

## LAB-C17 Exploring STL Vectors with the Person Class

### Objective:

In this lab, you will explore the functionality of STL vectors by implementing and testing various operations using a Person class. The Person class represents an individual with a name and age. You will use characters from *The Simpsons* and their friends to populate and manipulate a vector of Person objects.

### Part 1: Implementing the Person Class

1. Define the Person class with the following attributes and methods:
  - **Attributes:** string name, int age
  - **Methods:**
    - Constructor: Person(string name, int age)
    - Overloaded operator<< for output
    - Overloaded operator< for sorting
2. Implement operator<< to print a Person object in the format:  
Person[Name: Homer Simpson, Age: 39]
3. Implement operator< to compare Person objects based on their names in ascending order.

### Part 2: Exploring STL Vector Operations

#### 1. Inserting Elements into a Vector

- Create a `vector<Person*>` and populate it with the following characters:
  - Homer Simpson (39)
  - Marge Simpson (36)
  - Bart Simpson (10)
  - Lisa Simpson (8)
  - Maggie Simpson (1)
  - Ned Flanders (60)
  - Milhouse Van Houten (10)
  - Mr. Burns (104)

#### 2. Accessing Elements

- Print the first (front()) and last (back()) elements of the vector.

### **3. Erasing Elements**

- Make a function to find a person by name. The function returns the index of the cell holding the first match (or -1 if none).
- Remove Mr. Burns from the vector using `erase()`.
- Display the updated list.

### **4. Sorting the Vector**

- Use `sort()` to sort the vector based on names.
- Print the sorted list.

### **5. Finding an Element**

- Use `find_if()` to check if Milhouse Van Houten is in the vector.
- Print whether the search was successful.

### **6. Saving Data to a File**

- Write the contents of the vector to a file named `people.txt` using `ofstream`.

### **7. Release Unused Memory**

### **8. Loading Data from a File**

- Read the data from `people.txt` and reconstruct the vector.
- Print the reloaded vector. Traverse the vector using an iterator.