Edwin (Stacy) Sparks
9-1-21

Lab 02 - Euclid Comparison Count Sort

1)

a) find gcd (31415, 14142) by applying Euclid algorithm

Iterations	m	n	Quotient q	Remainder r
1	31415	14142	2	3131
2	14142	3131		1618
3	3131	1619		1513
4	1619	1513		105
5	1513	105		43
6	105	43		19
7	43	19		5
8	19	5		4
9	5	4		1
10	4	1		0
11	(1)	0	= n = Stop	Undefined

Final Result: g.c.d = 1 Number of Iterations: 10

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b) Estimate how many times faster it will be to find gcd (31415, 14142) via Euclid's vs. Consecutive int.

Consecutive Integer:
$t = \min 14142 \longrightarrow 1 = 14142$ interations

Euclid Algorithm: = 10 interations => $\frac{14142}{10} = 1,414\times$ faster

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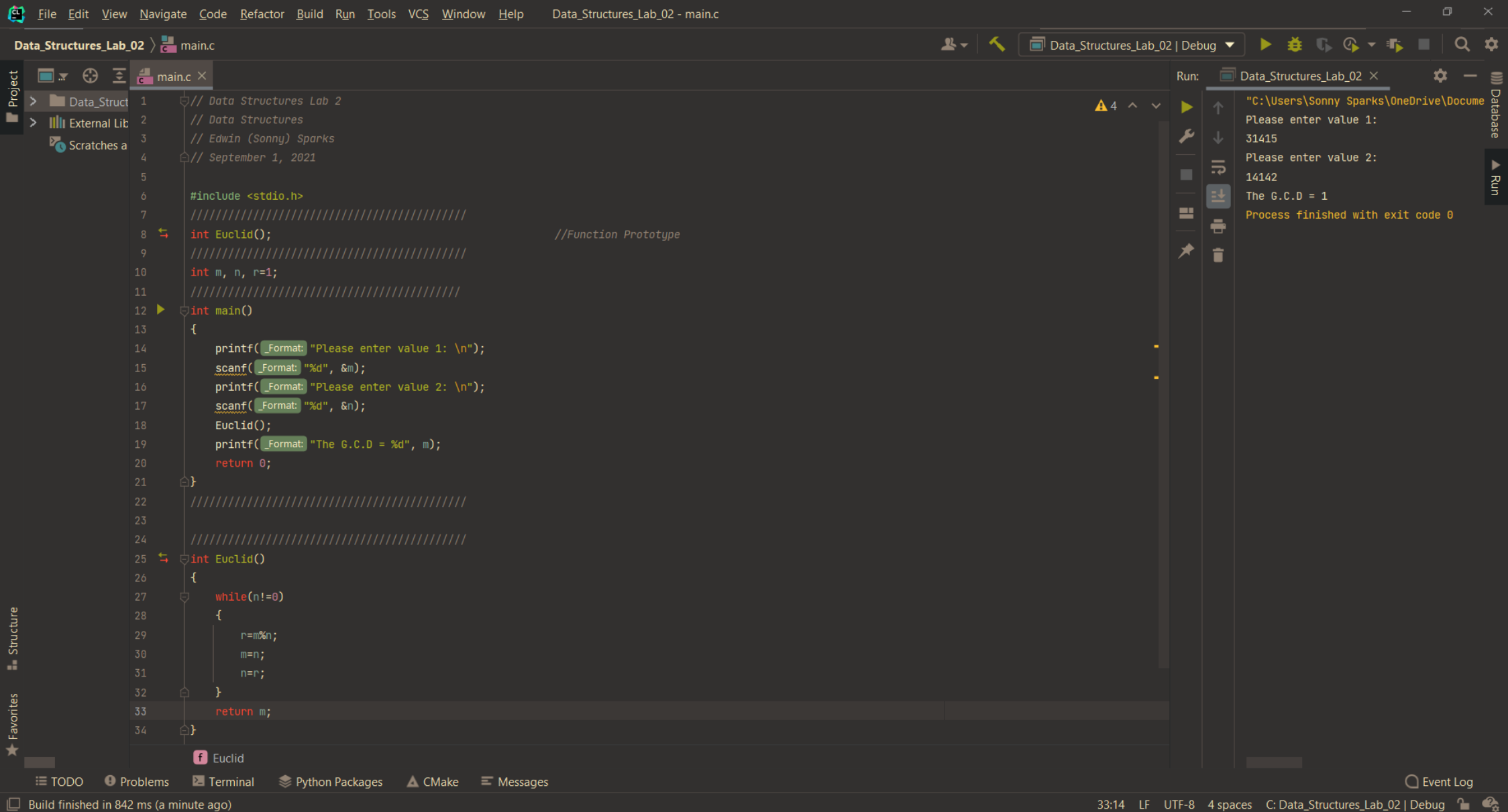
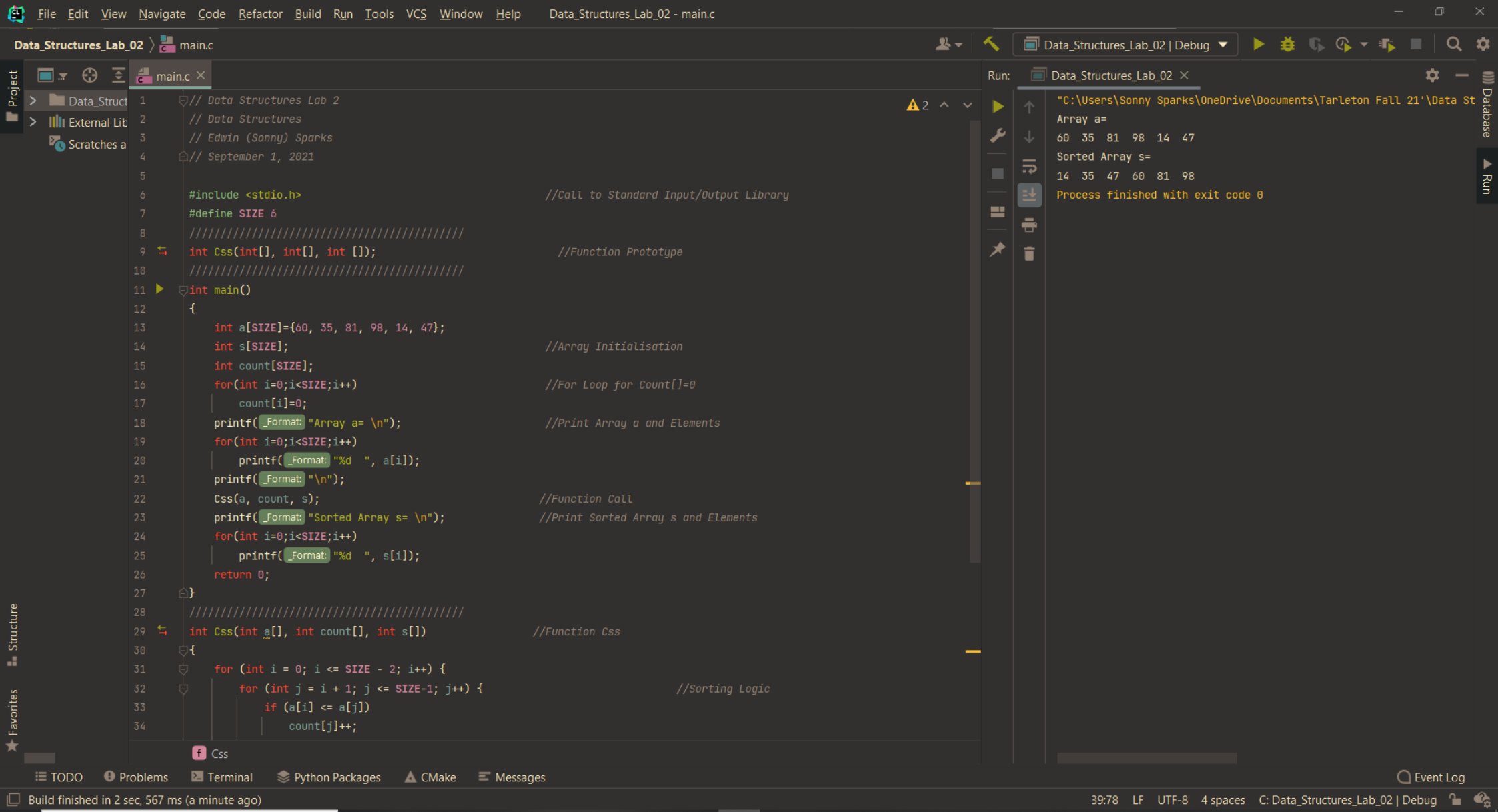
c) Solve the same problem by finding the prime factors
Consider, Sieve Algorithm

