**National University of Computer and Emerging Sciences**



# Laboratory Manual 06

*for*

# Data Structure

**Department of Computer Science**

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**Objectives:**

In this lab, students will practice:

* Stacks using Arrays

**STACKS**

# Task 1:

Implement a template-based stack using Array. The required member methods are:

**bool isFull():** return true if stack is full else false.

**int size()**: returns the count of total elements stored in the stack.

**bool isEmpty()**: returns true if the stack is empty else false.

**bool top(T&)**: returns, but does not delete, the topmost element from the stack via the parameter passed by reference. It returns false via a return statement if there is no element in the stack, else it returns true and assigns the top most element to the parameter passed by reference.

**void pop()**: deletes the top most element from the stack. If there is no element, return some error.

# Task 2:

Given an expression containing opening and closing braces, brackets, and parentheses. Implement a function “**isBalanced**” to check whether the given expression is a balanced expression or not, using your stack implementation.

bool isBalanced(string exp)

For example, {[{}{}]}[()], {{}{}}, and []{}() are balanced expressions, but {()}[) and {(}) are not balanced. In your main function, test your function using the given.

Kindly add this question in manual also

# Task 3:

"Design a basic media player in C++ using a stack data structure. The player should be able to push and pop media files (such as songs) onto and off the stack, and play the topmost file.”

class MediaPlayer {

private:

    stack<string> playlist;

public:

    void addToPlaylist(const string& media) // this function will add media onto the playlist

    void removeFromPlaylist() // it remove element from the playlist

    void play() // it will play element from the playlist

    void displayPlaylist() // it will display the playlist

};

int main() {

    MediaPlayer player;

    player.addToPlaylist("Song 1");

    player.addToPlaylist("Song 2");

    player.addToPlaylist("Song 3");

    player.displayPlaylist();

    player.play();

    player.removeFromPlaylist();

    player.displayPlaylist();

    return 0;

}