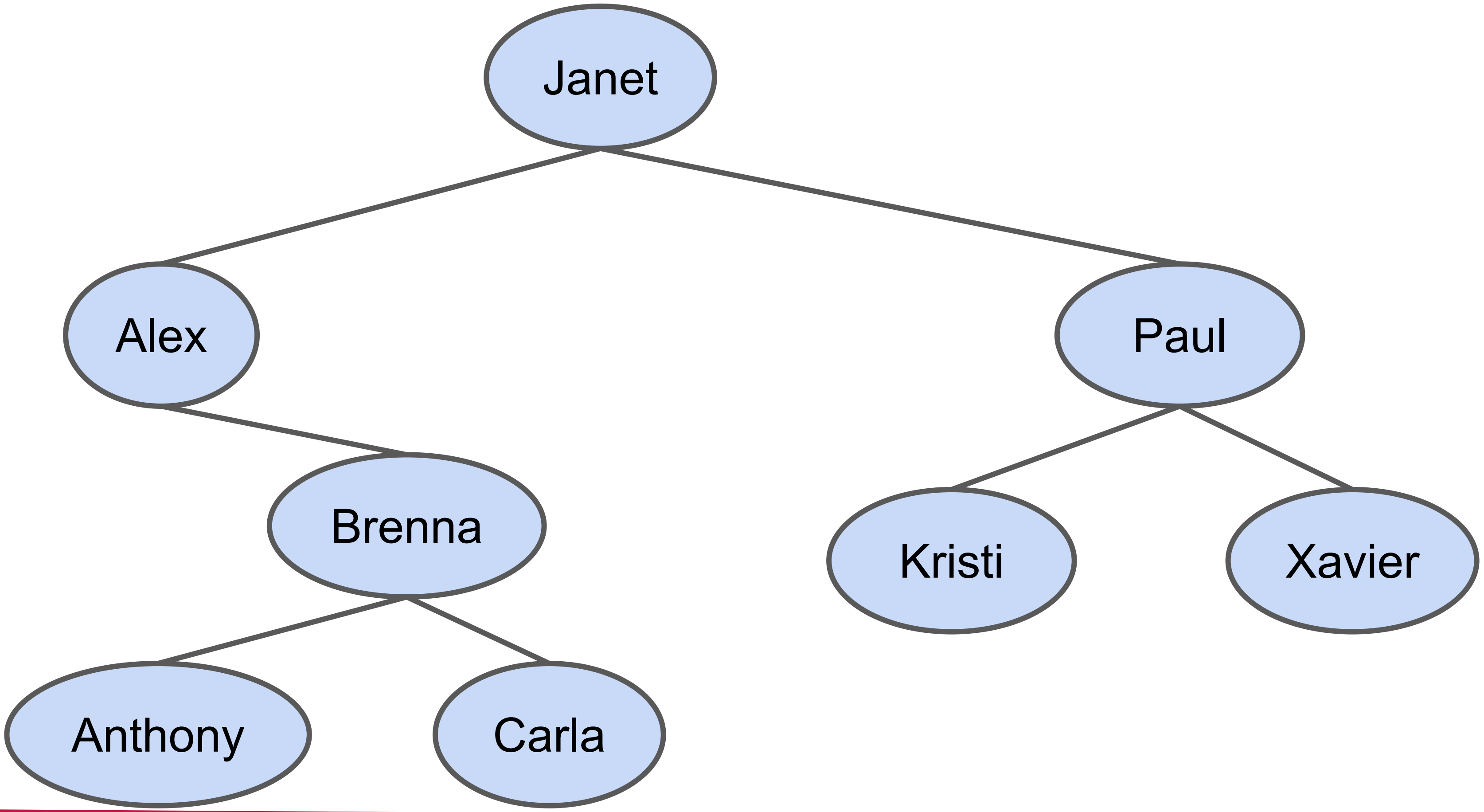
Search Trees



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