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| Soal Praktikum <i>Practicum Case</i> |  |
| COMP6362 Data Structures | |
| Teknik Informatika <i>Computer Science</i> | CS-COMP6362-Var04.3 |
| Periode Berlaku Mulai Semester Genap 2020/2021 <i>Valid on Even Semester Year 2020/2021</i> | Revisi 00 <i>Revision 00</i> |

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

Ms. Diana works in a tourism office. She wants to make the code of managing the tourism objects at East Java. 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 Tourism Objects
 2. Add Tourism Objects
 3. Remove Tourism Objects
 4. Inorder, Preorder, Postorder
 5. Exit and Remove All
- If user chooses **View All Tourism Objects**, then:
 - If there is no data in the tree, show the message “-- There is No Tourism Object in The Tree --”
 - If data is already in the tree, show the Tourism Objects list in this format:
“Tourism Objects:”
“- [Tourism Object’s Name] ([Tourism Object’s Code])”

- If user chooses **Add Tourism Object**, then:
 - Ask user to input **Tourism Object's name**. Validate that the length of **Tourism Object's name** must be **between 3 and 20 characters**.
 - Ask user to input **Tourism Object's code**. Validate that **the Tourism Object's code** must be **between 0 and 100**.
 - If **the Tourism Object's code** already exists, show the message “ * **Tourism Object's Code Cannot be the Same, Please Input Other Code** * ”
 - 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 Tourism Object Success ---**”
- If user chooses **Remove Tourism Object**, then:
 - If there is no data in the tree, show the message “**-- There is No Tourism Object in The Tree --**”
 - If data is already in the tree, ask user to input **Tourism Object's code**. Validate that **the Tourism Object's Code** must be **between 0 and 100**.
 - If the data can be found, delete the node and its child nodes, and show the message “**--- The Tourism Object Has Been Removed ---**”
 - If data cannot be found, show the message “**--- The Tourism Object Doesn't Exist ---**”
- If user chooses **Inorder, Preorder, Postorder**, then:
 - If there is no data in the tree, show the message “**-- There is No Tourism Object in The Tree --**”
 - If data is already in the tree, show the **Tourism Object's code** 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

```
EAST JAVA TOURISM OBJECT CODE
*****

1. View All Tourism Object
2. Add Tourism Object
3. Remove Tourism Object
4. Inoder, Preorder, Postorder
5. Exit and Remove All

>> Input choice :
```

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

```
--- There is No Tourism Object in The Tree ---
```

Print Screen of View All Tourism Object Menu (Menu '1')

```
Tourism Object List :
- Bromo Mountain      (75)
- Klayar Beach         (45)
- Jatim Park           (20)
- Panderman Hill       (24)
- Tiga Warna Beach    (22)
```

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

```
Input Tourism Object's Name [3..20]: Bromo Mountain
```

```
Input Tourism Object's code [0..100]: 75
```

```
--- Add Tourism Object Success ---
```

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

```
Input Tourism Object's Name [3..20]: Tiga Warna Beach
```

```
Input Tourism Object's code [0..100]: 22
```

```
Will He Be in 'left' or 'right' Bromo Mountain ?: right
```

```
--- Add Tourism Object Success ---
```

Print Screen of Add Tourism Object Menu (Menu '2')

When the tree is not empty and inputted tourism object has reached the maximum tree level

```

Input Tourism Object's Name [3..20]: Coban Rondo
Input Tourism Object's code [0..100]: 35
Will He Be in 'left' or 'right' Bromo Mountain ?: left
Will He Be in 'left' or 'right' Klayar Beach ?: left
Will He Be in 'left' or 'right' Jatim Park ?: left
Will He Be in 'left' or 'right' Panderman Hill ?: left

--- Maximum Tree Level is 4 ---

```

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

```

--- There is No Tourism Object in The Tree ---

```

Print Screen of Remove Tourism Object Menu (Menu '3')

```

Input Tourism Object's code That You Want to Be Removed [0..100]: 24

--- The Tourism Object Has Been Removed ---

```

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

```

--- There is No Tourism Object in The Tree ---

```

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

```

Preorder  : 75 45 20 24 22
Inorder   : 24 20 45 75 22
Postorder : 24 20 45 22 75

```