Task 2: Adding user programs to xv6

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INTRODUCTION

Introducing the lab task

INTRODUCTION

We added three user programs to the xv6 operating system (OS) each of which implements the following:

- Linear search
- Bubble sort
- Print statistics

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ROLES

The role of every team member

ROLES

Jana Saleh	Implemented the last user program which printed the statistics of a list of floating-point numbers and modified the make file to incorporate the functionality.
Mariam Dahab	Implemented the second user program which sorted a given list using the bubble sort algorithm and modified the make file to incorporate the functionality.
Muhammad Azzazy	Implemented the first user program which searched for a given key in a given list and returned the index of the value in the list which corresponds to the key and modified the make file to incorporate the functionality.

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PSEUDOCODE

Description of the added apps and pseudocode

LINEAR SEARCH

```
LINEARSEARCH(A, k)
        flag ← false
        for i←1 to length[A]
        do
                if A[i] == k
                        then index ← i
                     flag ← true
```

BUBBLE SORT


```
BUBBLESORT(A)
        for i←1 to length[A]-1
                do for j←1 to length[A]-1
                        do if A[j] < A[j+1]
                                then swap A[j] ↔ A[j+1]
```

PRINT STATISTICS

```
PRINTSTATS(A)
        for  i ← 1 to length[A]-1
                do for j ← 1 to length[A]-1
                                do swap A[j] ↔ A[j+1]

        sum ← 0
        for i ← 1 to length[A]
                do sum ← sum + A[i]

        for i ← 1 to length[A]
                do if A[i] > max
                                then max ← A[i]
                if A[i] < min
                        then min ← A[i]
        average ← sum/length[A]
        square_of_mean ← average^2
        var ← (sum_of_squares / length[A]) - square_of_mean
        std ← sqrt(var)

        if length[A] mod 2 == 0
                then median ← (A[length[A]] + A[length[A]+1]) / 2
        else
                pos ← ⌈length[A] / 2)⌉
                median ← A[pos]
```

04

MODIFICATIONS

Modified files & reasons for modification

MAKEFILE

The makefile was modified by changing both the variable UPROGS and EXTRAS to include the three programs that we defined:

- linear_search
- bubble_sort
- print_stats

This was done to guarantee that the three C files are compiled and linked to form executables to be included in our version of the xv6 OS.

Another modification to the makefile involved adding the flag “-lm” when compiling the program print_stats since print_stats is using the math library and this library requires the aforementioned flag for successful linking.

The last modification involved adding the compiler flag “-lc” to successfully link to the errno library which is used by the square root function from the math library.

THANKS!

Do you have any questions?

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