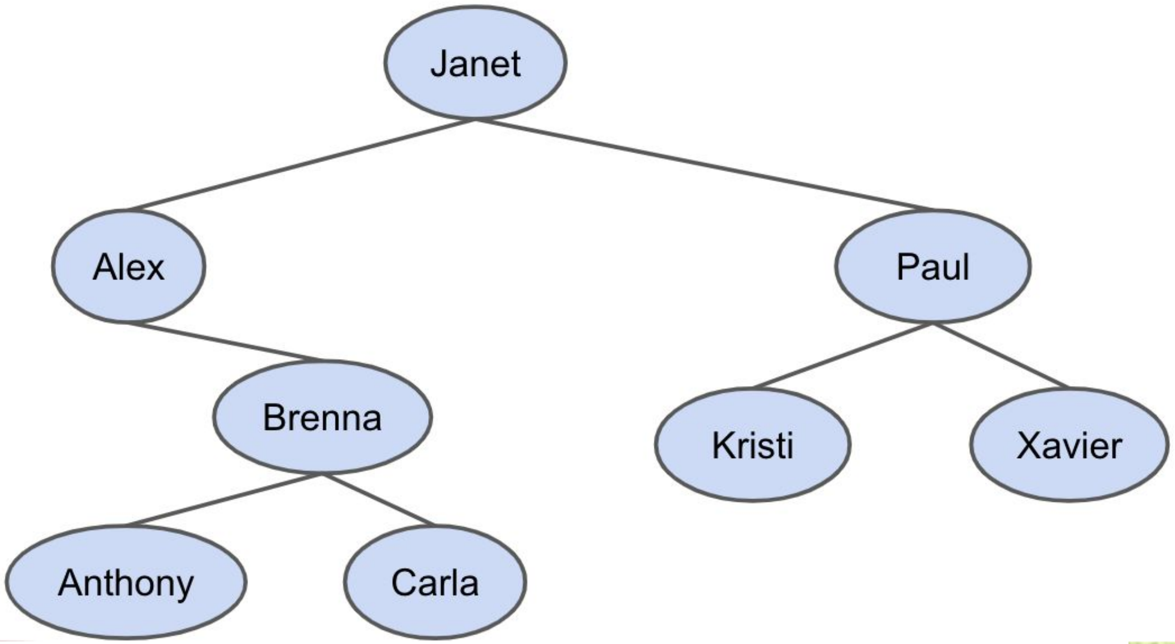
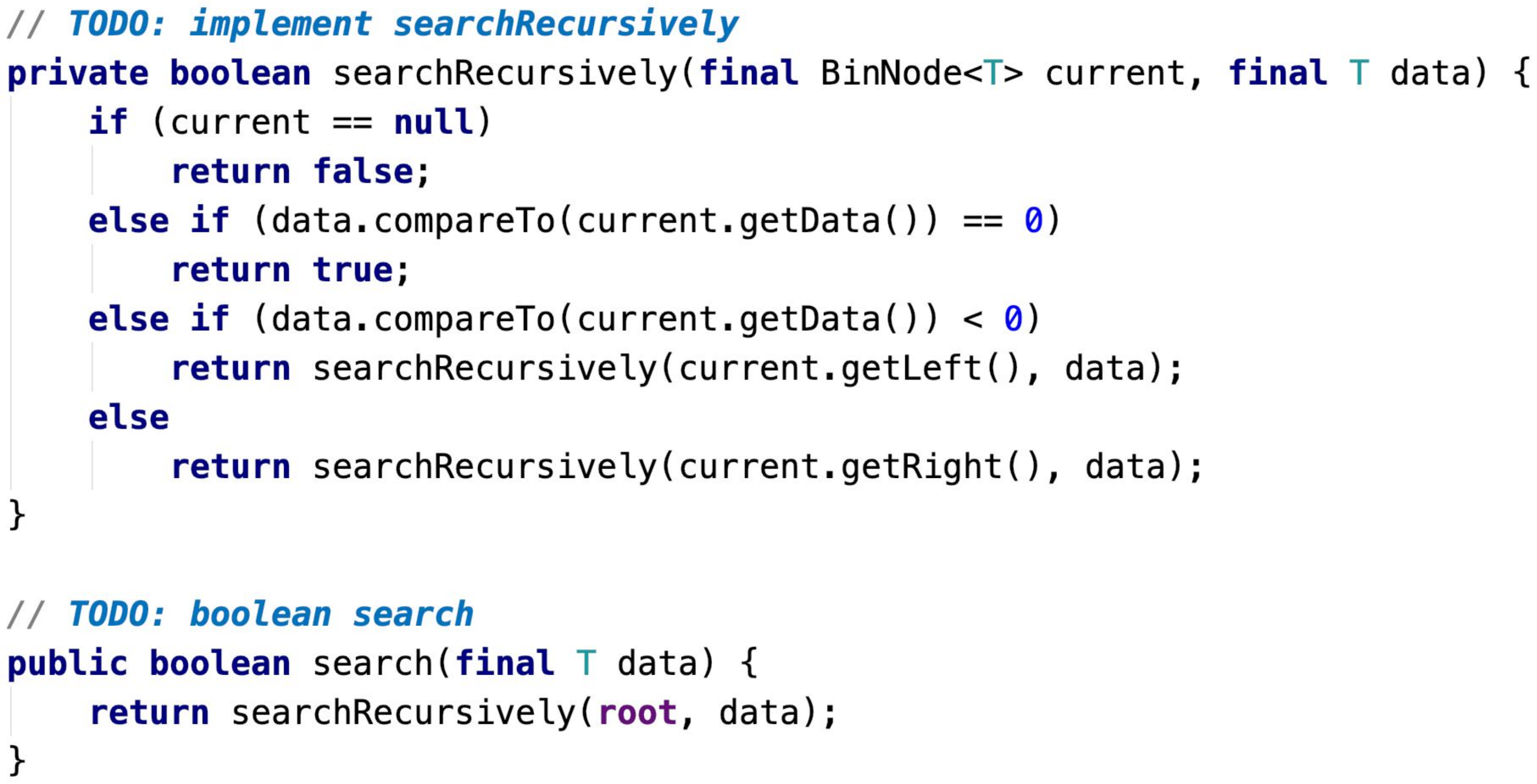
Search Trees

