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1- Pseudocode is a series of text that is written in plain English which makes it easier for the programmer to understand but impossible for the computer to compile. Algorithm is a computer procedure that tells the program how to solve a problem in steps.

2- *Pseudo code

```
#include <stdio.h>

Prototype linearSearch(int a[], int v, int n) in void

Int main(){

        initialize an array with int.

        initialize a value with int.

        find the size of an array with int.

        call linearSearch function.

}

Void linearSearch function{

initialize x with int

        write a for loop (x=0;x<n;x++){

                Check if x<n{

                        Tell the user that the element is not found with printf
        }

        Check if a[x] is equal to v{

            Tell the user that the element is found with printf

            Break from the loop

        }

    }

}
```

3a- Bubble sort

Pseudo code

```
    Void bubbleSort(int a, int n){
        Initialize i, j,k and z with int
        Create a for loop(i=0;i<n-1;i++){
            Create a for loop(j=0;j<n-i-1;j++){
                Check if a[j]>a[j+1]{
                    Swap a[j] with a[j+1] by using variable k
                }
            }
        }
        Create a for loop(z=0;z<n;z++){
            printf(“%d “, a[z]);
    }
```

Algorithm

```
Assume i and j are 0
Compare element j and j+1
If out of order then swap the two elements and add 1 to j until j=n
i=i+1
```

3b-

Quick sort pseudo code

```
Initialize partition function with int(int a, int low, int high){
    Initialize k and z variable with int and set k to 0
    Initialize pivot variable with int and set to a[high]
    Initialize i variable with int and set to low-1
    Create a for loop(j=low; j<=high-1; j++){
        Check if a[j]<=pivot{
            i++
            swap a[i] and a[j]
        }
    }
    Swap a[i+1] and a[high]
    Return i+1
}
Initialize quicksort function with void(int a[], int low, int high){
    Check if (low<high){
        Initialize pi and set it to partition function
        Call quicksort function(a, low, pi-1)
        Call quicksort function(a, pi+1, high)
    }
}
```

Algorithm

Set pi to partition faction

Partition array into 2 subarrays around element called pivot

Assume pivot is first element of the array

Start by comparing 2nd element of the array to pivot

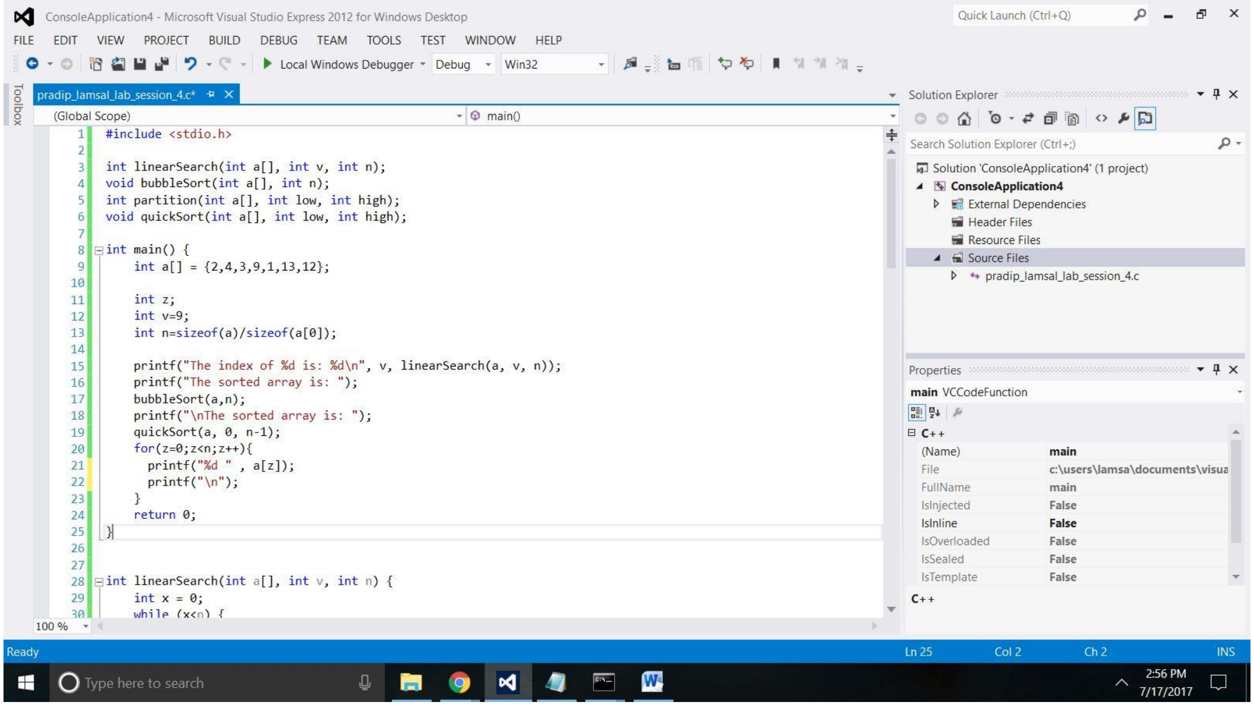
If element j is smaller or equal to pivot i equal to i+1 and swap the two elements

