**Fully functional Stack class (50pts, +10 ec)**

**Project Description & Goal**

The goal of this project is to understand the basics of a Stack data structure. We will be building upon this project in the next iteration when we talk about abstraction and inheritance.

**Project Specifications**

* Create a class that acts as a Stack for integers
* Implement all required methods
* Create a menu in Main() that allows for each of the methods to be called on the stack.

**Required Methods**

* **public int Pop()**
  + Removes and returns the top element of the stack.
* **public void Push(int val)**
  + Pushes val to the top of the stack.
* **public int Peek()**
  + Returns the top element of the stack. (do not remove it!)
* **public void Print()**
  + Prints the entirety of the stack (essentially for debugging, in practice we keep to the rule that a stack is FILO only and that we cannot access the rest of the stack).

**Project Learning Objectives**

* Understand a stack data structure.
* Learn what it takes to create a data structure that can be used as a utility for your projects.

**Project Demonstrated Competencies**

1. Stack class is correct and all methods work appropriately.
2. Menu loops and allows the user to access each of the Stack methods.
3. Optional: Implement the search method.
   * public int Search(int val): Returns the position in the stack.
     + Top element = 0
     + First element under top = 1
     + etc
4. Optional: Implement error handling for all methods.
   * What happens if I try to Pop() or Peek() on an empty stack?

**Rubric**

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|  | **Description of perfect implementation** | **Score** |
| Competency #1 | The stack class has all 4 methods and they work exactly as they should. | \_\_\_  25 |
| Competency #2 | The main menu allows the user to directly access all 4 methods. Push() asks the user for input and then calls Push(int input), Peek() and Pop() will print what they return, and print will print the entire stack. | \_\_\_  25 |
| Competency #3 | Search method correctly returns the position in the stack to the user. | \_\_\_  +7 |
| Competency #4 | Error handling prevents program from crashing when they try to remove an element from an empty Stack. | \_\_\_  +3 |