- Practice #1:



Search Trees



```java
// TODO: implement searchRecursively
private boolean searchRecursively(final BinNode<T> current, final T data) {
    if (current == null)
        return false;
    else if (data.compareTo(current.getData()) == 0)
        return true;
    else if (data.compareTo(current.getData()) < 0)
        return searchRecursively(current.getLeft(), data);
    else
        return searchRecursively(current.getRight(), data);
}

// TODO: boolean search
public boolean search(final T data) {
    return searchRecursively(root, data);
}
```

Expression Trees

- Binary trees used to represent arithmetic and boolean expressions
- Nodes can represent operators or operands (constants / variables)
- Operator nodes are always internal nodes while operand nodes are always leaf nodes

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Expression Trees

```
3 - y * 5 + z
```

Expression Trees

$\boxed{\texttt{3 - y}}\ \texttt{* 5 + z}$

```
- 3 y
```

Expression Trees

```
3 - y * 5 + z
```

```
* - 3 y 5
```

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Expression Trees

$$\boxed{3 - y * 5 + z}$$

```
+ * - 3 y 5 z
```

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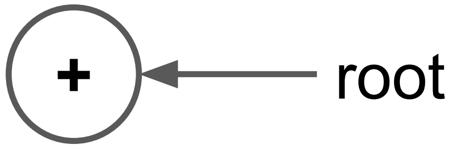
Expression Trees

```
+ * - 3 y 5 z
```

