Soal Praktikum *Practicum Case*	BINUS MALANG Institute of Creative Technology
COMP6362 Data Structures	
Teknik Informatika *Computer Science*	CS-COMP6362-Var02.1
Periode Berlaku Mulai Semester Genap 2019/2020 ***Valid on*** *Even Semester Year* 2019/2020	**Revisi 00** *Revision 00*

Learning Outcomes
- Demonstrate how to create any learned data structure
- Analyze the usage of data structure in application

Topic
- Session 08 - Binary Tree

Sub Topics
- Binary Tree Implementation
- Insert Binary Tree
- Pop 1 node
- Pop All
- Searching in Binary Tree

Soal
Case

Mrs. Celine is a Pink Library staff. She wants to make the task of managing the library's book. She asks you as a skillful programmer to make a program using the binary tree concept. Here are the descriptions of the program:

- Program consists of 5 menus:
  1. View All Book
  2. Add Book
  3. Remove Book
  4. Inorder, Preorder, Postorder
  5. Exit and Remove All

- If user chooses **View All Book**, then:
  - If there is no data in the tree, show the message **"--- There is No Book in The Tree ---"**
  - If data is already in the tree, show the book list in this format:
    "Book List:"
    "- [Book's Name] ([Book's Number])"

- If user chooses **Add Book**, then:
  - Ask user to input **book's name**. Validate that the length of **book's name** must be **between 3 and 50 characters**.
  - Ask user to input **book's number**. Validate that **the book's number** must be **between 1 and 100**.
  - If **the book's number** already exists, show the message **" * Book's Number Cannot be the Same, Please Input Other Number * "**
  - If tree is still empty, then data will be inserted automatically.
  - Otherwise, ask the user to input **the direction** where the data will be placed. Validate that **the direction** must be between **"left" and "right"**.
    - ✓ If the direction chosen is **"left"**, the data will be pushed to the left of current node.
    - ✓ If the direction chosen is **"right"**, the data will be pushed to the right of current node.
  - Maximum tree level is 4. If level is already at maximum, show the message **"--- Maximum Tree Level is 4 ---"**
  - If data has been successfully inputted, show the message **"--- Add Book Success ---"**

- If user chooses **Remove Book**, then:
  - If there is no data in the tree, show the message **"--- There is No Book in The Tree ---"**
  - If data is already in the tree, ask user to input **book's number**. Validate that **the book's number** must be **between 1 and 100**.
  - If the data can be found, delete the node and its child nodes and show the message **"--- The Book Has Been Removed ---"**
  - If data cannot be found, show the message **"--- The Book Doesn't Exist ---"**

- If user chooses **Inorder, Preorder, Postorder**, then:
  - If there is no data in the tree, show the message **"--- There is No Book in The Tree ---"**
  - If data is already in the tree, show the **book's number** in in-order, pre-order, and post-order.

- If user chooses **Exit and Remove All**, then:
  - Delete all data in the linked list.
  - Program ends.

Please run the EXE file to see the sample program.

Print Screen of Main Menu

Print Screen of View All Book Menu (Menu '1') When there is no book in the tree

```
--- There is No Book in The Tree ---
```

Print Screen of View All Book Menu (Menu '1')

```
Book List :
- Senja di Ufuk Malam  (1)
- Srikandi Barat       (2)
- Sudah Dong!          (3)
- Sudah Selesai        (7)
- Keluarga Cemara      (15)
```

Print Screen of Add Book Menu (Menu '2') When The Tree Was Still Empty

```
Input Book's Name [3..50]: Senja di Ufuk Malam
Input Book's Number [0..100]: 1


--- Add Book Success ---
```

Print Screen of Add Book Menu (Menu '2') When The Tree is Not Empty

```
Input Book's Name [3..50]: Srikandi Barat
Input Book's Number [0..100]: 2
Will He Be in 'left' or 'right' Senja di Ufuk Malam ?: left


--- Add Book Success ---
```

Print Screen of Add Book Menu (Menu '2')
When The Tree is Not Empty and Inputed Book is Reached The Maximum Tree Level

```
Input Book's Name [3..50]: After Me
Input Book's Number [0..100]: 90
Will He Be in 'left' or 'right' Senja di Ufuk Malam ?: right
Will He Be in 'left' or 'right' Sudah Dong! ?: right
Will He Be in 'left' or 'right' Sudah Selesai ?: right
Will He Be in 'left' or 'right' Keluarga Cemara ?: right


--- Maximum Tree Level is 4 ---
```

Print Screen of Remove Book Menu (Menu '3') When The Tree is Empty

```
--- There is No Book in The Tree ---
```

Print Screen of Remove Book Menu (Menu '3')

```
Input Book's Number That You Want to Be Removed [0..100]: 15


--- The Book Has Been Removed ---
```

Print Screen of Inorder, Preorder, Postorder Menu (Menu '4') When The Tree is Empty

```
--- There is No Book in The Tree ---
```

Print Screen of Inorder, Preorder, Postorder Menu (Menu '4')

```
Preorder  : 1 2 3 7 15
Inorder   : 2 1 3 7 15
Postorder : 2 15 7 3 1
```