Programming in C and C++ Lab (CS360 LAB)

ABU BAKAR SIDDIK

ID: 19897, Assignment- 1

Q1) Let's examine / run the following C++ program regarding string data type and related operators.

Ans:

```
#include <iostream>
using std::cout;
using std::endl;
using std::string;
const char SEMI_COLON = ';';
const string VERB1 = "went up ";
const string VERB2 = "down came ";
const string VERB3 = "washed ";
const string VERB4 = "out came ";
const string VERB5 = "dried up ";
int main(void){
string firstLine;
string secondLine;
string thirdLine;
string fourthLine;
firstLine = "The itsy bitsy spider " + VERB1 +"the water spout";
secondLine = VERB2 + "the rain and " + VERB3 +"the spider out";
thirdLine = VERB4 + "the sun and " + VERB5 +"all the rain";
fourthLine = "and the itsy bitsy spider " + VERB1 +"the spout again";
```

cout << firstLine << SEMI_COLON << endl;

cout << secondLine << SEMI_COLON << endl;

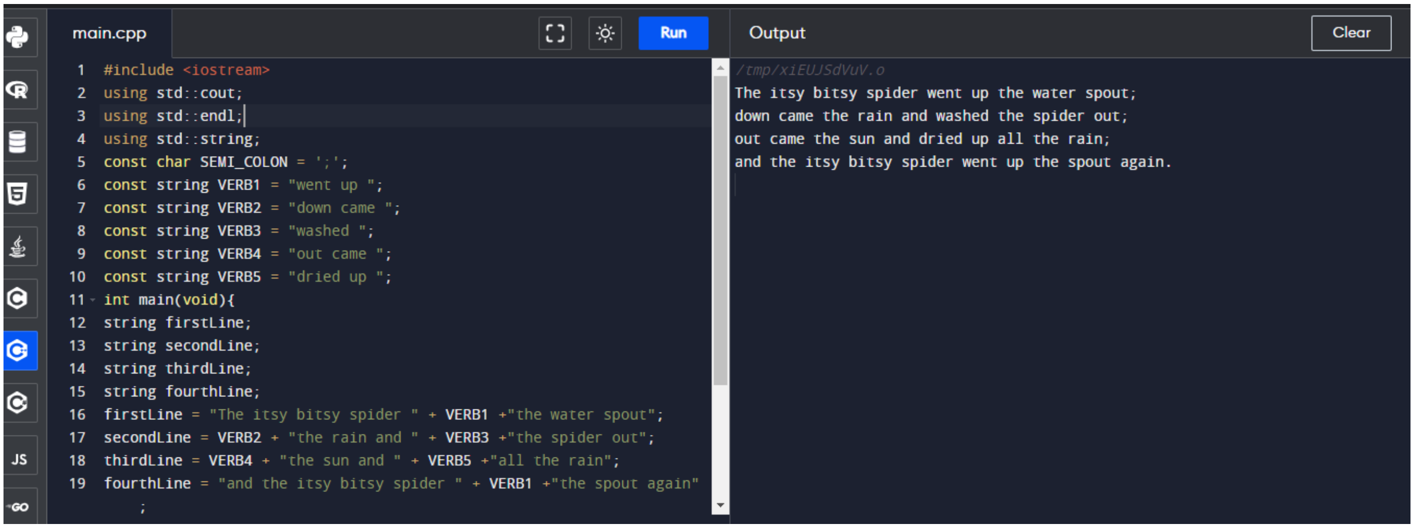
cout << thirdLine << SEMI_COLON;

cout << endl;

cout << fourthLine << '.' << endl;

return 0;

}



```
#include <iostream>
using std::cout;
using std::endl;
using std::string;
const char SEMI_COLON = ';';
const string VERB1 = "went up ";
const string VERB2 = "down came ";
const string VERB3 = "washed ";
const string VERB4 = "out came ";
const string VERB5 = "dried up ";
int main(void){
string firstLine;
string secondLine;
string thirdLine;
string fourthLine;
firstLine = "The itsy bitsy spider " + VERB1 +"the water spout";
secondLine = VERB2 + "the rain and " + VERB3 +"the spider out";
thirdLine = VERB4 + "the sun and " + VERB5 +"all the rain";
fourthLine = "and the itsy bitsy spider " + VERB1 +"the spout again"
    ;
```

```
/tmp/xiEUJSdVuV.o
The itsy bitsy spider went up the water spout;
down came the rain and washed the spider out;
out came the sun and dried up all the rain;
and the itsy bitsy spider went up the spout again.
```

Q2) Focuses on constructing output statements. Program Shell is the outline of a program. Use this shell for Question#1 through #3.

a) Question#1: Write a program to read-in from keyboard and print the following information single spaced on the screen. Use literal constants in the output statements for each of the data items to be written on the screen. Run your program to verify that the output is as specified.

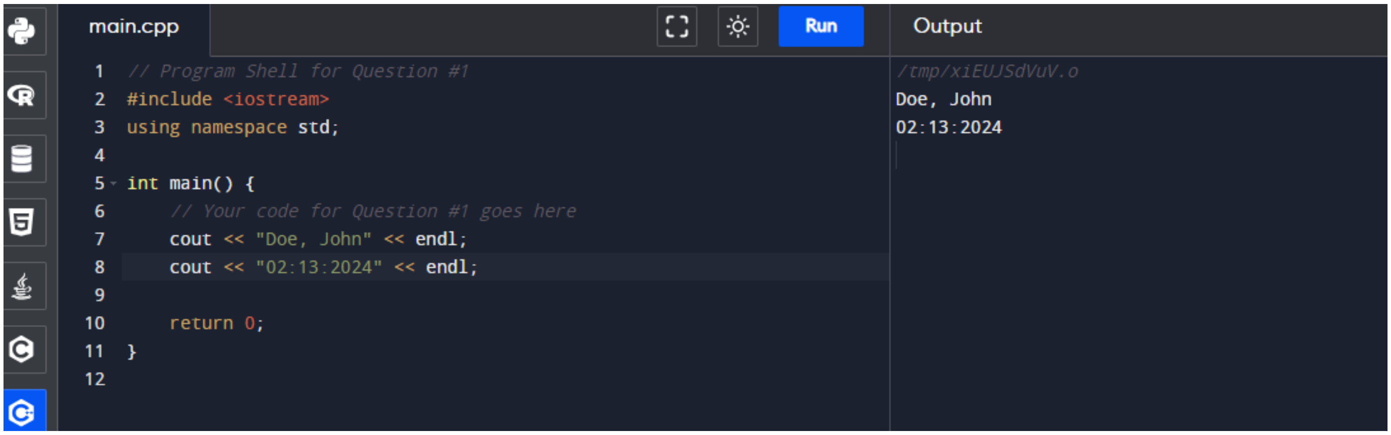
i. your name (last name, comma, blank, first name)
ii. today's date (month:day:year)