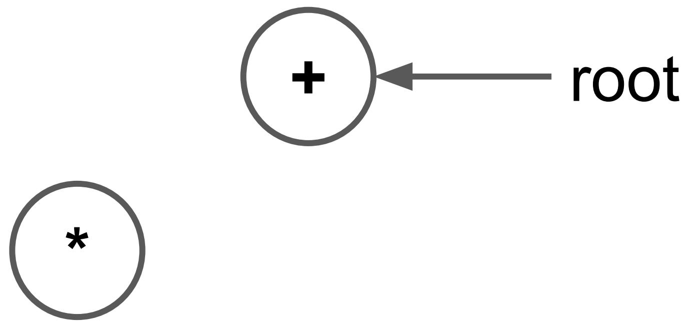
Expression Trees

```
+ * - 3 y 5 z
```



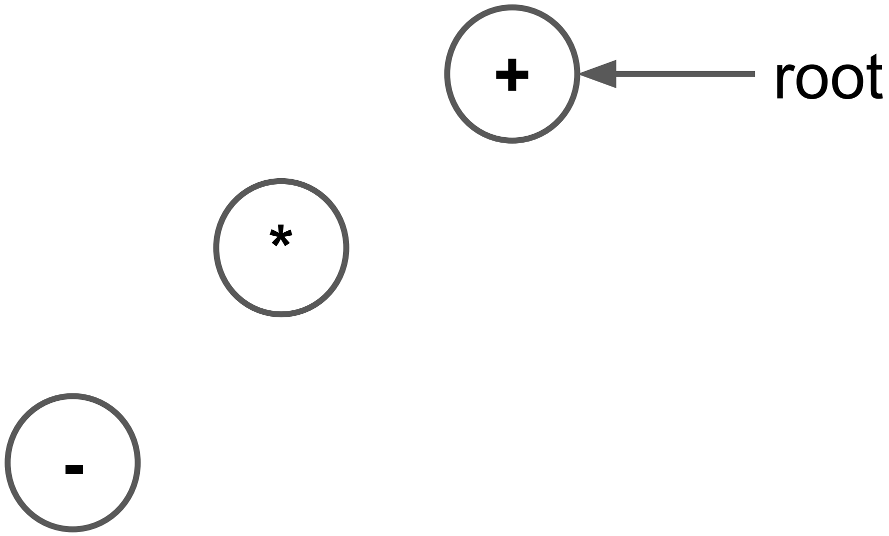
Expression Trees

```
+ * - 3 y 5 z
```



Expression Trees