Work j through whole array

Swap pivot with element in position i

Recursive sort two subarrays and combine two subarrays

Codes and results altogether:



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Win32
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pradip_lamsal_lab_session_4.c*
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main()
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Solution 'ConsoleApplication4' (1 project)
ConsoleApplication4
External Dependencies
Header Files
Resource Files
Source Files
pradip_lamsal_lab_session_4.c
Properties
main VCCodeFunction
C++
100 %
Ready
Ln 25
Col 2
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Type here to search
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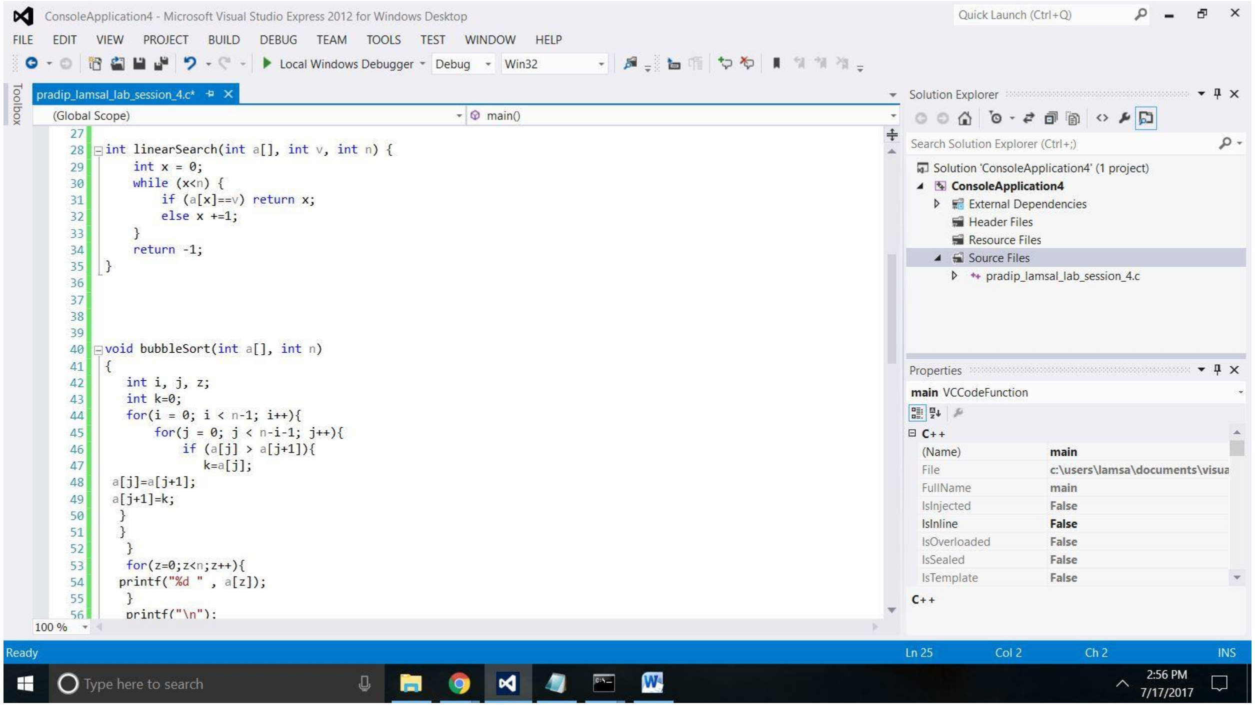
7/17/2017

```c
#include <stdio.h>

int linearSearch(int a[], int v, int n);
void bubbleSort(int a[], int n);
int partition(int a[], int low, int high);
void quickSort(int a[], int low, int high);

int main() {
    int a[] = {2,4,3,9,1,13,12};

    int z;
    int v=9;
    int n=sizeof(a)/sizeof(a[0]);

    printf("The index of %d is: %d\n", v, linearSearch(a, v, n));
    printf("The sorted array is: ");
    bubbleSort(a,n);
    printf("\nThe sorted array is: ");
    quickSort(a, 0, n-1);
    for(z=0;z<n;z++){
      printf("%d " , a[z]);
      printf("\n");
    }
    return 0;
}


int linearSearch(int a[], int v, int n) {
    int x = 0;
    while (x<n) {
```

