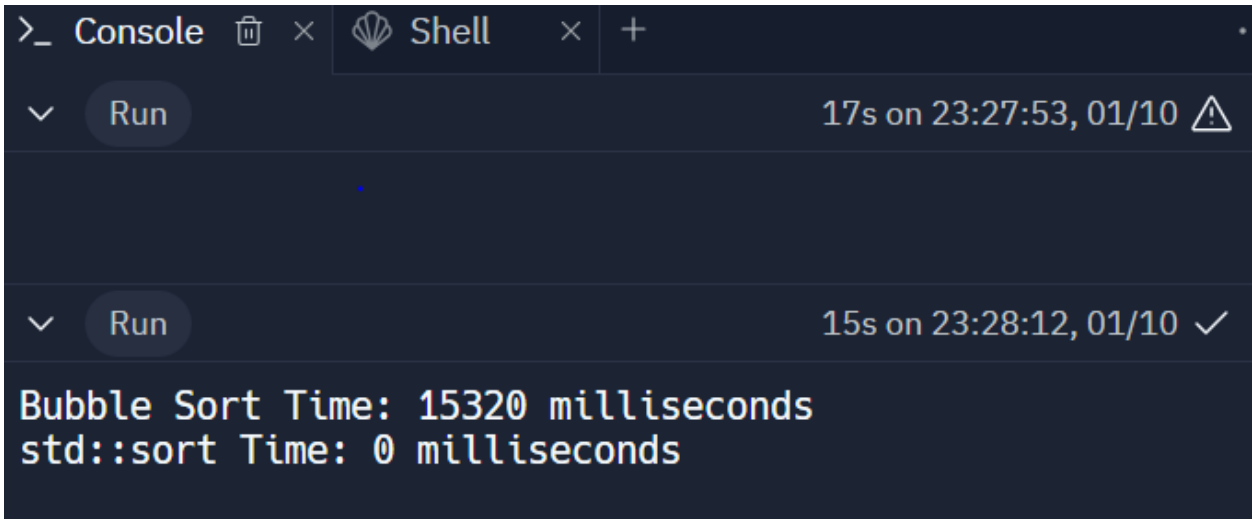
Saad Naseer ACS231038

Code 2:

```
#include <iostream>

#include <vector>

#include <algorithm>

#include <chrono>


// Bubble Sort implementation

void bubbleSort(std::vector<int>& arr) {

   int n = arr.size();

   for (int i = 0; i < n - 1; ++i) {

      for (int j = 0; j < n - i - 1; ++j) {

         if (arr[j] > arr[j + 1]) {

            std::swap(arr[j], arr[j + 1]);

         }

      }

   }

}


int main() {

   // Initialize a vector of 100,000 integers in descending order

   std::vector<int> data(100000);

   for (int i = 0; i < 100000; ++i) {

      data[i] = 100000 - i;

   }
```

```
    // Measure time taken by Bubble Sort

    auto startBubbleSort = std::chrono::high_resolution_clock::now();

    bubbleSort(data);

    auto stopBubbleSort = std::chrono::high_resolution_clock::now();

    auto durationBubbleSort = std::chrono::duration_cast<std::chrono::milliseconds>(stopBubbleSort -
startBubbleSort);


    // Reset the vector to descending order

    std::reverse(data.begin(), data.end());


    // Measure time taken by std::sort

    auto startStdSort = std::chrono::high_resolution_clock::now();

    std::sort(data.begin(), data.end());

    auto stopStdSort = std::chrono::high_resolution_clock::now();

    auto durationStdSort = std::chrono::duration_cast<std::chrono::milliseconds>(stopStdSort -
startStdSort);


    // Output the results

    std::cout << "Bubble Sort Time: " << durationBubbleSort.count() << " milliseconds\n";

    std::cout << "std::sort Time: " << durationStdSort.count() << " milliseconds\n";


    return 0;

}
```



Code 1:

```
#include <iostream>

#include <vector>

#include <algorithm> // For std::remove_if


struct Product {

   int id;

   std::string name;

   double price;

   int quantity;

};


class Inventory {

private:

   std::vector<Product> products;
```

```
public:
    // Function to add a new product to the inventory
    void addProduct(const Product& newProduct) {
        products.push_back(newProduct);
    }

    // Function to remove a product based on its ID
    void removeProductById(int productId) {
        products.erase(std::remove_if(products.begin(), products.end(),
            [productId](const Product& product) { return product.id == productId; }),
            products.end());
    }

    // Function to display the current inventory
    void displayInventory() const {
        std::cout << "Inventory:\n";
        for (const auto& product : products) {
            std::cout << "ID: " << product.id << ", Name: " << product.name
                      << ", Price: " << product.price << ", Quantity: " << product.quantity << "\n";
        }
    }
};

int main() {
    Inventory inventory;
```

```
    // Adding products to the inventory
    inventory.addProduct({1, "Product A", 20.0, 50});
    inventory.addProduct({2, "Product B", 30.0, 30});
    inventory.addProduct({3, "Product C", 15.0, 40});

    // Displaying the initial inventory
    inventory.displayInventory();

    // Removing a product by ID
    inventory.removeProductById(2);

    // Displaying the updated inventory after removal
    inventory.displayInventory();

    return 0;
}
```

Console Shell

Run 4s on 23:40:24, 01/10

```
Inventory:
ID: 1, Name: Product A, Price: 20, Quantity: 50
ID: 2, Name: Product B, Price: 30, Quantity: 30
ID: 3, Name: Product C, Price: 15, Quantity: 40
Inventory:
ID: 1, Name: Product A, Price: 20, Quantity: 50
ID: 3, Name: Product C, Price: 15, Quantity: 40
```