Question: In this project you are asked to investigate a sorting algorit...

In this project you are asked to investigate a sorting algorithm, called "slowsort". Write a research report, which addresses all points below.

Implement the following sorting algorithm:

```
slowsort(a,left,right);
/* sorts sub-vector a[left,right] */
{
  if (left < right)
    {
      center = (left+right) / 2;
      slowsort(a,left,center);
      slowsort(a,center+1,right);
      if (a[center] > a[right]) exchange(a[center],a[right]);
      slowsort(a,left,right-1)
    }
}
```

1. Explain why the algorithm successfully sorts. You should use an inductive argument.
2. Now run the algorithm for different n, where the vector a is defined as follows:

```
for (int  i = 0  ; i < a.size(); i++ )
    a[i] = 1 + (int) (1000 * (sin (1.2 * i) * sin (1.2 * i)) )
```

3. For $n = 10$ (n is the size of the vector) modify the code to report all the exchanges taking place; in the form:

```
0|868|456|195|992|78|629|730|30|962|
now exchanging element 1 and 2
0|456|868|195|992|78|629|730|30|962|
```

4. Now take out all write statements, add a counter to count the number of comparisons between vector elements made for $n = 20, 40, 60, \ldots 200$ and tabulate the results.
5. Now take out the counter, measure the running time for $n = 20, 40, 60, \ldots 200$, and tabulate the running time results (in seconds). (How to measure time is descrived on the announcement page.)
6. It can be shown that the number of comparisons $t(n) \approx A\, n^{(B \log_2 n)}$ for suitable constants A and B. Find values A and B that match as best as possible what you found in item 4.

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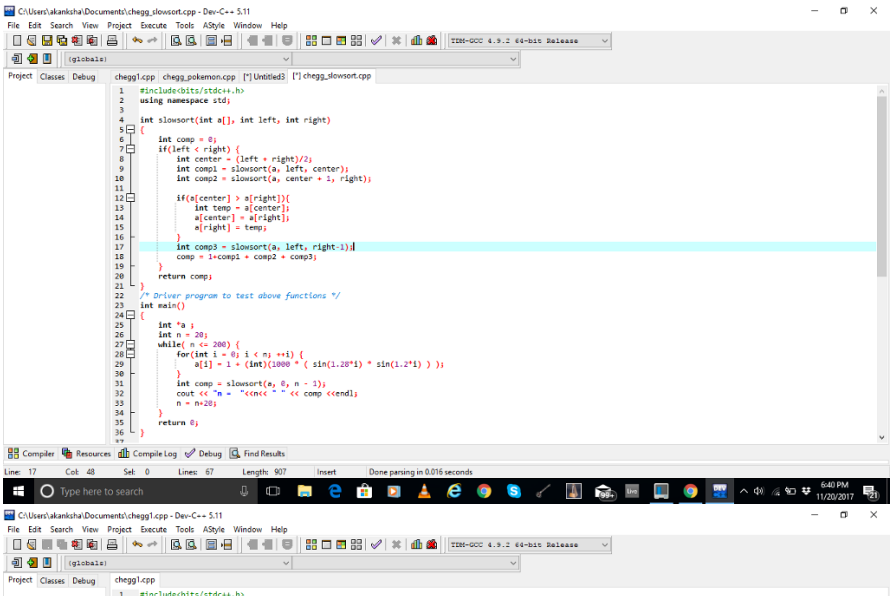
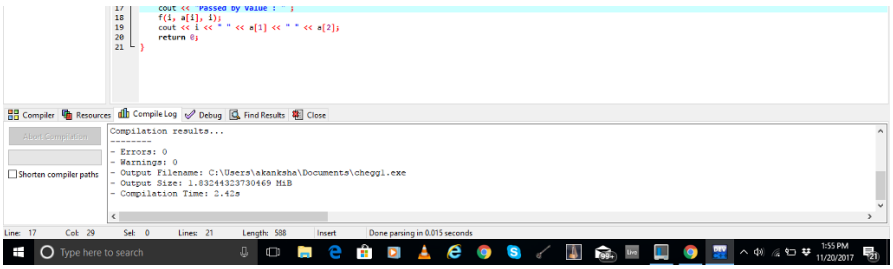
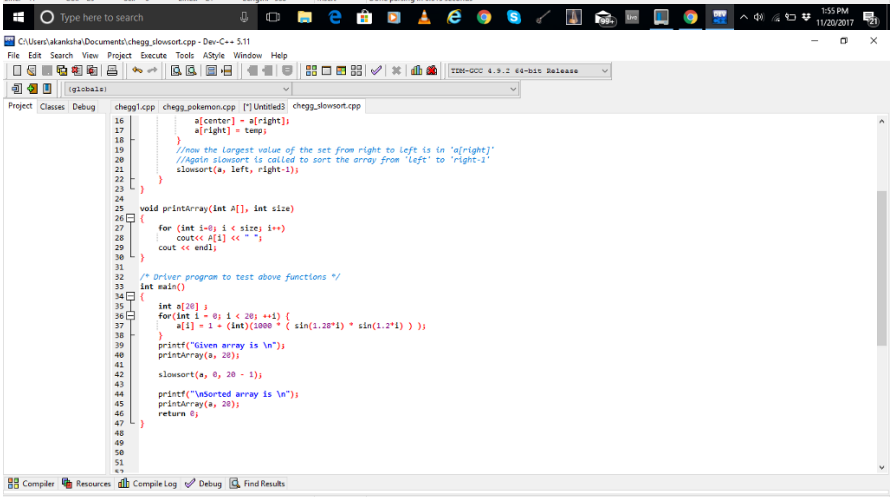
Expert Answer

