

How to Implement Bubble Sort in a Linux Environment Using Shell Scripting

Bubble Sort is a simple and intuitive sorting algorithm that repeatedly steps through the list to be sorted, compares adjacent elements, and swaps them if they are in the wrong order. This process is repeated until the list is sorted. While Bubble Sort is not the most efficient sorting algorithm for large datasets, it is a great educational tool for understanding basic sorting mechanisms.

In a Linux environment, implementing Bubble Sort can be an excellent way to practice shell scripting and understand how to manipulate arrays and perform basic operations in the command line. This article will guide you through the process of creating a Bubble Sort implementation using a Bash script.

Examples:

1. Creating the Bubble Sort Script:

First, open your favorite text editor and create a new file named `bubble_sort.sh`.

```
#!/bin/bash

# Bubble Sort function
bubble_sort() {
    local array=("$@")
    local n=${#array[@]}
    local temp

    for ((i = 0; i < n; i++)); do
        for ((j = 0; j < n - i - 1; j++)); do
            if ((array[j] > array[j + 1])); then
                # Swap elements
                temp=${array[j]}
                array[j]=${array[j + 1]}
                array[j + 1]=$temp
            fi
        done
    done

    echo "${array[@]}"
}

# Read input array from command line arguments
input_array=("$@")
echo "Original array: ${input_array[@]}"
```

```
# Sort the array
sorted_array=$(bubble_sort "${input_array[@]}")
echo "Sorted array: $sorted_array"
```

2. Making the Script Executable:

Save the file and make it executable using the following command:

```
chmod +x bubble_sort.sh
```

3. Running the Script:

You can now run the script by passing an array of numbers as arguments. For example:

```
./bubble_sort.sh 64 34 25 12 22 11 90
```

The script will output the original array and the sorted array:

```
Original array: 64 34 25 12 22 11 90
Sorted array: 11 12 22 25 34 64 90
```

4. Explanation of the Script:

- The `bubble_sort` function takes an array as input and sorts it using the Bubble Sort algorithm.
- The `local array=("$@")` line initializes the array with the input arguments.
- The nested for loops iterate through the array and swap adjacent elements if they are in the wrong order.
- The sorted array is then printed to the console.

This simple implementation of Bubble Sort in a Bash script demonstrates how you can perform basic sorting operations in a Linux environment. It also provides a great opportunity to practice shell scripting and understand array manipulation.