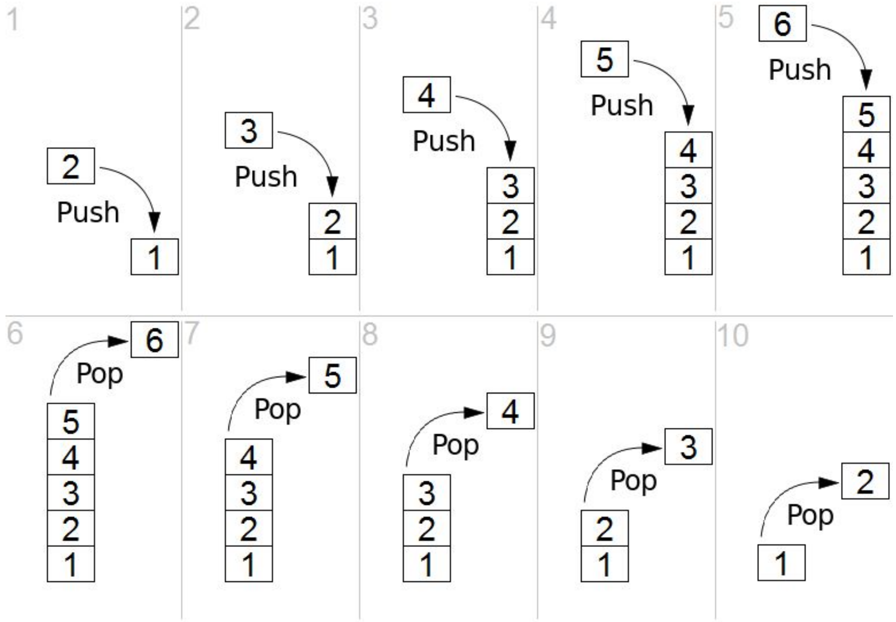
Lab 6: Interface

Stack: Stack is an abstract data type that serves as a collection of elements, with two principal operations: push, which adds an element to the collection, and pop, which removes the most recently added element that was not yet removed [1].



Simple representation of a stack runtime with push and pop operations.[1]

Exercise 1: Create a Project

1. Create a project called "lab6"
   a) If you are using Eclipse create a project in Eclipse as we did in previous weeks.
   b) If you are using text editor, create a "lab6" directory in "java" directory which is in your home directory.

Exercise 2: Create a Stack Interface

1. Create a Stack interface in package named "stack"
   a) If you are using text editor, create "stack" directory in "lab6" directory. In this "stack" directory, create a java file called Stack.java. The first line of this file should be:

2. In Stack interface declare the following methods.

```
public void push(Object item);

public Object pop ();
public boolean empty();
```

Exercise 3: Create StackImpl and StackItem Classes

1. Create a StackItem class in stack package.
   a) Stack Item have two instance variables:
      i. Object item;
      ii. StackItem next;
   b) StackItem has a constructor which sets the item variable
   c) StackItem has accessor method for its variables and a mutator method for only next variable
2. Create a StackImpl class which implements the Stack interface
   a) StackImpl has an instance variable
      i. StackItem top;
   b) Implement the methods in the StackImpl class

Exercise 3: Create StackDemo class to test the StackImpl class

1. Create a StackDemo class in demo package.
2. Add the following method to the class

```
public static void main(String[] args) {
    Stack stack = new StackImpl();
    stack.push("A");
    stack.push("B");
    stack.push("C");
    stack.push("D");
    while (!stack.empty()){
        System.out.println(stack.pop());
    }
}
```

Exercise 4: Create and Test StackArrayListImpl class

1. Create a StackArrayImpl class which implements the Stack interface in stack package.
   a) StackArrayImpl has an instance variable:
      i. ArrayList stack = new ArrayList();
   b) Implement the methods in the StackArrayImpl class
2. In the StackDemo class initialize the stack variable to an instance of StackArrayImpl instead of StackImpl as below and rerun the StackDemo class
   a) Stack stack = new StackImpl();

Rerefences

[1] https://en.wikipedia.org/wiki/Stack_(abstract_data_type)