Ans:

// Program Shell for Question #1

#include <iostream>

```
using namespace std;

int main() {
    // Your code for Question #1 goes here
    cout << "Doe, John" << endl;
    cout << "02:13:2024" << endl;

    return 0;
}
```



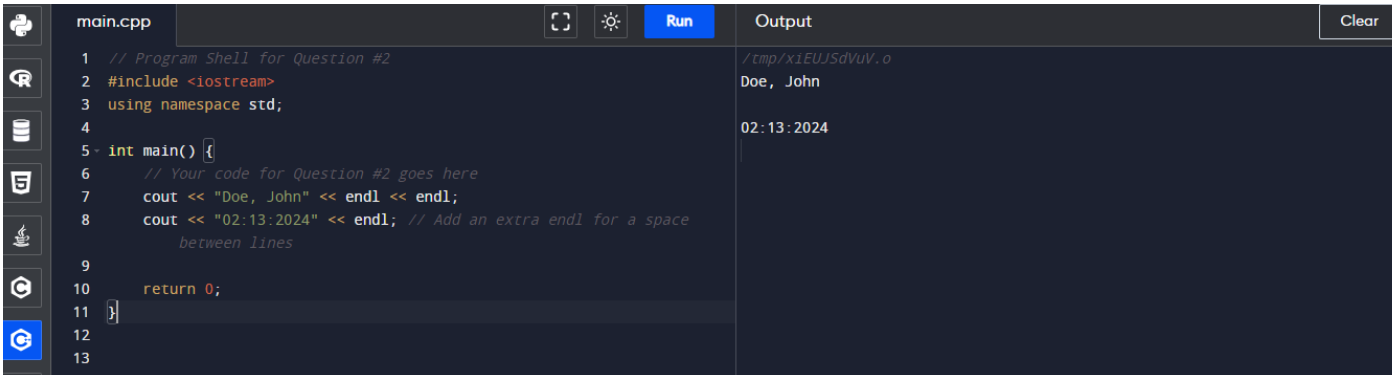
```
// Program Shell for Question #1
#include <iostream>
using namespace std;

int main() {
    // Your code for Question #1 goes here
    cout << "Doe, John" << endl;
    cout << "02:13:2024" << endl;

    return 0;
}
```

```
/tmp/xiEUJSdVuV.o
Doe, John
02:13:2024
```

b) Question#2: Change your program so that there is a space between the two lines of output.

Ans:

```
// Program Shell for Question #2
#include <iostream>
using namespace std;

int main() {
    // Your code for Question #2 goes here
    cout << "Doe, John" << endl << endl;

    cout << "02:13:2024" << endl; // Add an extra endl for a space between lines


    return 0;

}
```



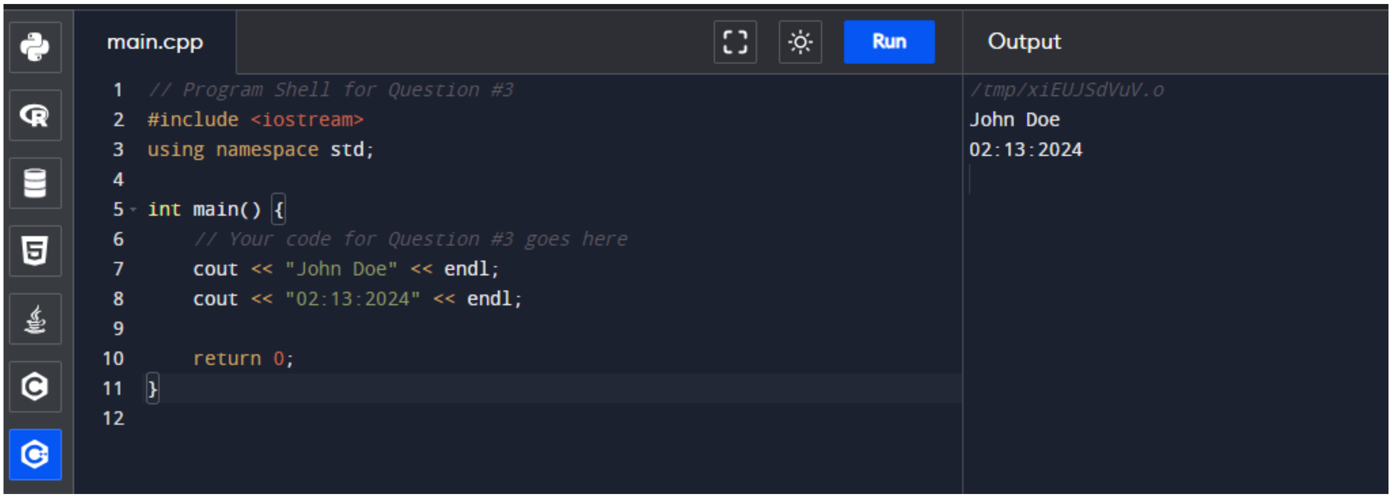
```
// Program Shell for Question #2
#include <iostream>
using namespace std;

int main() {
    // Your code for Question #2 goes here
    cout << "Doe, John" << endl << endl;
    cout << "02:13:2024" << endl; // Add an extra endl for a space between lines

    return 0;
}


```

```
/tmp/xiEUJSdVuV.o
Doe, John

02:13:2024
```

c) Question#3: Change your program so that your first name is printed followed by your last name, with a blank in between the names.