```
+ * - 3 y 5 z
```



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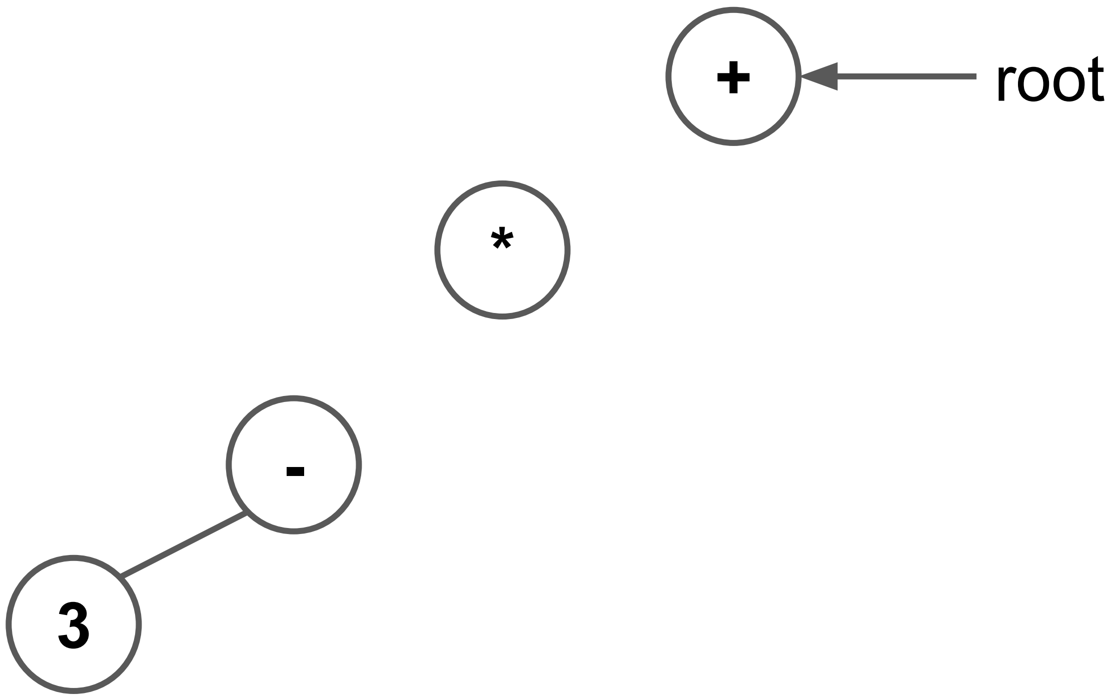
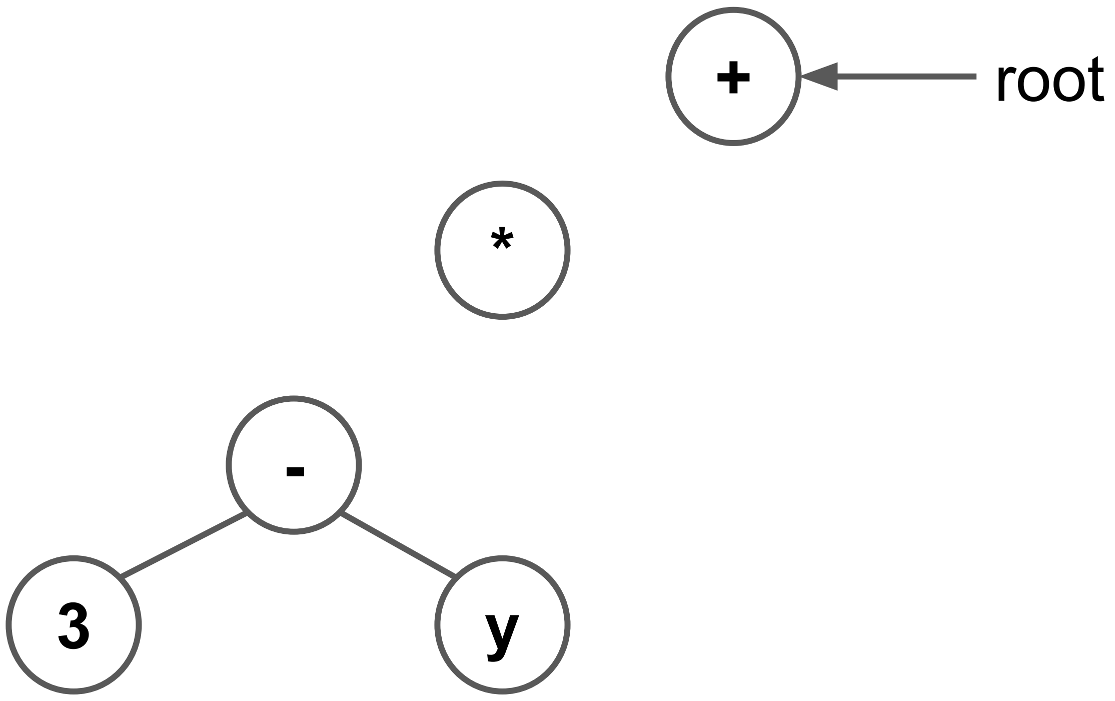
Expression Trees