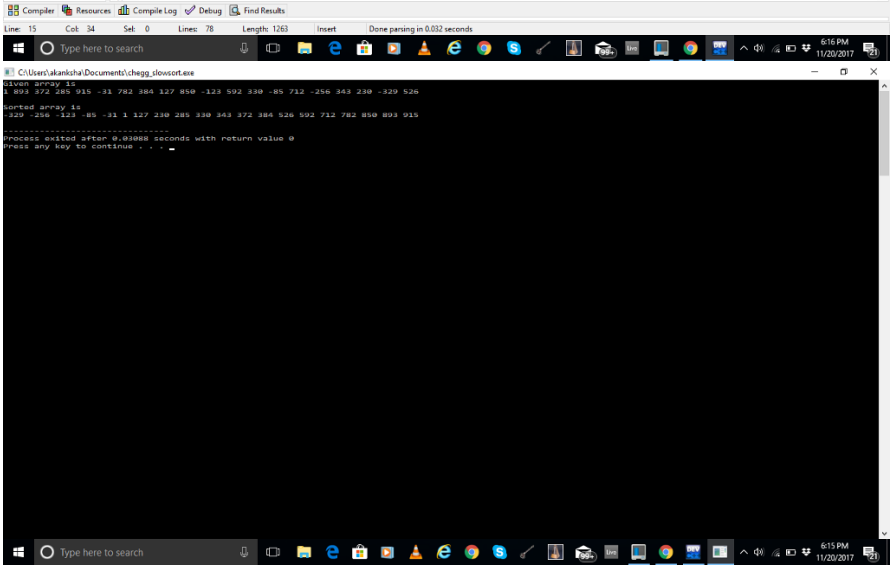
Anonymous answered this
18 answers

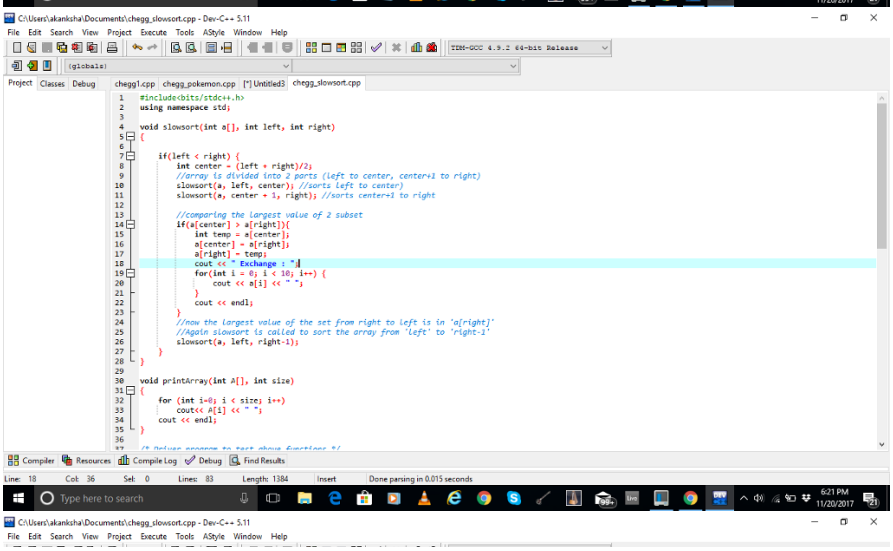
Was this answer helpful? 2 0

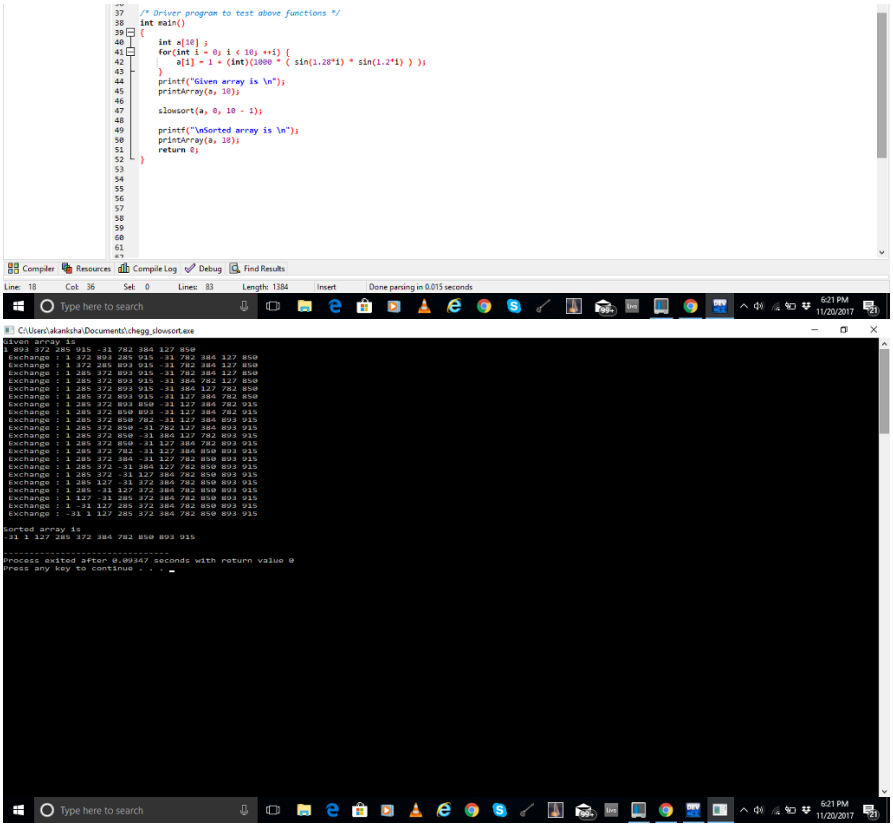












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Questions viewed by other students

Q: What is the logical bit layout of the number-12.5 in IEEE single- precision format (float)? Separate the 3 parts by a space for readability. What is ulps(20.30) in IEEE single precision?. What number is represented by the following IEEE single-precision value? 1 10000100 10110000000000000000000 The number 20 can be expressed in binary as 1.01 times 2^4, and 11 as 1.011times 2^...

A: See answer 100% (1 rating)

Q: Assume that n is a power of two. Consider the following sorting algorithm: SLOWSORT(A[1..n]) 1: if n > 1 then 2: SLOWSORT(A[1 .. n 2]) 3: SLOWSORT(A[n 2 +1 .. n]) 4: GATHER(A[1 .. n]) 5: end if GATHER(A[1 .. n]) 1: if n = 2 then 2: if A[1]>A[2] then 3: swap A[1] ↔ A[2] 4: end if 5: else 6: for i ← 1 to n 4 do 7: swap A[i+ n 4] ↔ A[i+ n 2] 8: end for 9: GATHER(A[1 .. n 2]) 1...

A: See answer 100% (1 rating)