Ans:

```
// Program Shell for Question #3

#include <iostream>

using namespace std;


int main() {

    // Your code for Question #3 goes here

    cout << "John Doe" << endl;

    cout << "02:13:2024" << endl;


    return 0;

}
```



```
// Program Shell for Question #3
#include <iostream>
using namespace std;

int main() {
    // Your code for Question #3 goes here
    cout << "John Doe" << endl;
    cout << "02:13:2024" << endl;

    return 0;
}

```

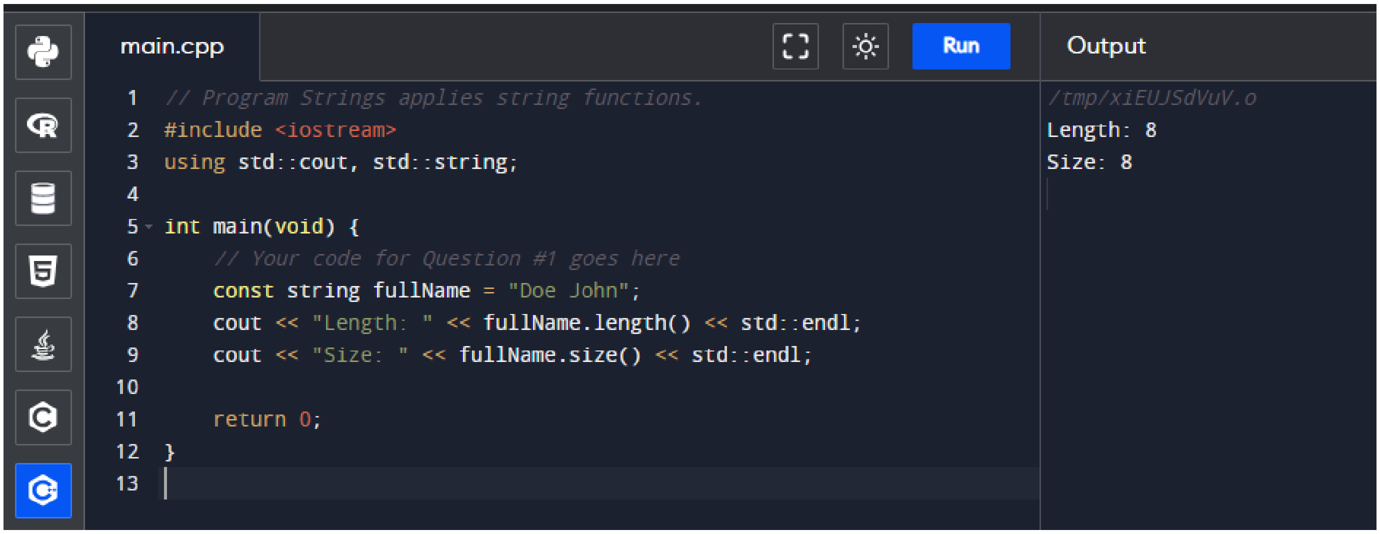
```
/tmp/xiEUJSdVuV.o
John Doe
02:13:2024
```

Q3) Use the following program shell for Question#1 through #3.

a) Question#1: Write a named string constant made up of your first and last names with a blank in between. Write the statements to print out the result of applying length and size to your named constant object. Compile and run your program.

Ans:

```
// Program Strings applies string functions.

#include <iostream>

using std::cout, std::string;


int main(void) {

   // Your code for Question #1 goes here

   const string fullName = "Doe John";

   cout << "Length: " << fullName.length() << std::endl;

   cout << "Size: " << fullName.size() << std::endl;


   return 0;

}
```



```cpp
// Program Strings applies string functions.
#include <iostream>
using std::cout, std::string;

int main(void) {
    // Your code for Question #1 goes here
    const string fullName = "Doe John";
    cout << "Length: " << fullName.length() << std::endl;
    cout << "Size: " << fullName.size() << std::endl;

    return 0;
}
```

```
/tmp/xiEUJSdVuV.o
Length: 8
Size: 8
```

b) Question#2: Add statements to your Question#1 program to print your name formatted as last name first, followed by a comma and your first name. Use function substr to accomplish this task. Compile and run your program.

Ans:

#include <iostream>

using std::cout, std::string;

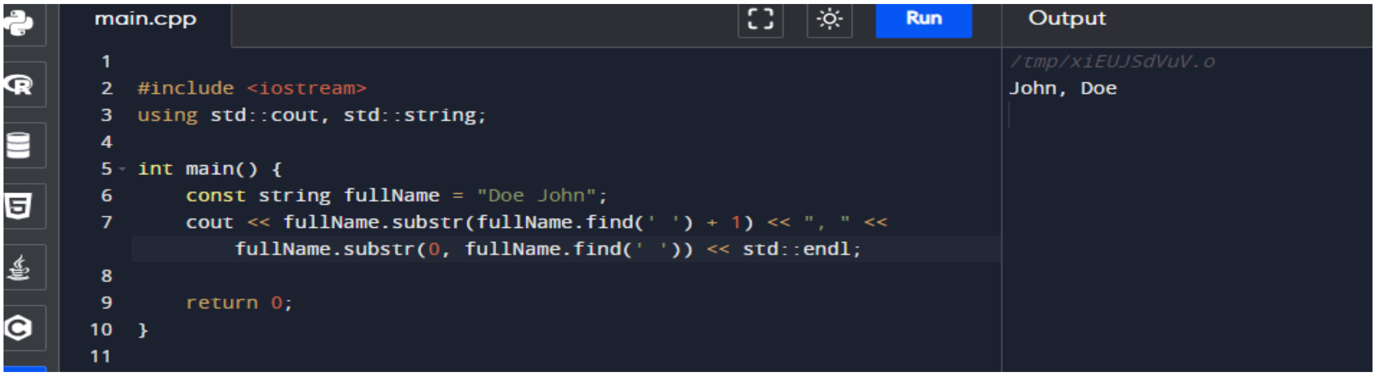
int main() {

  const string fullName = "Doe John";

  cout << fullName.substr(fullName.find(' ') + 1) << ", " << fullName.substr(0, fullName.find(' ')) << std::endl;

  return 0;