(Name)	main
File	c:\users\lamsa\documents\visua
FullName	main
IsInjected	False
IsInline	False
IsOverloaded	False
IsSealed	False
IsTemplate	False

C++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```c

int linearSearch(int a[], int v, int n) {
    int x = 0;
    while (x<n) {
        if (a[x]==v) return x;
        else x +=1;
    }
    return -1;
}




void bubbleSort(int a[], int n)
{
   int i, j, z;
   int k=0;
   for(i = 0; i < n-1; i++){
       for(j = 0; j < n-i-1; j++){
           if (a[j] > a[j+1]){
              k=a[j];
 a[j]=a[j+1];
 a[j+1]=k;
  }
  }
   }
   for(z=0;z<n;z++){
  printf("%d " , a[z]);
   }
   printf("\n");
```

main VCCodeFunction

C++

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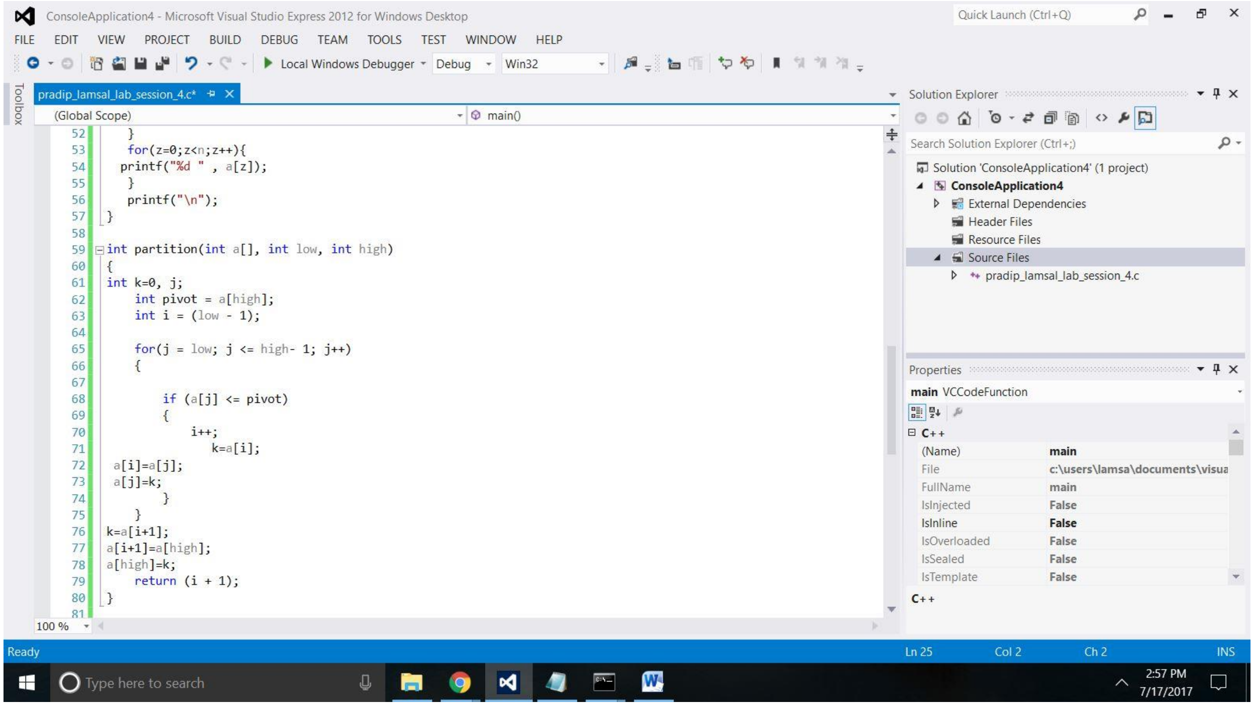
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```c
   }
   for(z=0;z<n;z++){
  printf("%d " , a[z]);
   }
   printf("\n");
}

int partition(int a[], int low, int high)
{
int k=0, j;
    int pivot = a[high];
    int i = (low - 1);

    for(j = low; j <= high- 1; j++)
    {

        if (a[j] <= pivot)
        {
            i++;
               k=a[i];
 a[i]=a[j];
 a[j]=k;
        }
    }
k=a[i+1];
a[i+1]=a[high];
a[high]=k;
    return (i + 1);
}

