# UAT\_Stack

UAT\_Stack is a stack (Last in First Out [LIFO]) data structure written in C++. It is implemented using nodes that can store data that is generic in nature (can be whatever data type desired though the data stored must be of a consistent type). When data is added to the stack, a new node is created and all other nodes are pushed down lower in the stack. Linkages between the nodes on the stack are managed with smart pointers to prevent memory leaks.

## Classes

### StackNode

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| --- | --- | --- | --- |
| Name | Parameter(s) | Return Type | Description |
| StackNode | None | N/A | Creates a new StackNode with no data. |
| StackNode | generic\_type | N/A | Creates a new StackNode that stores the data passed in of the data type specified. |
| ~StackNode | None | N/A | Destroys a StackNode object and decrements the reference counter. |
| GetData | None | generic\_type | Returns the data stored in the StackNode. |
| GetNext | None | shared\_ptr<StackNode> | Returns the shared\_ptr to the next node in the stack. |
| SetNext | shared\_ptr<StackNode> | None | Sets the pointer to the next node. |

### UAT\_Stack

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| --- | --- | --- | --- |
| Name | Parameter(s) | Return Type | Description |
| UAT\_Stack | None | N/A | Construct a new UAT\_Stack object that is empty (contains no nodes). |
| UAT\_Stack | generic\_type | N/A | Construct a new UAT\_Stack object with a new top node that contains the data passed in as a parameter. |
| init | None | void | Code to initialize an empty UAT\_Stack object. |
| ~UAT\_Stack | None | N/A | Destroys the UAT\_Stack object by iterating through all nodes on the stack and deleting them. |
| PushNode | shared\_ptr<StackNode> | bool | Adds the node pointed to by the passed in smart pointer to the top of the stack. |
| Push | generic\_type | void | Creates a new StackNode and adds it to the top of the Stack. |
| Pop | StackNode | shared\_ptr<StackNode> | Removes a node from the top of the stack and returns a smart pointer to that node. |
| PopValue | None | generic\_type | Removes a node from the top of the stack and returns the data stored in that node. |
| PeekValue | None | generic\_type | Returns the data stored in the node at the top of the stack. The node on top is not removed from the stack. |
| Peek | None | shared\_ptr<StackNode> | Returns a smart pointer to the node on the top of the stack. The node on top is not removed from the stack. |
| GetSize | None | int | Returns the size of the stack (number of nodes stored in the stack). |
| PrintStack | None | void | Prints the data stored in the stack to Standard Output (usually the screen). |

### Main / Testing

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| --- | --- | --- | --- |
| Name | Parameter(s) | Return Type | Description |
| main | None | int | When executed directly, this is the function that starts everything off, by calling the menu function. |
| Menu | None | None | Displays a menu that will enable the usage of the UAT\_Stack classes and can be used to initiate the automated testing suites. |
| TestingSuite | None | bool | Initiates the Node and Stack testing suites and determines if both suites pass testing. |
| NodeTestingSuite | None | bool | Executes the automated testing for the StackNode class. |
| StackTestingSuite | None | bool | Executes the automated testing for the UAT\_Stack class. All functions are tested. |