### **Task 2: Iterating Through Containers and Finding Elements**

**Goal:** Practice iterating through containers and retrieving specific elements.

### **Scenario:**

You are tasked with highlighting all active widgets on the HMI screen. The HMI has two main containers:

* std::vector for dynamic widgets.
* std::set for static widgets.

### **Steps:**

1. **Populate Containers:**
   1. Initialize a std::vector<std::string> with dynamic widgets ("Speedometer", "Tachometer", etc.).
   2. Initialize a std::set<std::string> with static widgets ("Logo", "WarningLights").
2. **Use Iterators:**
   1. Print all dynamic widgets using an iterator.
   2. Check if a specific widget (e.g., "WarningLights") is in the std::set using std::set::find.
3. **Advanced Iteration:**
   1. Combine both containers into a std::vector<std::string> using std::copy.
   2. Use std::find to locate a specific widget in the combined container.
4. **Output Results:**
   1. Print the widget list dynamically and show results of widget searches.

Program:

#include <iostream>

#include <vector>

#include <set>

#include <string>

#include <algorithm>

#include <iterator>

using namespace std;

int main() {

vector<string> dynamicWidgets = {"Speedometer", "Tachometer", "FuelGauge", "Temperature"};

set<string> staticWidgets = {"Logo", "WarningLights", "Map", "Clock"};cout << "Dynamic Widgets: \n";

for (auto it = dynamicWidgets.begin(); it != dynamicWidgets.end(); ++it) {

cout << \*it << "\n";

}

auto foundStaticWidget = staticWidgets.find("WarningLights");

if (foundStaticWidget != staticWidgets.end()) {

cout << "\n'WarningLights' is in static widgets.\n";

} else {

cout << "\n'WarningLights' is NOT in static widgets.\n";

}

vector<string> combinedWidgets;

copy(dynamicWidgets.begin(), dynamicWidgets.end(), back\_inserter(combinedWidgets));

copy(staticWidgets.begin(), staticWidgets.end(), back\_inserter(combinedWidgets));

auto foundCombinedWidget = find(combinedWidgets.begin(), combinedWidgets.end(), "FuelGauge");

if (foundCombinedWidget != combinedWidgets.end()) {

cout << "\n'FuelGauge' found in combined widgets at position: "

<<distance(combinedWidgets.begin(), foundCombinedWidget) << "\n";

} else {

cout << "\n'FuelGauge' is NOT in the combined widgets.\n";

}

cout << "\nCombined Widgets: \n";

for (const auto& widget : combinedWidgets) {

cout << widget << "\n";

}

return 0;

}

Output:

Dynamic Widgets:

Speedometer

Tachometer

FuelGauge

Temperature

'WarningLights' is in static widgets.

'FuelGauge' found in combined widgets at position: 2

Combined Widgets:

Speedometer

Tachometer

FuelGauge

Temperature

Clock

Logo

Map

WarningLights