EGR 126
Programming for Engineers

Lesson #6 - Introduction to C++

1. The programming language that is used in this class is _____________.

2. C++ is a superset of ____________ programming language. This means that C++ includes all of C's features and adds many features of its own, e.g. object oriented programming ____________ features.

3. See Section 1.10 for more background info.

Syntax Rules, Errors, and Debugging

1. Programming languages have a set of rules which are known as ____________ rules.

2. When these rules are violated, the compiler will display one or more (syntax) ____________ messages.

3. There are other types of errors: run-time errors and logic errors.

4. These types of errors are known as program ____________.

5. Finding and correcting these bugs is known as ____________.
6. A _________ error compiles correctly. This error is detected when the program is run or executed.

Example 1: Which statement below will cause a run-time error?

\[
\begin{align*}
B &= 6.0; \\
C &= B \times 2.0; \\
E &= B / (C - 12.0); \\
F &= E + 2;
\end{align*}
\]

7. A program may compile correctly, execute with no run-time error, but still give a wrong result. This is because the program contains a _________ error.

Example 2: Which statement below will cause a logic error?

\[
\begin{align*}
\text{side1} &= 6.0; \\
\text{side2} &= 2.5; \\
\text{Area} &= \text{side1} + \text{side2}; \\
\text{Perimeter} &= (\text{side1} \times 2) + (\text{side2} \times 2);
\end{align*}
\]

Program #1

Write a program that displays the following three lines. The program should also pause between lines 2 and 3:

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The algorithm for the program is shown below:

1. Print "EGR 126"
The program is shown below:

// Program No. 1
#include <iostream>
using namespace std;
void main (void)
{
    cout << " 
    " << endl; // 1st line
    cout << "Programming for Engineers\n"; // 2nd line
    cout << " 
    "; // 3rd line
}

1. ___________ is a header file. Header files contain pre-written pieces of code that we can use. In particular, <iostream> is for input/output manipulation.

2. ___________ allows us to print text and numbers to the screen. cout is one of the pre-written coding instructions that is located in <iostream>.

3. The using ________________ directive enables the compiler to:
   a) Access the standard C++ library
   b) Simply put, having access to the standard library allows us to write code that’s more succinct and less cumbersome.

4. include and using directives are known as ___________ directives - a preprocessor directive instructs the compiler on steps to take before compilation.

5. ___________ forces the output to go to a new line.
   _________ ends a line and forces the cursor to a new line.

6. _________ and _________ are used for comments.
   The compiler ignores anything after a _________.
   or anything between a _________.
   What is the main difference between // and /* */?
// Another way to write Program No. 1
#include <iostream>
using namespace std;

void main (void)
|
  // Print output
  cout << "Programming for Engineers";

Program #2
Write a program that displays the following four lines.

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The shell for the program is given below:

// Program No. 2
#include <iostream>
using namespace std;

void main (void)
{ /* Print output */
  cout << "Programming for Engineers";
}
Program #3:
Write a program that computes the area of the rectangular field shown below. Assume that the sides are 72.89 ft and 43.57 ft.

The program should display each side length on a new line, then display the area in sq. feet.

All displays should be on the computer screen.

The data structures (or variables) for the program are:
- side 1 = 72.89 ft
- side 2 = 43.57 ft
- the area in

The algorithm for the program is shown below:
1. Declare
2. Assign initial values to
3. ______________________
4. ______________________
5. ______________________

// Program No. 3
#include <iostream>
using namespace std;
void main (void)
{
    // Declare variables
    double _______________; // Length in ft
    double _______________; // Width in ft
    double _______________; // Area in sq. ft.
// Initialize variables
side1 = ________________;
side2 = ________________;
// Compute area
area = ____________________;
// Display the sides and area
______________________________________________________;
______________________________________________________;
______________________________________________________;
} // End of program

1. **Note:**
   
   `side1`, `side2`, and `area` are declared
to be of type __________. This means that the
associated memory spaces must be able to accommodate
double precision values such as 2.156 or -0.0324.

2. The output of this program will be:

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**Lab work Problem:**

1. Enter Program #3 in the lab. Compile and run the program.
2. Ask the professor to inspect your program.

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**Homework Assignment:**

1. Problem 2-01 in (Problems in C++) text.
2. Write a program that computes the area of the triangle shown below. The lengths of the base and height, as well as the area, should be displayed on separate lines on the computer screen.