}



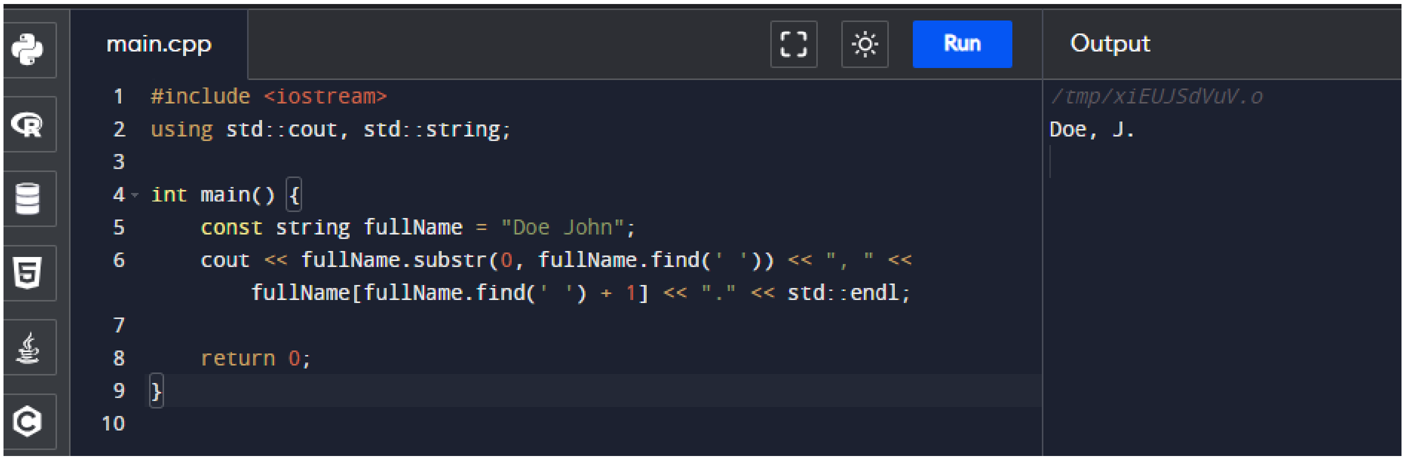
```cpp

#include <iostream>
using std::cout, std::string;

int main() {
    const string fullName = "Doe John";
    cout << fullName.substr(fullName.find(' ') + 1) << ", " <<
        fullName.substr(0, fullName.find(' ')) << std::endl;

    return 0;
}

```

```
/tmp/xiEUJSdVuV.o
John, Doe
```

c) Question#3: Add the statements necessary to print your last name, followed by a comma and your first initial. Compile and run your program.

Ans:

```
#include <iostream>

using std::cout, std::string;


int main() {

   const string fullName = "Doe John";

   cout << fullName.substr(0, fullName.find(' ')) << ", " << fullName[fullName.find(' ') + 1] << "."
<< std::endl;


   return 0;

}
```



```
#include <iostream>
using std::cout, std::string;

int main() {
    const string fullName = "Doe John";
    cout << fullName.substr(0, fullName.find(' ')) << ", " <<
        fullName[fullName.find(' ') + 1] << "." << std::endl;

    return 0;
}

```

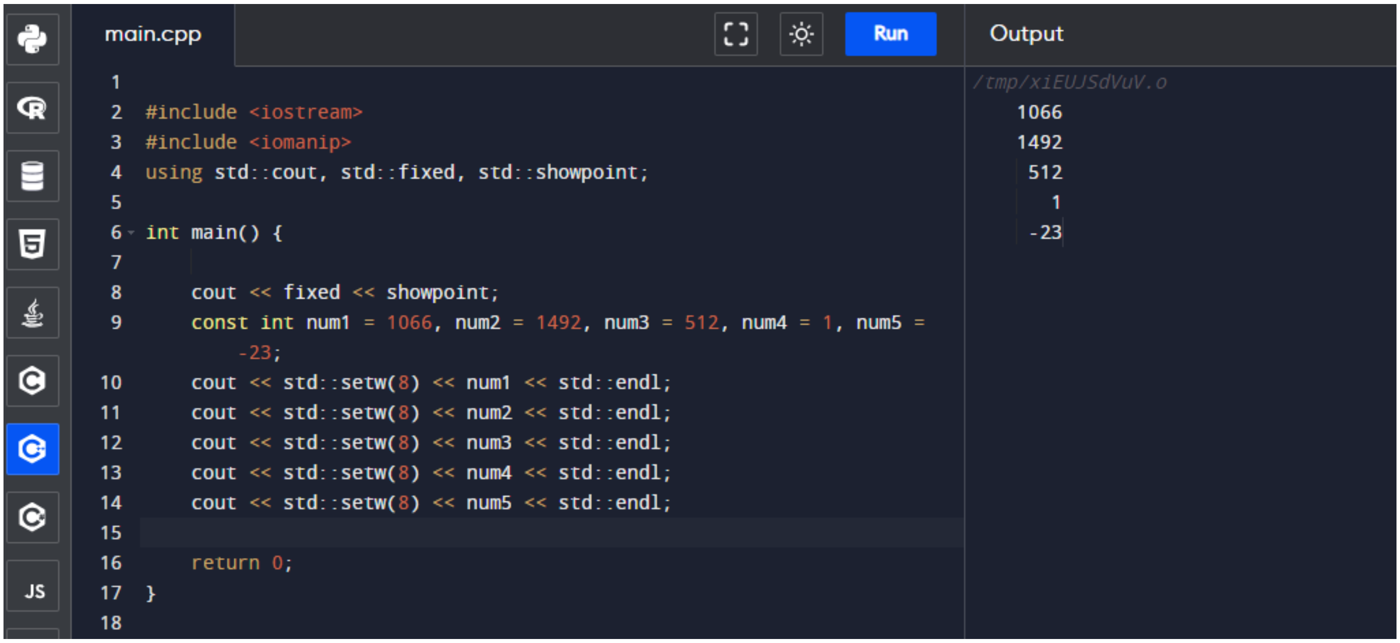
```
/tmp/xiEUJSdVuV.o
Doe, J.
```

Q4) Use the following program shell for Question#1 through Question#4.