```

main VCCodeFunction

C++

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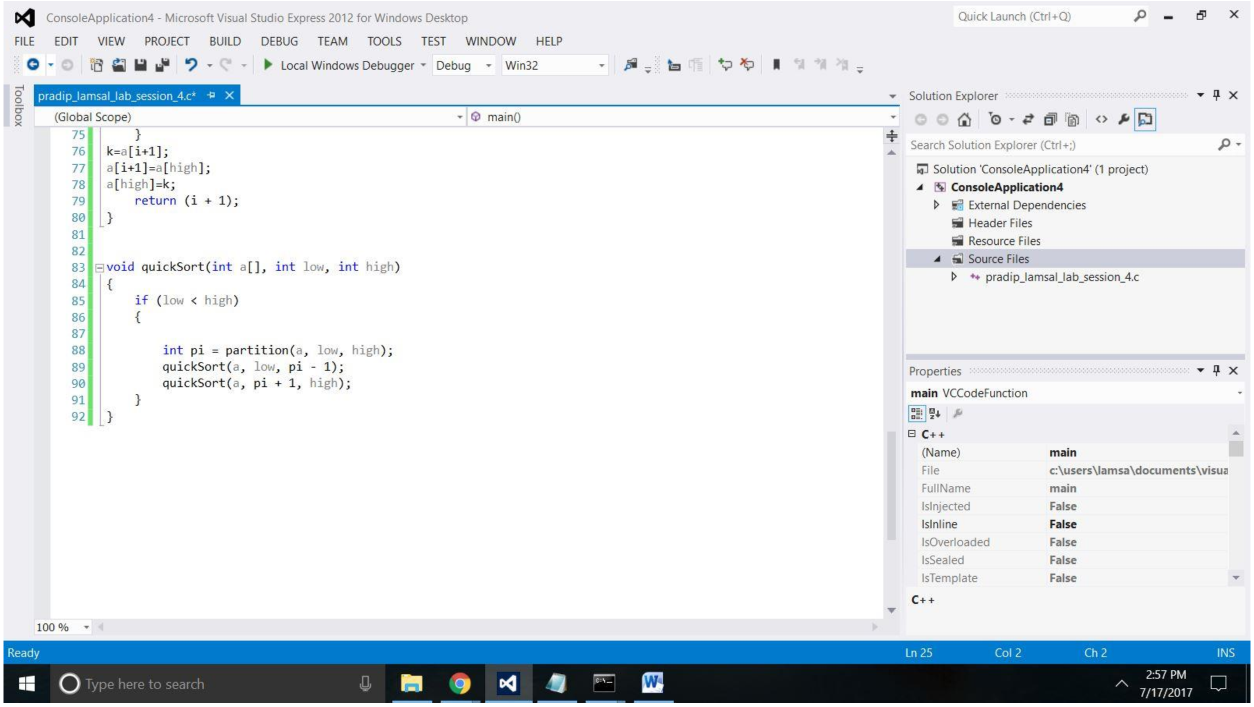
C++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```
    }
k=a[i+1];
a[i+1]=a[high];
a[high]=k;
    return (i + 1);
}


