National University of Computer and Emerging Sciences

Laboratory Manual

for

Data Structures Lab

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In this lab, students will practice:

1. Stack Implementation using a Singly Linked List
2. The applications of Stacks

Question 1:

1. Implement a template-based stack using a singly linked list. The required member methods are:

int size(): returns the count of total element 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.

push(T const& e): pushes the element "e" on top of the stack.

Question 2:

"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. Additionally, include functionalities to skip to the next file, rewind to the previous file, and display the current playing 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;
}
```