a. Question#1: Write a program to print the following numbers right-justified in a column on the screen. Make the values named constants. 1066 1492 512 1 -23

Ans:

```
#include <iostream>

#include <iomanip>

using std::cout, std::fixed, std::showpoint;


int main() {


    cout << fixed << showpoint;

    const int num1 = 1066, num2 = 1492, num3 = 512, num4 = 1, num5 = -23;

    cout << std::setw(8) << num1 << std::endl;

    cout << std::setw(8) << num2 << std::endl;

    cout << std::setw(8) << num3 << std::endl;

    cout << std::setw(8) << num4 << std::endl;

    cout << std::setw(8) << num5 << std::endl;


    return 0;

}
```



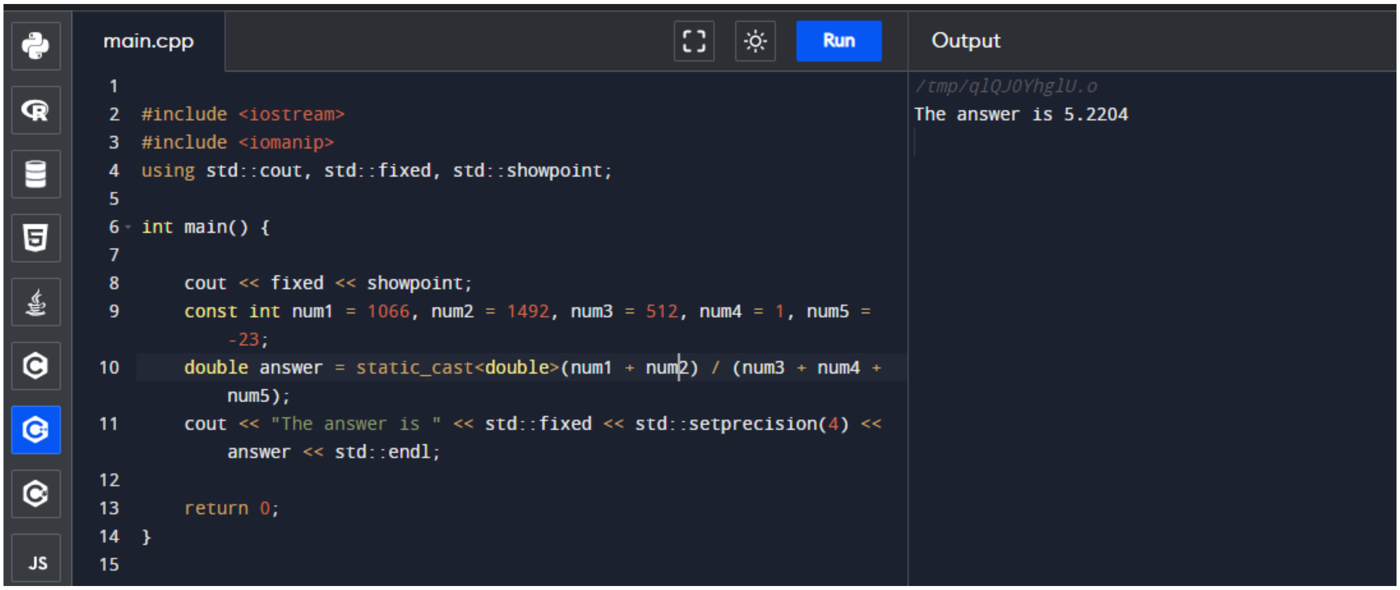
```

#include <iostream>
#include <iomanip>
using std::cout, std::fixed, std::showpoint;

int main() {

    cout << fixed << showpoint;
    const int num1 = 1066, num2 = 1492, num3 = 512, num4 = 1, num5 =
        -23;
    cout << std::setw(8) << num1 << std::endl;
    cout << std::setw(8) << num2 << std::endl;
    cout << std::setw(8) << num3 << std::endl;
    cout << std::setw(8) << num4 << std::endl;
    cout << std::setw(8) << num5 << std::endl;

    return 0;
}

```

```
/tmp/xiEUJSdVuV.o
    1066
    1492
     512
       1
     -23
```

b. Question#2: Add two statements to your program. Calculate the floating point result from dividing the sum of the first two values by the sum of the last three values and store it in answer. The second statement should write the contents of answer on the screen to four decimal places. (Do not forget to declare answer.) The answer is _______________.

Ans:

```
#include <iostream>

#include <iomanip>

using std::cout, std::fixed, std::showpoint;


int main() {


   cout << fixed << showpoint;

   const int num1 = 1066, num2 = 1492, num3 = 512, num4 = 1, num5 = -23;

   double answer = static_cast<double>(num1 + num2) / (num3 + num4 + num5);

   cout << "The answer is " << std::fixed << std::setprecision(4) << answer << std::endl;


   return 0;

}
```



