Seatwork 7.1	
<Using Sorting Algorithms >	
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6. Output	

Answer the following questions:

1. What is sorting algorithm? A sorting algorithm is a sequence of steps that allows a person to arrange items in a list or group in order, for instance, from the smallest to the largest or alphabetically.

2.Where can sorting algorithms be used? Sorting algorithms are used in any situation where the data needs to be organized, such as in phone contacts, arranging scores in a game, searching through information quickly, or managing tasks by priority.

3. Explain the different types of sorting algorithms. So the first one is the Bubble Sort it keeps comparing pairs of items that are next to each other and swaps them if they are in the wrong order, iterating this process until the list is sorted. Selection Sort operates by locating the smallest item in the unsorted part of the list and moving it to the beginning, and then doing this for the rest of the list. Insertion Sort removes one item at a time and inserts it into the correct place of the already sorted part of the list. Merge Sort divides the list into smaller parts, sorts every part, and then combines the parts together to make a sorted list. At last, Quick Sort selects a pivot which is the special item, separates the list into the items that are smaller than the pivot and the ones that are larger, and sorts these parts separately. The way each of these methods does and can still be helpful in different cases is organizing the data.

4. Give sample programs in C++ that uses sorting algorithms, specifically selection sort, insertion sort, and bubble sort. Explain how the programs work.
Bubble sort:

```cpp
Using Sorting Algorithms.cpp
1    #include <iostream>
2    #include <vector>
3    #include <ctime>
4    #include <cstdlib>
5
6    using namespace std;
7
8    // Function to perform Bubble Sort
9    void bubble_sort(vector<int>& arr) {
10       int n = arr.size();
11       for (int i = 0; i < n; ++i) {
12           for (int j = 0; j < n - i - 1; ++j) {
13               if (arr[j] > arr[j + 1]) {
14                   // Swapping elements
15                   int temp = arr[j];
16                   arr[j] = arr[j + 1];
17                   arr[j + 1] = temp;
18               }
19           }
20       }
21   }
22
```

 Selection sort:

```cpp
 2
 3    // Function to perform Selection Sort
 4  void selection_sort(vector<int>& arr) {
 5        int n = arr.size();
 6        for (int i = 0; i < n; ++i) {
 7            int min_index = i;
 8            for (int j = i + 1; j < n; ++j) {
 9                if (arr[j] < arr[min_index]) {
10                    min_index = j;
11                }
12            }
13            // Swapping elements
14            int temp = arr[i];
15            arr[i] = arr[min_index];
16            arr[min_index] = temp;
17        }
18    }
19
```

Insertion Sort:

```cpp
39
40    // Function to perform Insertion Sort
41  void insertion_sort(vector<int>& arr) {
42        int n = arr.size();
43        for (int i = 1; i < n; ++i) {
44            int key = arr[i];
45            int j = i - 1;
46            while (j >= 0 && arr[j] > key) {
47                arr[j + 1] = arr[j];
48                j--;
49            }
50            arr[j + 1] = key;
51        }
52    }
53
```

in Bubble Sort, adjacent elements are swapped and 'hop' over each other until the entire list is sorted. In Selection Sort, the smallest element is identified and moved in the front of the list until there are no remaining unsorted elements. In Insertion Sort, each unsorted element is placed into the sorted portion of the list in the correct order by shifting larger elements..

GeeksforGeeks. (n.d.). *Bubble Sort*. Retrieved September 16, 2025, from https://www.geeksforgeeks.org/bubble-sort/
Simplilearn. (2025, January 26). *What is sorting in C++: Bubble sort, insertion sort & more*. Simplilearn.
https://www.simplilearn.com/tutorials/cpp-tutorial/sorting-in-cpp

8. Conclusion

Doing this activity I learned how different sorting algorithms like Bubble Sort, Selection Sort, and Insertion Sort work and how to do them in C++ though I still need to understand it for me to have a better understanding of it like these sorting methods help organize data so programs can run better and faster also knowing how each algorithm works makes it easier to pick the right one depending on the data I'm working with. This experience also helped me a very little I think I improve yes just a little but I will try to study this more so I can have use of it in the future.

9. Assessment Rubric