Foundations of Computing

Programming Languages

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There are Lots of Programming Languages

- `http://en.wikipedia.org/wiki/List_of_programming_languages`
- We will use Python 3.6 (in Grok)
- You just write it like a text file, and the Python "interpreter" turns it into machine code for you

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Linear Search in Assembler

```
;linear search using procedures
include io.h

cr equ 0dh
lf equ 0ah

data segment

  ll db cr,lf,'Enter N                    = ',0
  l2 db cr,lf,'Enter Element = ',0
  l3 db cr,lf,'Search For : = ',0
  l4 db cr,lf,'Element Found at pos: ',0
  l5 db cr,lf,'Element Not Found',0

  n dw ?
  pos dw ?
  search dw ?

  array dw 40 dup(?)
  value dw 40 dup(?)

data ends

code segment

assume  cs:code,ds:data

  Linear Proc Near

          mov cx,n
          mov bx,search
          lea si,array
          mov ax,1

          in2:   cmp bx,[si]
                 je found
                 in3:
                 add si,2
                 inc ax
                 dec cx
                 jnz in2

          jmp nf

          found:  output l4
                  ilea value,ax
                  output value
                  NLT

          Nf:     output l5

          RET

  Linear EndP

  start:  mov ax,data
          mov ds,ax

          output l1
          inputs value,40
          atoi value
          mov n,ax

          mov cx,n
          lea si,array

          in1:    output l2
```

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Linear Search in C

```c
// C code to linearly search x in arr[]. If x
// is present then return its location, otherwise
// return -1

#include <stdio.h>

int search(int arr[], int n, int x)
{
    int i;
    for (i = 0; i < n; i++)
        if (arr[i] == x)
            return i;
    return -1;
}

// Driver code
int main(void)
{
    int arr[] = { 2, 3, 4, 10, 40 };
    int x = 10;
    int n = sizeof(arr) / sizeof(arr[0]);

    // Function call
    int result = search(arr, n, x);
    (result == -1)
        ? printf("Element is not present in array")
        : printf("Element is present at index %d", result);
    return 0;
}
```

Source(s): `https://www.geeksforgeeks.org/linear-search/`

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Linear Search in C++

```cpp
// C++ code to linearly search x in arr[]. If x
// is present then return its location, otherwise
// return -1

#include <iostream>
using namespace std;

int search(int arr[], int n, int x)
{
    int i;
    for (i = 0; i < n; i++)
        if (arr[i] == x)
            return i;
    return -1;
}

// Driver code
int main(void)
{
    int arr[] = { 2, 3, 4, 10, 40 };
    int x = 10;
    int n = sizeof(arr) / sizeof(arr[0]);

    // Function call
    int result = search(arr, n, x);
    (result == -1)
        ? cout << "Element is not present in array"
        : cout << "Element is present at index " << result;
    return 0;
}
```

Source(s): `https://www.geeksforgeeks.org/linear-search/`

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Linear Search in PHP

```php
<?php
// PHP code for linearly search x in arr[].
// If x is present then return its location,
// otherwise return -1

function search($arr, $x)
{
    $n = sizeof($arr);
    for($i = 0; $i < $n; $i++)
    {
        if($arr[$i] == $x)
            return $i;
    }
    return -1;
}

// Driver Code
$arr = array(2, 3, 4, 10, 40);
$x = 10;

// Function call
$result = search($arr, $x);
if($result == -1)
    echo "Element is not present in array";
else
    echo "Element is present at index " ,
                                    $result;

// This code is contributed
// by jit_t
?>
```

Source(s): `https://www.geeksforgeeks.org/linear-search/`

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Linear Search in JavaScript

```
<script>

// Javascript code to linearly search x in arr[]. If x
// is present then return its location, otherwise
// return -1

function search(arr, n, x)
{
    let i;
    for (i = 0; i < n; i++)
        if (arr[i] == x)
            return i;
    return -1;
}

// Driver code

    let arr = [ 2, 3, 4, 10, 40 ];
    let x = 10;
    let n = arr.length;

    // Function call
    let result = search(arr, n, x);
    (result == -1)
        ? document.write("Element is not present in array")
        : document.write("Element is present at index " + result);

// This code is contributed by Manoj

</script>
```