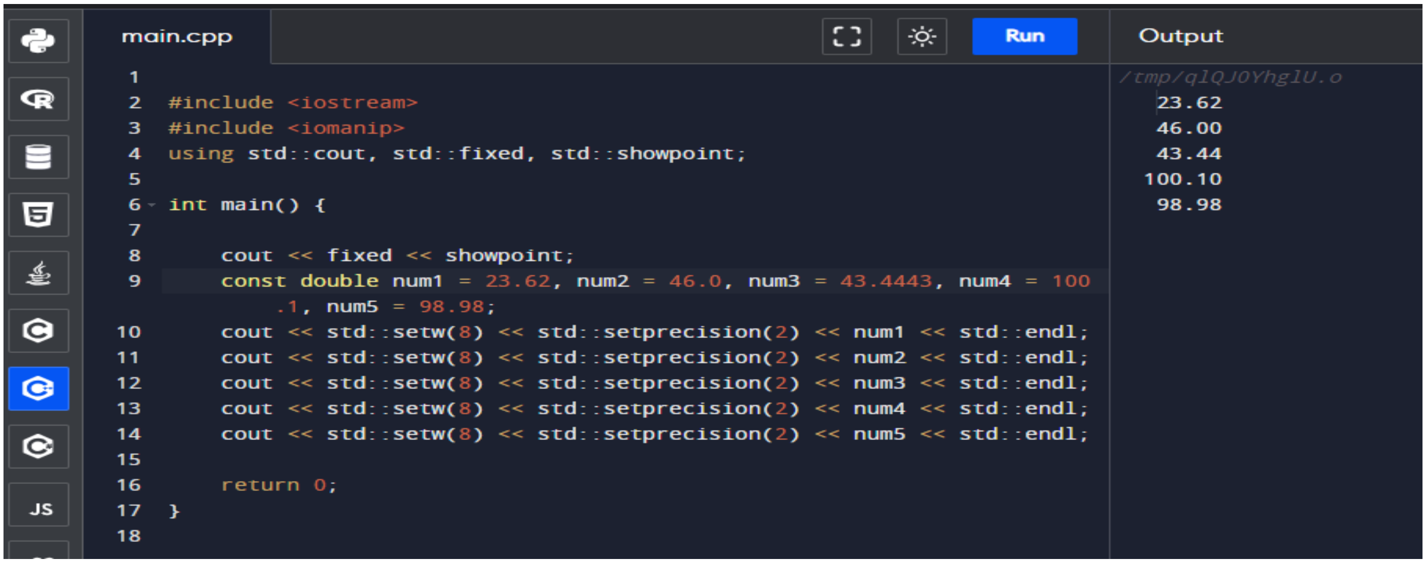
```

#include <iostream>
#include <iomanip>
using std::cout, std::fixed, std::showpoint;

int main() {

    cout << fixed << showpoint;
    const int num1 = 1066, num2 = 1492, num3 = 512, num4 = 1, num5 =
        -23;
    double answer = static_cast<double>(num1 + num2) / (num3 + num4 +
        num5);
    cout << "The answer is " << std::fixed << std::setprecision(4) <<
        answer << std::endl;

    return 0;
}

```

```
/tmp/qlQJOYhglU.o
The answer is 5.2204
```

c. Question#3: Write the following numbers right-justified in a column on the screen. Each of the data values should be written in formatted floating-point notation with two decimal places. Use field width specifications rather than listing the numbers in your program with the proper formatting. You may use either literal constants or named constants. 23.62 46.043.4443 100.1 98.98

Ans:

```
#include <iostream>

#include <iomanip>

using std::cout, std::fixed, std::showpoint;

int main() {

  cout << fixed << showpoint;

  const double num1 = 23.62, num2 = 46.0, num3 = 43.4443, num4 = 100.1, num5 = 98.98;

  cout << std::setw(8) << std::setprecision(2) << num1 << std::endl;

  cout << std::setw(8) << std::setprecision(2) << num2 << std::endl;

  cout << std::setw(8) << std::setprecision(2) << num3 << std::endl;

  cout << std::setw(8) << std::setprecision(2) << num4 << std::endl;

  cout << std::setw(8) << std::setprecision(2) << num5 << std::endl;

  return 0;

}
```



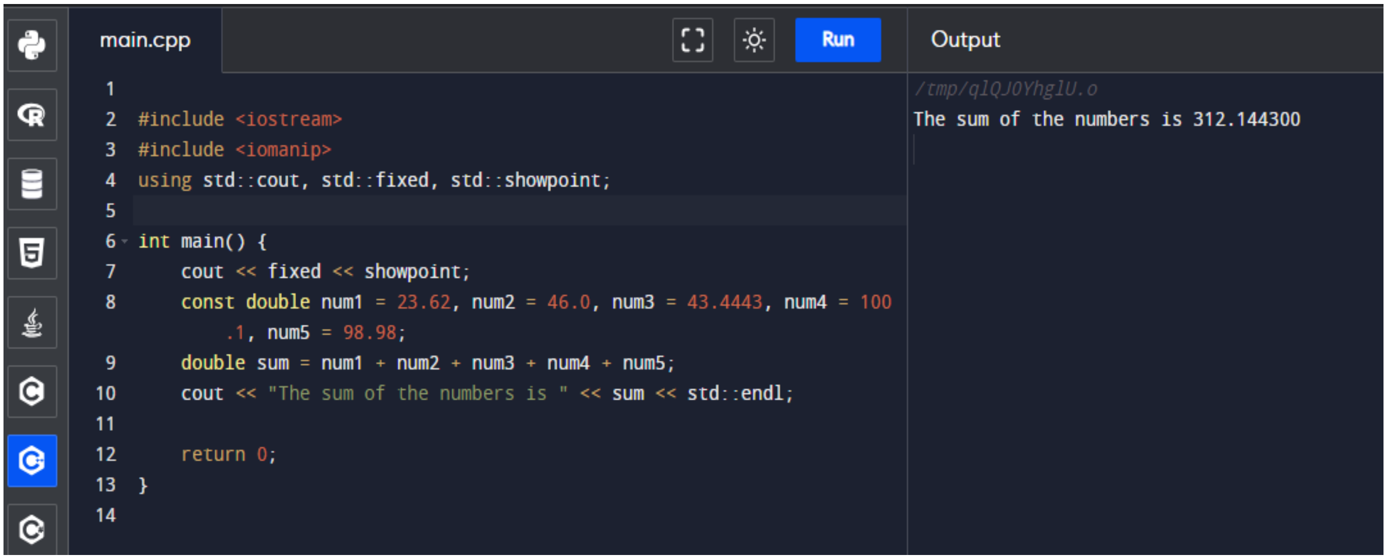
```

#include <iostream>
#include <iomanip>
using std::cout, std::fixed, std::showpoint;

int main() {

    cout << fixed << showpoint;
    const double num1 = 23.62, num2 = 46.0, num3 = 43.4443, num4 = 100.1, num5 = 98.98;
    cout << std::setw(8) << std::setprecision(2) << num1 << std::endl;
    cout << std::setw(8) << std::setprecision(2) << num2 << std::endl;
    cout << std::setw(8) << std::setprecision(2) << num3 << std::endl;
    cout << std::setw(8) << std::setprecision(2) << num4 << std::endl;
    cout << std::setw(8) << std::setprecision(2) << num5 << std::endl;

    return 0;
}

```

```
/tmp/qlQJ0YhglU.o
   23.62
   46.00
   43.44
  100.10
   98.98
```

d. Question#4: Add two statements to your program for Question#3. The first statement should calculate the sum of the numbers and store the result in variable sum. The second statement should write sum on the screen, properly labeled. The sum of the numbers is __________________.