`+ * - 3 y 5 z`



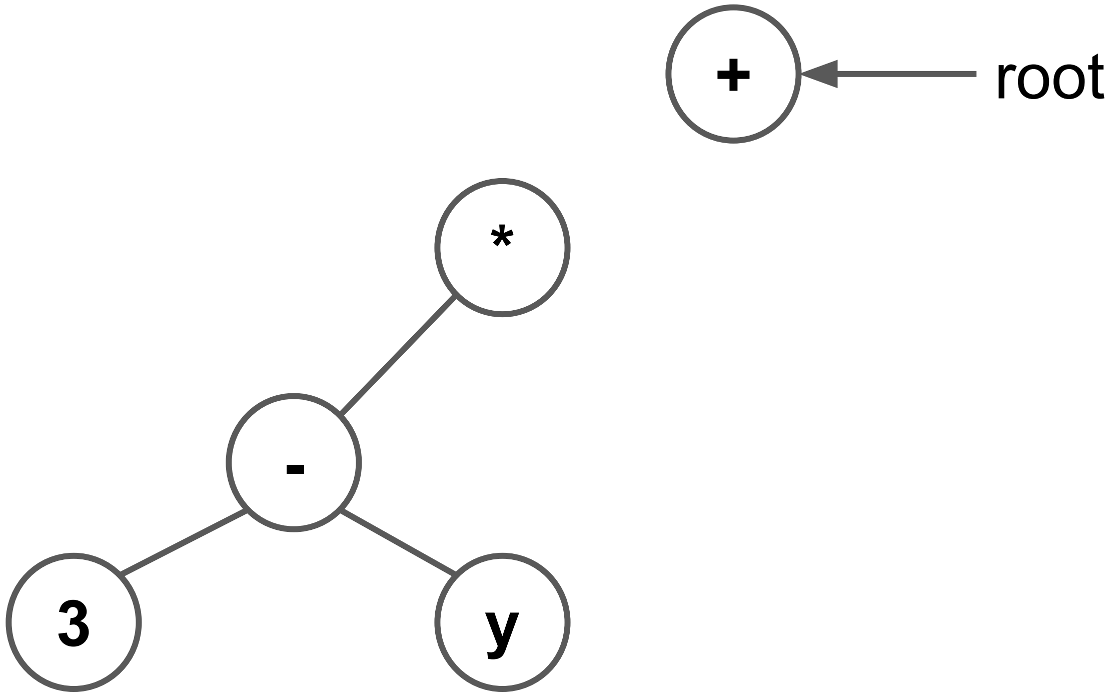
Expression Trees

`+ * - 3 y 5 z`



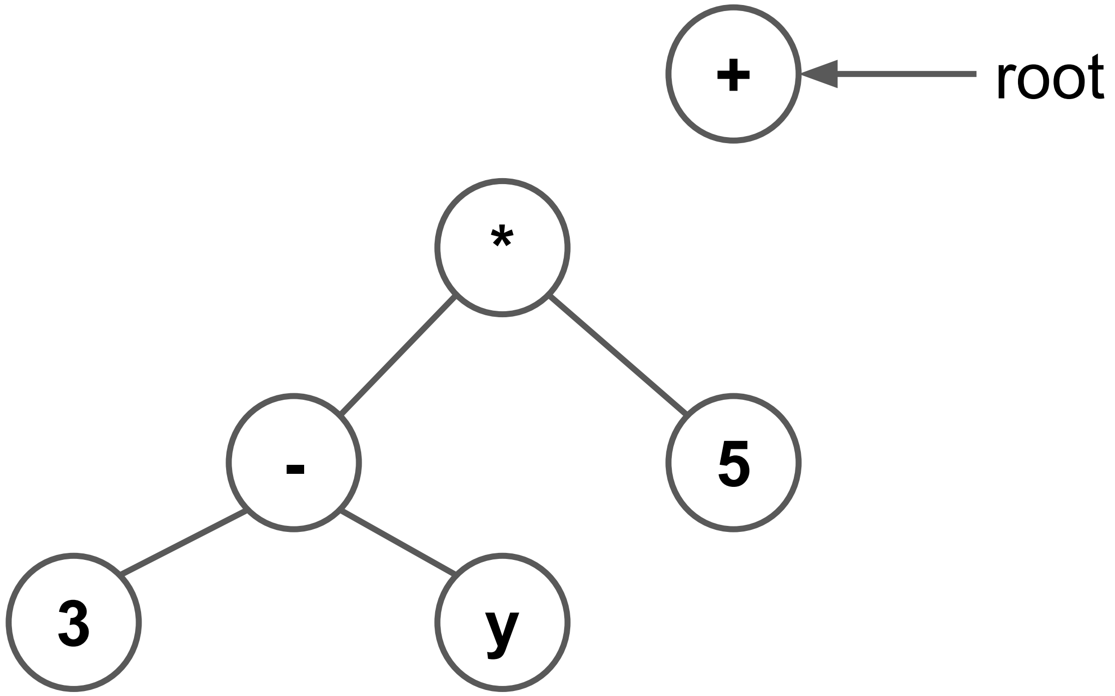
Expression Trees

`+ * - 3 y 5 z`



