

How to Implement Linear Search in Linux Using Shell Scripting

Linear search, also known as sequential search, is a simple algorithm used to find a specific element in a list. It works by iterating through the list from the beginning to the end, comparing each element with the target value until a match is found or the list is exhausted. This algorithm is fundamental in computer science and can be implemented in various programming languages.

In the context of the Linux environment, linear search can be implemented using shell scripting. Shell scripts are powerful tools for automating tasks and managing system operations. This article will guide you through the process of creating a shell script to perform a linear search on an array of numbers.

Examples:

1. Creating a Shell Script for Linear Search

First, open your favorite text editor and create a new shell script file named `linear_search.sh`:

```
#!/bin/bash

# Function to perform linear search
linear_search() {
    local arr=("$@")
    local target=${arr[-1]}
    unset arr[-1]

    for i in "${!arr[@]}"; do
        if [ "${arr[$i]}" -eq "$target" ]; then
            echo "Element found at index $i"
            return 0
        fi
    done

    echo "Element not found"
    return 1
}

# Array of numbers
numbers=(10 20 30 40 50 60 70 80 90)

# Target element to search for
target=30

# Call the linear_search function
```

```
linear_search "${numbers[@]}" "$target"
```

In this script:

- The `linear_search` function takes an array and a target element as input.
- It iterates through the array and compares each element with the target.
- If a match is found, it prints the index of the element and returns 0.
- If no match is found, it prints "Element not found" and returns 1.

2. Running the Shell Script

To execute the script, follow these steps:

```
chmod +x linear_search.sh
./linear_search.sh
```

The output will be:

```
Element found at index 2
```

3. Modifying the Script for User Input

You can modify the script to accept user input for the array and the target element:

```
#!/bin/bash

# Function to perform linear search
linear_search() {
    local arr=("$@")
    local target=${arr[-1]}
    unset arr[-1]

    for i in "${!arr[@]}"; do
        if [ "${arr[$i]}" -eq "$target" ]; then
            echo "Element found at index $i"
            return 0
        fi
    done

    echo "Element not found"
    return 1
}

# Read array of numbers from user
echo "Enter numbers separated by space:"
```

```
read -a numbers

# Read target element from user
echo "Enter the target element:"
read target

# Call the linear_search function
linear_search "${numbers[@]}" "$target"
```

This version of the script will prompt the user to enter the array of numbers and the target element, making it more interactive.