void quickSort(int a[], int low, int high)
{
    if (low < high)
    {

        int pi = partition(a, low, high);
        quickSort(a, low, pi - 1);
        quickSort(a, pi + 1, high);
    }
}
```

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FullName main
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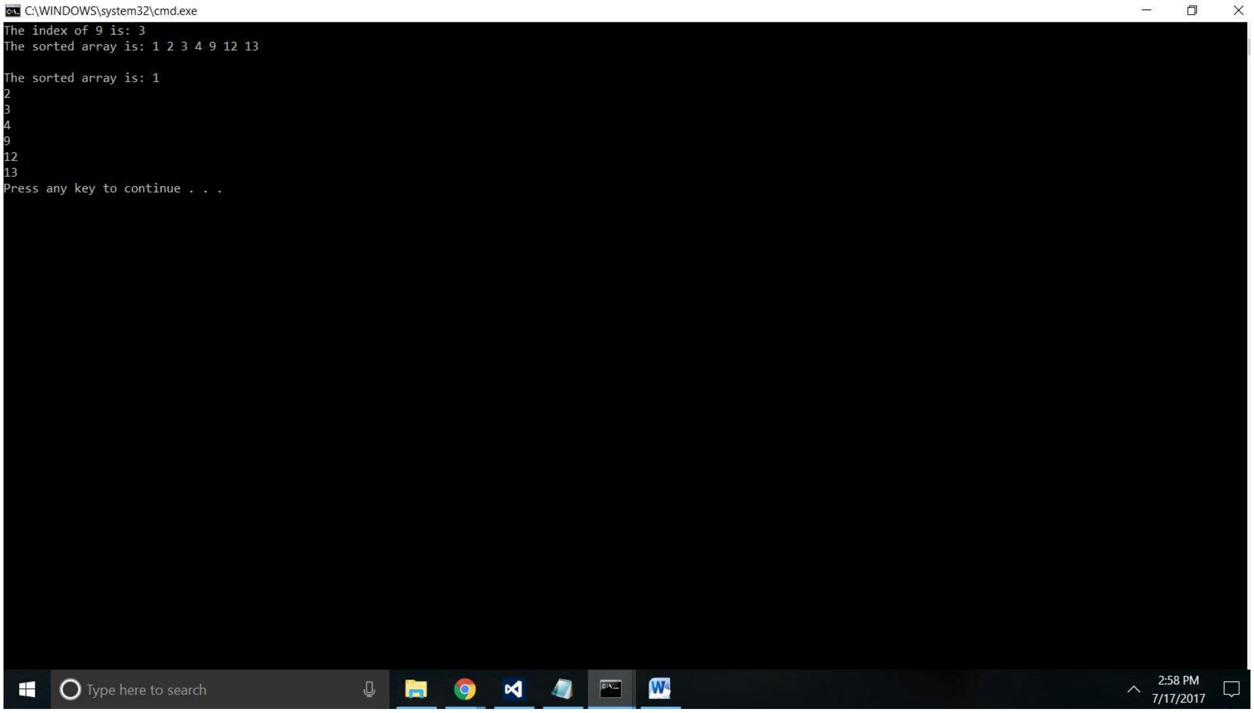

```
The index of 9 is: 3
The sorted array is: 1 2 3 4 9 12 13

The sorted array is: 1
2
3
4
9
12
13
Press any key to continue . . .
```