CS 3310 - Data and File Structures
Assignment 1
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The source code for this program is located in:
" hw1cs3310_moussalli_012518\src\hw1cs3310_moussalli_012518\"
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At first when I wrote this program, I was using a 3D String array for the bags system. It seemed like it was working great, until I tried to binary search the array...I ran into many problems and it was much easier to change how I was storing the items. I decided to create a Weapon class with the five attributes of a weapon (name, max strength, min strength, rarity, and current strength). Once I switched over to using an array of Weapon objects, the binary search went much easier. I was able to find a matching item very quickly using the standard binary search algorithm, but I still had to find a way to check adjacent elements for matching items. To do this, once I found one matching item, I sent the item's index and the inventory to a separate method which used that index to check greater and lesser elements in the array: first checking that the name is the same, then checking the rarity.

The rest of the assignment was mostly just a refresher for knowing how to work with Java. I had to remember basic system calls, which was very frustrating because I used to be fluent in Java, but I eventually remembered how classes, methods, and scanners work.
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The speed difference when comparing linear search to binary search is very apparent. The average search time for binary search was only a fraction of the average linear search time.

Algorithm	Time complexity
Linear search	O(n) -> O(n^2)
Selection sort	O(n^2)
Binary search	O(logn) -> O(nlog(n))