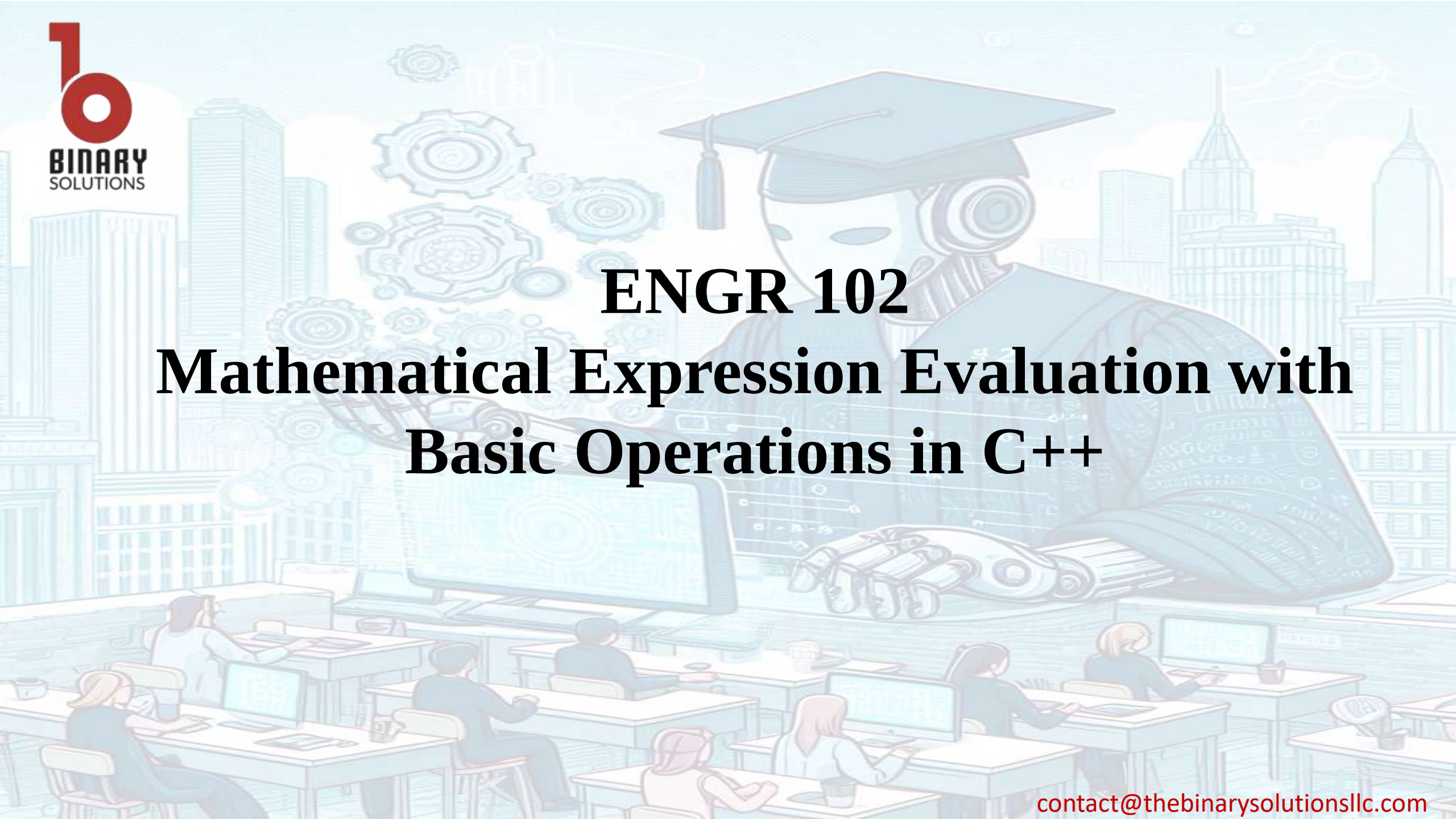

ENGR 102
Mathematical Expression Evaluation with Basic Operations in C++

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Introduction

This program evaluates a mathematical expression involving arithmetic operations, mathematical functions, and constants. It demonstrates the use of basic arithmetic operators and mathematical functions in C++ to compute complex expressions.

Problem Statement

Given the expression

$$y2 = \sqrt{150} - (4.5)^2 \frac{\log(400)}{1.5} + \sqrt{25}$$

the task is to compute the value of yy and output the result.

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Solution Steps

- Compute the value of yy using the provided mathematical expression.
- Output the result.

Pseudo Code

1. Begin main function.
    1.1 Calculate the value of y2 using the following expression:
        y2 = sqrt(150) - pow(4.5, 2) * (log(400) / 1.5) + sqrt(25)
        1.1.1 Compute the square root of 150.
        1.1.2 Raise 4.5 to the power of 2.
        1.1.3 Compute the natural logarithm of 400.
        1.1.4 Divide the result of step 1.1.3 by 1.5.
        1.1.5 Multiply the result of step 1.1.2 by the result of step 1.1.4.
        1.1.6 Subtract the result of step 1.1.5 from the result of step 1.1.1.
        1.1.7 Add the square root of 25 to the result of step 1.1.6.
    1.2 Output the value of y2 with the text "Result: ".
    1.3 End main function.

C++ Code

```
#include <iostream>

#include <cmath>

using namespace std;

int main() {

    double y2 = sqrt(150) - pow(4.5, 2) * (log(400) / 1.5) + sqrt(25);

    cout << "Result: " << y2 << endl;

    return 0;

}
```

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Code Explanation

- **#include <iostream>#include <cmath>using namespace std;**

These lines include necessary header files.

- **int main() {**

This line marks the beginning of the ‘main’ function, which is the entry point of the program.

- **double y2 = sqrt(150) - pow(4.5, 2) * (log(400) / 1.5) + sqrt(25);**

This line calculates the value of y2 based on the mathematical expression provided.

- **cout << "Result: " << y2 << endl;**

This line outputs the value of ‘y2’ to the standard output stream (typically the console), preceded by the text "Result: ".

- **return 0;}**

This line indicates the end of the ‘main’ function and returns an integer value of ‘0’ to the operating system, typically indicating successful execution.

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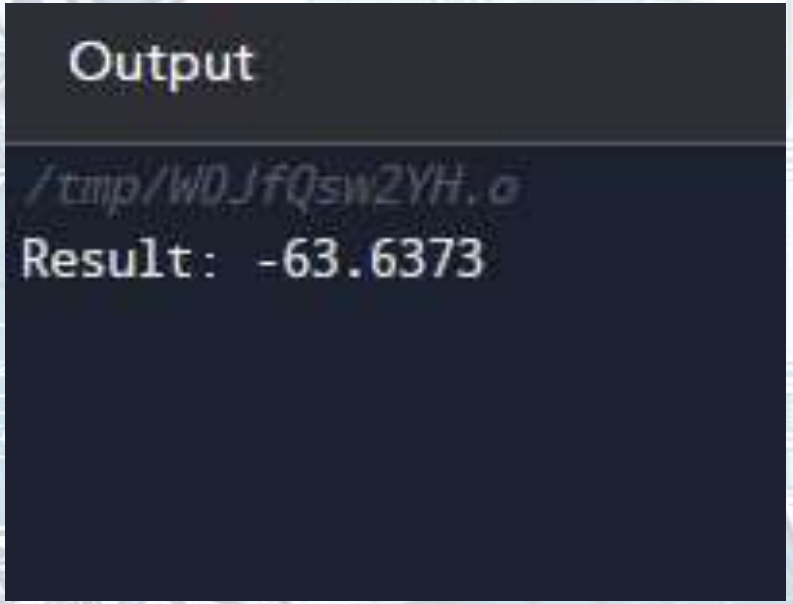
Final Answer

The calculated value of y2 represents the solution to the given mathematical expression.

Result = -63.6373



Additional Comments/Tips

- Ensure the correctness of the expression and the values of constants for accurate computation.
- Validate the result by comparing it with known results or by performing manual calculations.

Conclusion

This program demonstrates the use of arithmetic operators and mathematical functions in C++ to evaluate complex mathematical expressions efficiently, providing a practical approach for numerical computation.