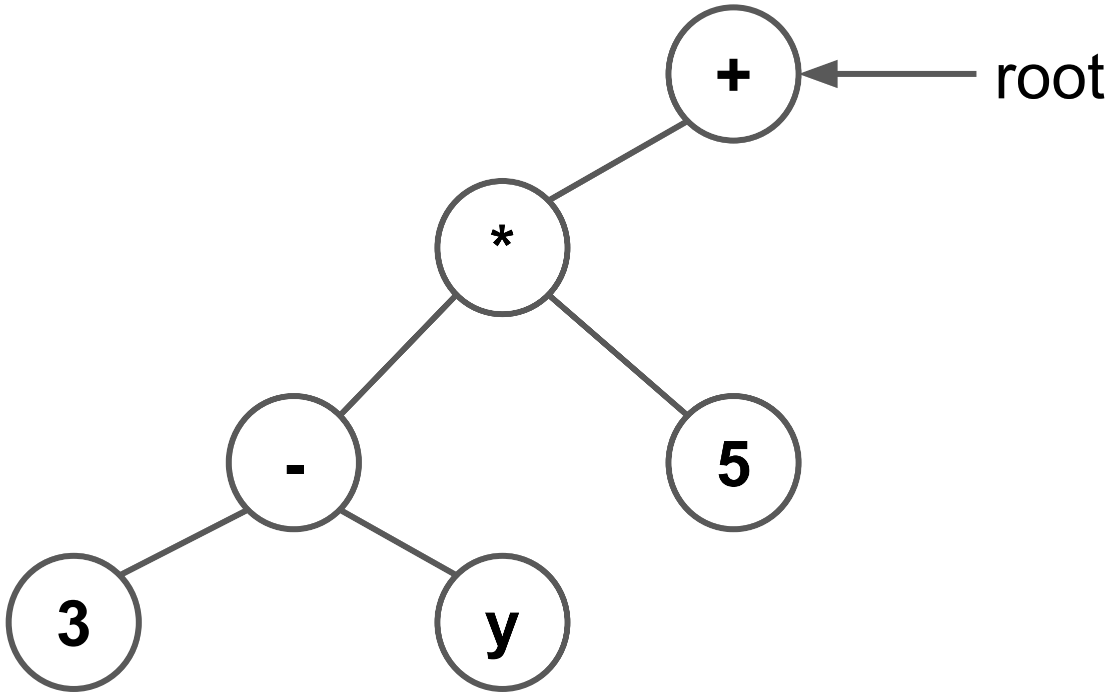
Expression Trees

`+ * - 3 y 5 z`



Expression Trees

`+ * - 3 y 5 z`



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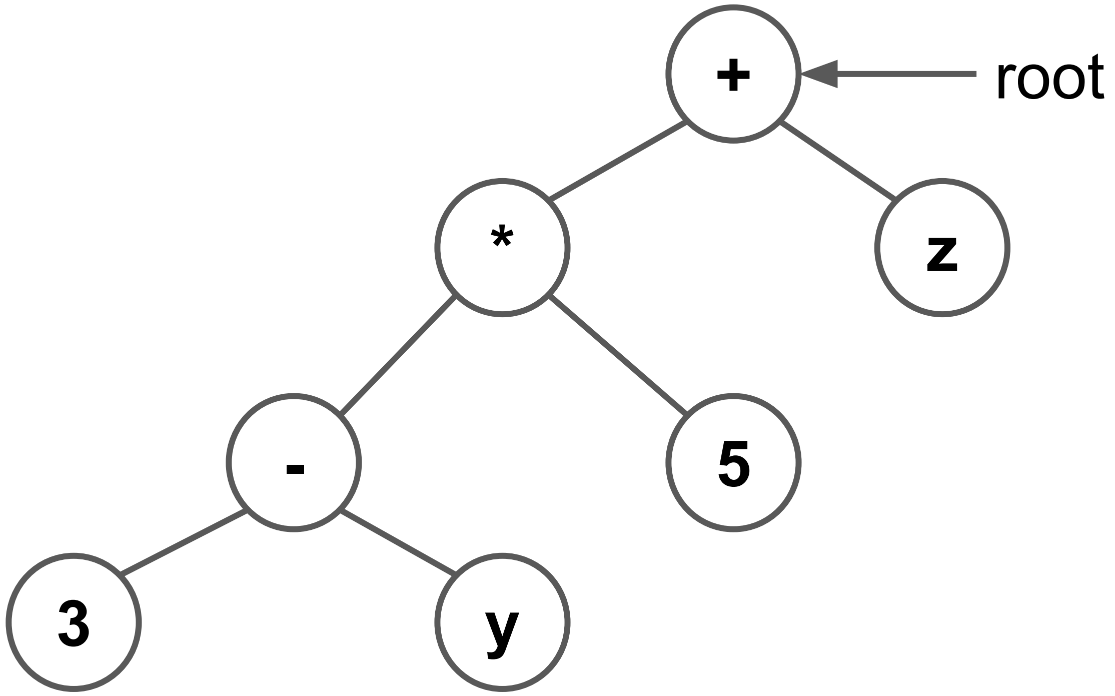