Ans:

```
#include <iostream>

#include <iomanip>

using std::cout, std::fixed, std::showpoint;


int main() {

   cout << fixed << showpoint;

   const double num1 = 23.62, num2 = 46.0, num3 = 43.4443, num4 = 100.1, num5 = 98.98;

   double sum = num1 + num2 + num3 + num4 + num5;

   cout << "The sum of the numbers is " << sum << std::endl;


   return 0;

}
```



```

#include <iostream>
#include <iomanip>
using std::cout, std::fixed, std::showpoint;

int main() {
    cout << fixed << showpoint;
    const double num1 = 23.62, num2 = 46.0, num3 = 43.4443, num4 = 100.1, num5 = 98.98;
    double sum = num1 + num2 + num3 + num4 + num5;
    cout << "The sum of the numbers is " << sum << std::endl;

    return 0;
}

```

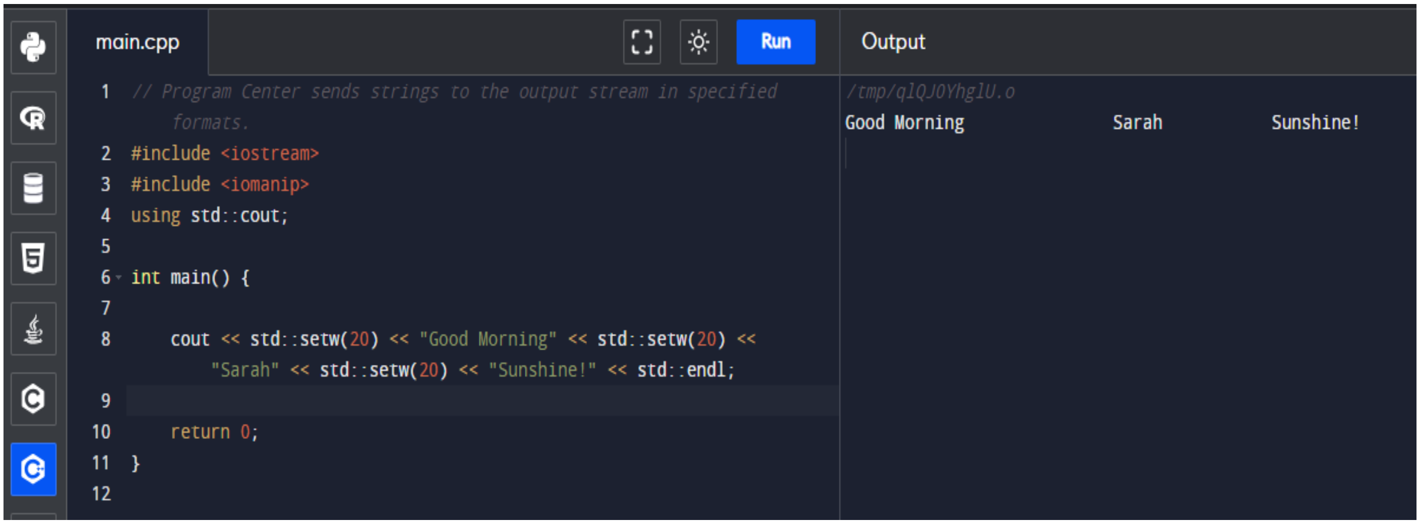
```
/tmp/qlQJOYhglU.o
The sum of the numbers is 312.144300
```

Q5) Use the following program shell for Question#1through #3.

a. Question#1: Add the statements necessary to print the following strings centered in fields of 20 characters, all on one line: "Good Morning", "Sarah", and "Sunshine!". Do not use manipulators. Compile and run your program; show your output.

Ans:

```
// Program Center sends strings to the output stream in specified formats.

#include <iostream>

#include <iomanip>

using std::cout;


int main() {


   cout << std::setw(20) << "Good Morning" << std::setw(20) << "Sarah" << std::setw(20) << "Sunshine!" << std::endl;


   return 0;

}
```



```
// Program Center sends strings to the output stream in specified formats.
#include <iostream>
#include <iomanip>
using std::cout;

int main() {

    cout << std::setw(20) << "Good Morning" << std::setw(20) << "Sarah" << std::setw(20) << "Sunshine!" << std::endl;

    return 0;
}

```

```
/tmp/qlQJ0YhglU.o
Good Morning               Sarah           Sunshine!
```

b. Question#2: Repeat Question#1using manipulators to help center your strings. Compile and run your program. Your output should be the same.

Ans:

// Program Center sends strings to the output stream in specified formats.

#include <iostream>

#include <iomanip>

using std::cout;

int main() {

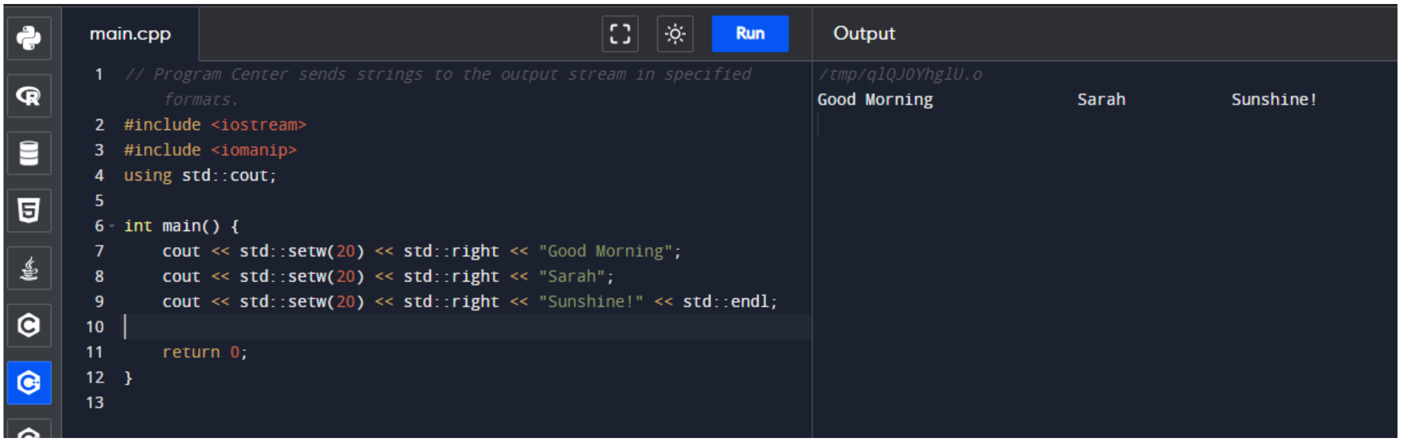
    cout << std::setw(20) << std::right << "Good Morning";

    cout << std::setw(20) << std::right << "Sarah";

    cout << std::setw(20) << std::right << "Sunshine!" << std::endl;

    return 0;