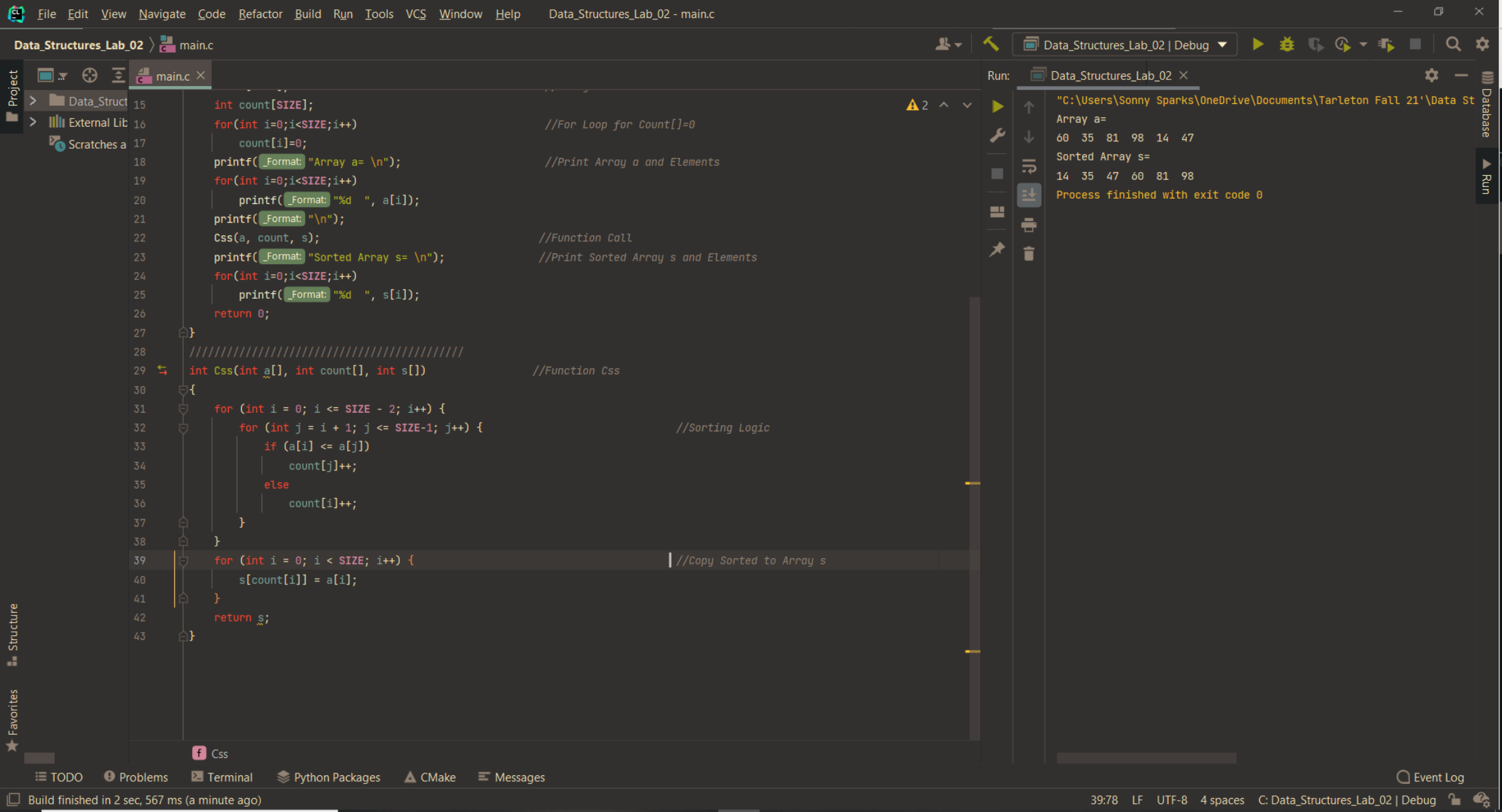
31415 = 5, 61, 103, 1

14142 = 2, 3, 2357, 1

g.c.d = 1


File Edit View Navigate Code Refactor Build Run Tools VCS Window Help Data_Structures_Lab_02 - main.c
Data_Structures_Lab_02 main.c
Data_Structures_Lab_02 | Debug
main.c
// Data Structures Lab 2
// Data Structures
// Edwin (Sonny) Sparks
// September 1, 2021
#include <stdio.h>
int Euclid(); //Function Prototype
int m, n, r=1;
int main()
{
printf(_Format: "Please enter value 1: \n");
scanf(_Format: "%d", &m);
printf(_Format: "Please enter value 2: \n");
scanf(_Format: "%d", &n);
Euclid();
printf(_Format: "The G.C.D = %d", m);
return 0;
}
int Euclid()
{
while(n!=0)
{
r=m%n;
m=n;
n=r;
}
return m;
}
Run: Data_Structures_Lab_02
"C:\Users\Sonny Sparks\OneDrive\Docume
Please enter value 1:
31415
Please enter value 2:
14142
The G.C.D = 1
Process finished with exit code 0
TODO Problems Terminal Python Packages CMake Messages Event Log
Build finished in 842 ms (a minute ago)
33:14 LF UTF-8 4 spaces C: Data_Structures_Lab_02 | Debug


File Edit View Navigate Code Refactor Build Run Tools VCS Window Help Data_Structures_Lab_02 - main.c
Data_Structures_Lab_02 main.c
Data_Structures_Lab_02 | Debug
main.c
Data_Struct
External Lib
Scratches a
// Data Structures Lab 2
// Data Structures
// Edwin (Sonny) Sparks
// September 1, 2021
#include <stdio.h> //Call to Standard Input/Output Library
#define SIZE 6
//
int Css(int[], int[], int []); //Function Prototype
//
int main()
{
int a[SIZE]={60, 35, 81, 98, 14, 47};
int s[SIZE]; //Array Initialisation
int count[SIZE];
for(int i=0;i<SIZE;i++) //For Loop for Count[]=0
count[i]=0;
printf(_Format: "Array a= \n"); //Print Array a and Elements
for(int i=0;i<SIZE;i++)
printf(_Format: "%d ", a[i]);
printf(_Format: "\n");
Css(a, count, s); //Function Call
printf(_Format: "Sorted Array s= \n"); //Print Sorted Array s and Elements
for(int i=0;i<SIZE;i++)
