Activity No. 4.2	
Stacks - String elements	
Course Code: CPE010	**Program:** Computer Engineering
Course Title: Data Structures and Algorithms	**Date Performed:** 08 - 28 - 25
Section: CPE21S4	**Date Submitted:** 08 - 28 - 25
Name(s): Santiago, David Owen A.	**Instructor:** Engr. Jimlord Quejado

6. Output

Header File:

```cpp
1    #ifndef STACK_H
2    #define STACK_H
3    #define MAX 10
4    #include <iostream>
5
6    template<typename T>
7    class stack{
8        private:
9            int top = -1;
10           T arr[MAX];
11
12       public:
13           //isEmpty
14           bool isEmpty(){
15               return(top < 0);
16           }
17
18           //isFull
19           bool isFull(){
20               return(top >= MAX-1);
21           }
22
23           //peek
24
25           void peek(){
26               if (isEmpty()){
27                   std::cout << "Stack is empty\n";
28               }
29               else{
30                   std::cout << "The top element of the stack is: "<< arr[top] << std::endl;
31               }
32           }
33
34           //push
35           void push(T value){
36               if (isFull()){
37                   std::cout << "Stack overflow" << std::endl;
38               }
39               else{
40                   arr[++top] = value;
41                   std::cout << "Successfully pushed the value " << value <<" into the stack\n";
42               }
43           }
44
45           //pop
46           void pop(){
47               if(isEmpty()){
48                   std::cout << "Stack is empty\n";
49               }
50               else{
51                   std::cout << "Successfully popped " << arr[top--] << std::endl;
52               }
53           }
```

```cpp
        //display
        void display(){
            if(isEmpty()){
                std::cout << "Stack is empty\n";
            }
            else{
                std::cout << "The elements of the stack are: ";
                for(int i = top; i >= 0; i--){
                    std::cout << arr[i] << " ";
                }std::cout<<'\n';
            }
        }
};


#endif
```

Main File and Header Implementation:

```cpp
1    #include <iostream>
2    #include "stack.h"
3
4
5
6    int main(){
7
8        stack<int> s1;
9        std::cout<<"Santiago Stacks Array Implementation \n\n";
10       std::cout << "Testing push: \n";
11       for(int i = 0; i < 10; i++){
12           s1.push(i + 1);
13       }
14       std::cout<<"\nTesting Display: \n";
15       s1.display();
16
17       std::cout<<"\nTesting Peek: \n";
18       s1.peek();
19
20       std::cout<<"\nTesting Pop: \n";
21       s1.pop();
22       s1.peek();
23       s1.display();
24
25
26       return 0;
27   }
```

Output:


```
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Santiago Stacks Array Implementation

Testing push:
Successfully pushed the value 1 into the stack
Successfully pushed the value 2 into the stack
Successfully pushed the value 3 into the stack
Successfully pushed the value 4 into the stack
Successfully pushed the value 5 into the stack
Successfully pushed the value 6 into the stack
Successfully pushed the value 7 into the stack
Successfully pushed the value 8 into the stack
Successfully pushed the value 9 into the stack
Successfully pushed the value 10 into the stack

Testing Display:
The elements of the stack are: 10 9 8 7 6 5 4 3 2 1

Testing Peek:
The top element of the stack is: 10

Testing Pop:
Successfully popped 10
The top element of the stack is: 9
The elements of the stack are: 9 8 7 6 5 4 3 2 1

-------------------------------
Process exited after 0.01868 seconds with return value 0
Press any key to continue . . . |
```

7. Supplementary Activity

8. Conclusion

In this activity, I was able to create a cpp header file that contains the functions necessary in creating a stack using array implementation. I created each function, namely—isFull, isEmpty, pop, push, peek, and display. Moreover, I was able to learn and fully understand the logic behind each function and each implementation of stacks in cpp. I believe this activity was perfect in helping me actively learn how to create these functions and how the full program flow goes. All in all, I hope for more activities like this in the future as it trains my brain to actively learn which is helpful in improving my skills directly.

9. Assessment Rubric