Source(s): `https://www.geeksforgeeks.org/linear-search/`

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Linear Search in Java

```java
// Java code for linearly searching x in arr[]. If x
// is present then return its location, otherwise
// return -1

class GFG
{
    public static int search(int arr[], int x)
    {
        int n = arr.length;
        for (int i = 0; i < n; i++)
        {
            if (arr[i] == x)
                return i;
        }
        return -1;
    }

    // Driver code
    public static void main(String args[])
    {
        int arr[] = { 2, 3, 4, 10, 40 };
        int x = 10;

        // Function call
        int result = search(arr, x);
        if (result == -1)
            System.out.print(
                "Element is not present in array");
        else
            System.out.print("Element is present at index "
                             + result);
    }
}
```

Source(s): https://www.geeksforgeeks.org/linear-search/

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Linear Search in C#

```
// C# code to linearly search x in arr[]. If x
// is present then return its location, otherwise
// return -1
using System;

class GFG {
    public static int search(int[] arr, int x)
    {
        int n = arr.Length;
        for (int i = 0; i < n; i++)
        {
            if (arr[i] == x)
                return i;
        }
        return -1;
    }

    // Driver code
    public static void Main()
    {
        int[] arr = { 2, 3, 4, 10, 40 };
        int x = 10;

        // Function call
        int result = search(arr, x);
        if (result == -1)
            Console.WriteLine(
                "Element is not present in array");
        else
            Console.WriteLine("Element is present at index "
                              + result);
    }
}
```

Source(s): `https://www.geeksforgeeks.org/linear-search/`

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Linear Search in Python 3

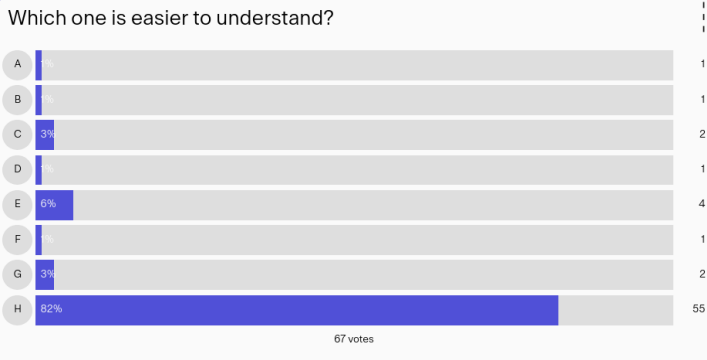
```python
# Python3 code to linearly search x in arr[].
# If x is present then return its location,
# otherwise return -1


def search(arr, n, x):

    for i in range(0, n):
        if (arr[i] == x):
            return i
    return -1


# Driver Code
arr = [2, 3, 4, 10, 40]
x = 10
n = len(arr)

# Function call
result = search(arr, n, x)
if(result == -1):
    print("Element is not present in array")
else:
    print("Element is present at index", result)
```

Source(s): https://www.geeksforgeeks.org/linear-search/

Which one is easier to understand?

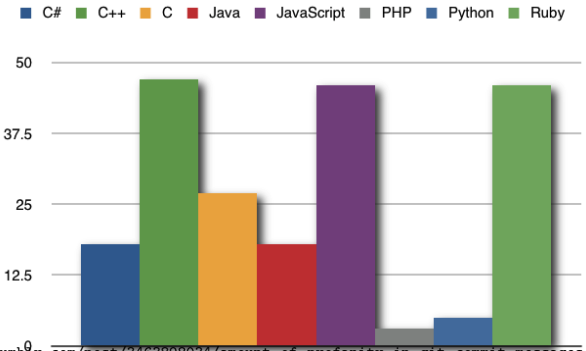
- A: Assembler
- B: C
- C: C++
- D: PHP
- E: JavaScript
- F: Java
- G: C#
- H: Python

Some Results from Semester 2, 2022



And Another Thing ...

The relative proportion of profanities per line in code written in different languages:



Source(s): http://ilovecharts.tumblr.com/post/3463898034/amount-of-profanity-in-git-commit-messages-per