printf(_Format: "%d ", s[i]);
return 0;
}
//
int Css(int a[], int count[], int s[]) //Function Css
{
for (int i = 0; i <= SIZE - 2; i++) {
for (int j = i + 1; j <= SIZE-1; j++) { //Sorting Logic
if (a[i] <= a[j])
count[j]++;
Css
Run: Data_Structures_Lab_02
"C:\Users\Sonny Sparks\OneDrive\Documents\Tarleton Fall 21'\Data St
Array a=
60 35 81 98 14 47
Sorted Array s=
14 35 47 60 81 98
Process finished with exit code 0
TODO Problems Terminal Python Packages CMake Messages Event Log
Build finished in 2 sec, 567 ms (a minute ago)
39:78 LF UTF-8 4 spaces C: Data_Structures_Lab_02 | Debug


File Edit View Navigate Code Refactor Build Run Tools VCS Window Help Data_Structures_Lab_02 - main.c
Data_Structures_Lab_02 main.c
Data_Structures_Lab_02 | Debug
main.c
Data_Struct
External Lib
Scratches a
int count[SIZE];
for(int i=0;i<SIZE;i++) //For Loop for Count[]=0
count[i]=0;
printf(_Format: "Array a= \n"); //Print Array a and Elements
for(int i=0;i<SIZE;i++)
printf(_Format: "%d ", a[i]);
printf(_Format: "\n");
Css(a, count, s); //Function Call
printf(_Format: "Sorted Array s= \n"); //Print Sorted Array s and Elements
for(int i=0;i<SIZE;i++)
printf(_Format: "%d ", s[i]);
return 0;
}
//////////////////////////////////////
int Css(int a[], int count[], int s[]) //Function Css
{
for (int i = 0; i <= SIZE - 2; i++) {
for (int j = i + 1; j <= SIZE-1; j++) { //Sorting Logic
if (a[i] <= a[j])
count[j]++;
else
count[i]++;
}
}
for (int i = 0; i < SIZE; i++) { //Copy Sorted to Array s
s[count[i]] = a[i];
}
return s;
}
Run: Data_Structures_Lab_02
"C:\Users\Sonny Sparks\OneDrive\Documents\Tarleton Fall 21'\Data St
Array a=
60 35 81 98 14 47
Sorted Array s=
14 35 47 60 81 98
Process finished with exit code 0
Css
TODO Problems Terminal Python Packages CMake Messages Event Log
Build finished in 2 sec, 567 ms (a minute ago)
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