}



```
// Program Center sends strings to the output stream in specified
    formats.
#include <iostream>
#include <iomanip>
using std::cout;

int main() {
    cout << std::setw(20) << std::right << "Good Morning";
    cout << std::setw(20) << std::right << "Sarah";
    cout << std::setw(20) << std::right << "Sunshine!" << std::endl;

    return 0;
}
```

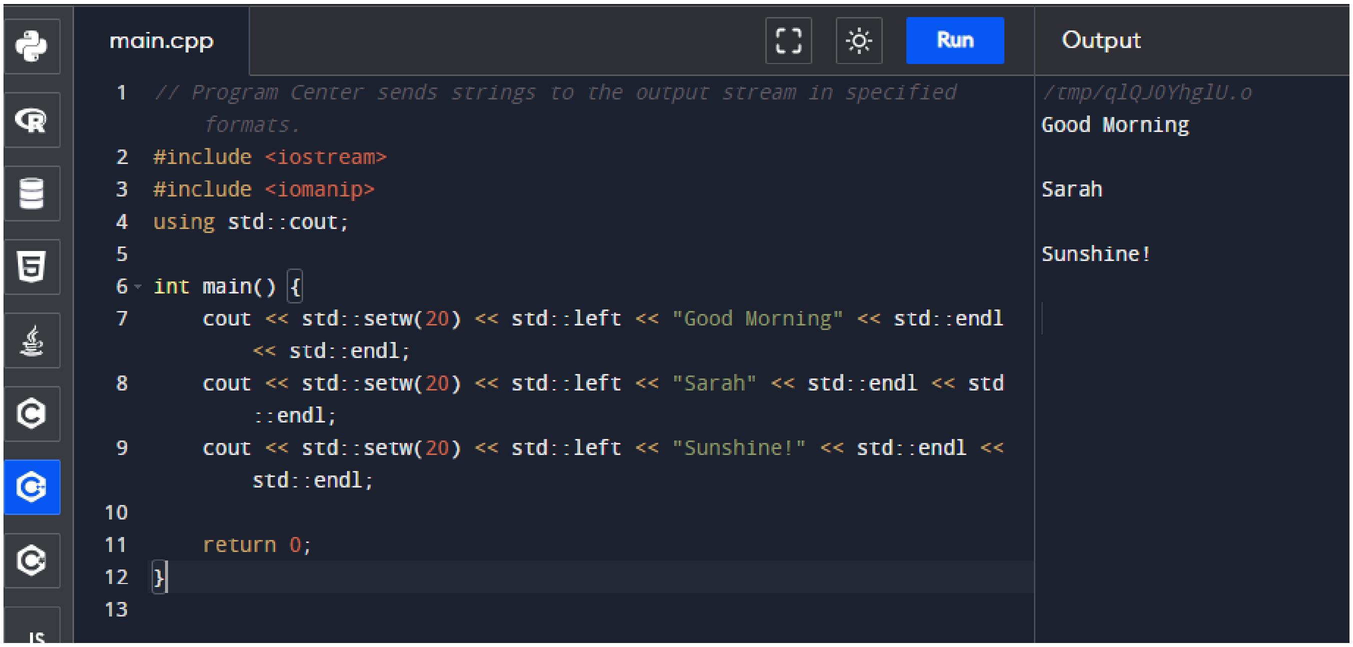
```
/tmp/q1QJ0Yhg1U.o
Good Morning               Sarah           Sunshine!
```

c. Question#3: Change the program in Question#2 so that the three strings are printed on three separate lines with a blank line in between each string.

Ans:

// Program Center sends strings to the output stream in specified formats.

```
#include <iostream>

#include <iomanip>

using std::cout;


int main() {

   cout << std::setw(20) << std::left << "Good Morning" << std::endl<< std::endl;

   cout << std::setw(20) << std::left << "Sarah" << std::endl << std::endl;

   cout << std::setw(20) << std::left << "Sunshine!" << std::endl << std::endl;


   return 0;

}
```



```
// Program Center sends strings to the output stream in specified formats.
#include <iostream>
#include <iomanip>
using std::cout;

int main() {
    cout << std::setw(20) << std::left << "Good Morning" << std::endl << std::endl;
    cout << std::setw(20) << std::left << "Sarah" << std::endl << std::endl;
    cout << std::setw(20) << std::left << "Sunshine!" << std::endl << std::endl;

    return 0;
}
```

```
/tmp/qlQJOYhglU.o
Good Morning

Sarah

Sunshine!
```

Github Links:

Q2. https://github.com/absiddik012/CS360Lab/blob/main/19897_CS360Lab_Assignment-1%2C%20Q-2(a%2Cb%2Cc)_Abu%20Bakar_Siddik

Q3. https://github.com/absiddik012/CS360Lab/blob/main/19897_CS360Lab_Assignment-1%2C%20Q-3(a%2Cb%2Cc)_Abu%20Bakar_Siddik

Q4. https://github.com/absiddik012/CS360Lab/blob/main/19897_CS360Lab_Assignment-1%2C%20Q-4(a%2Cb%2Cc%2Cd)_Abu%20Bakar_Siddik

Q5. https://github.com/absiddik012/CS360Lab/blob/main/19897_CS360Lab_Assignment-1%2C%20Q-5(a%2Cb%2Cc)_Abu%20Bakar_Siddik