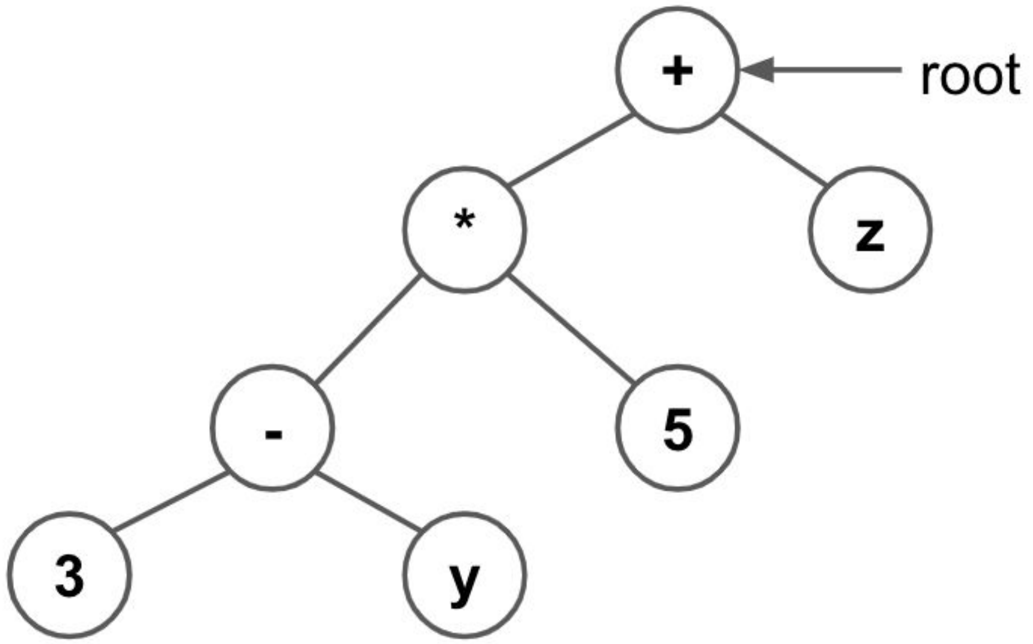
Expression Trees

`+ * - 3 y 5 z`



Expression Trees

- Practice #2:



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