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UNIVERSITY INSTITUTE OF ENGINEERING

Department of Computer Science & Engineering

(BE-CSE-5th Sem)

Subject Name: Design and Analysis of Algorithms.

Subject Code: 23CSH-301

Submitted to:

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Worksheet-1

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Semester : 5 **Date of Performance: 22/07/2025**
Subject Name: DAA **Subject Code: 23CSH-301**

1.Aim: Create stack, using templates, perform peek push and pop operations and check underflow and overflow condition.

2.Requirements(Hardware/Software): Online C++ compiler.

3.Procedure:

```
#include <iostream>
usingnamespacestd;
template <class T>
class Stack {
Tarr[5];
int top;
int size;
public:
Stack(){
top=-1;
size=5;
}
void push(T val) {
if(top==size-1){
cout<<"Stack Overflow!"<<endl;
}else {
```

```
arr[++top]=val;
cout<<val<<"pushed to stack"<< endl;
}
}
voidpop(){
if(top==-1){
cout<<"Stack Underflow!"<< endl;
}else {
cout<<arr[top--]<<"popped from stack"<< endl;
}
}
void peek() {
if(top==-1){
cout<<"Stack is empty!"<<endl;
}else {
cout<<"Top elementis:"<<arr[top]<<endl;
}
}
};
int main() {
Stack<int>s;
s.push(10);
s.push(20);
s.peek();
s.pop();
s.peek();
return0;

}
```

Algorithm:

1. Start
2. Initialize
   - top=-1
   - size=5
   - arr[size](array to hold stack elements)

Push Operation (push(x))

If top ==size-1

- Print "Stack Overflow"
- Return

Else

- Increment top by1
- Set arr[top] =x
- Print "x pushed to stack"

Pop Operation(pop())

If top == -1

Print"Stack Underflow"

Return

Else:

Print "arr[top] popped from stack"

Decrement top by 1

Peek Operation(peek())

If top == -1

Print "Stack is empty"

Else{

Print "arr[top]"

3. End

TimeComplexity:

Push operation : O(1)
Pop operation : O(1)
Peek operation : O(1)

Space complexity: O(n)

Output: