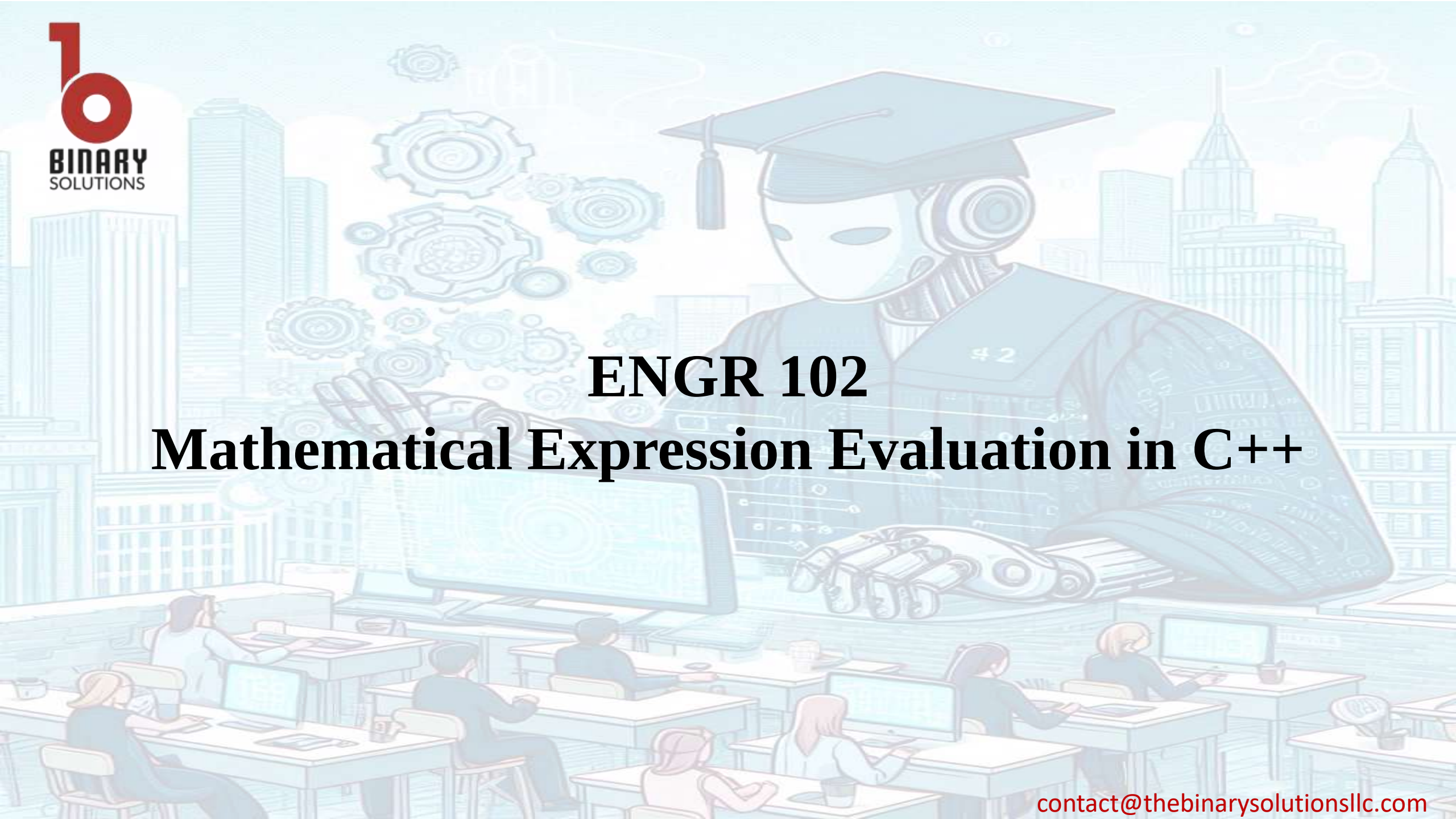

# ENGR 102
# Mathematical Expression Evaluation in C++

contact@thebinarysolutionsllc.com

# 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:

$$y = \frac{2}{0.036} \times \frac{\left(\sqrt{250} - x\right)^2}{e^{-0.2}}$$

where $x = 10.5$, the task is to compute the value of $y$ and output the result.

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# Solution Steps

- Define the variables $x$ and $y$.
- Compute the value of $y$ using the provided mathematical expression.
- Output the result.

# Pseudo Code

1. Begin main function.

1.1 Define variable x and assign it the value 10.5.

1.2 Calculate the value of y using the following expression:

y = (2 / 0.036) * (pow((sqrt(250) - x), 2) / exp(-0.2))

1.2.1 Compute the square root of 250.

1.2.2 Subtract x from the square root obtained in step 1.2.1 and square the result.

1.2.3 Compute the exponential function with an exponent of -0.2.

1.2.4 Divide 2 by 0.036.

1.2.5 Multiply the result of step 1.2.2 by the result of step 1.2.4.

1.2.6 Divide the result of step 1.2.5 by the result of step 1.2.3 to get the value of y.

1.3 Output the value of y with the text "Result: ".

1.4 End main function.

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# MATLAB Code

```
#include <iostream>
#include <cmath>

using namespace std;

int main() {
    double x = 10.5;
    double y = (2 / 0.036) * (pow((sqrt(250) - x), 2) / exp(-0.2));

    cout << "Result: " << y << endl;

    return 0;
}
```

# Code Explanation

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

This part includes necessary header files.

- **int main() {**

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

- **double x = 10.5;**

This line declares a variable ‘x’ of type ‘double’ and initializes it to the value ‘10.5’.

- **double y = (2 / 0.036) * (pow((sqrt(250) - x), 2) / exp(-0.2));**

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

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

This line outputs the value of y to the standard output stream, preceded by the text "Result: ".

- **return 0;}**

This line marks the end of the ‘main’ function.

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# Final Answer

- The calculated value of ‘y’ is the final answer.
- y = 1914.27

# Additional Comments/Tips

- Ensure the correctness of the expression and the values of constants and variables 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.