

# MTH 4300: Algorithms, Computers and Programming II

Spring 2026

Section: SMWA

## Problem Set 1

I know that it's very easy to just use AI to solve these problems, but please resist! I expect you all to give these problems an honest attempt. Spend about 30 minutes trying each problem yourself first. If you're still getting to a good place with your solution, then prompt AI to guide you to a solution rather than expect it to solve the entire problem for you.

### Problem 1: Arithmetic and Type Casting

Write a complete C++ program that:

1. Prompts the user to enter two integers
2. Calculates and displays:
  - The sum, difference (first minus second), and product
  - The integer quotient and remainder (using `/` and `%`)
  - The precise quotient as a `double` (using `static_cast`)
3. If the second integer is zero, print an error message instead of performing division

Your program should produce output similar to:

```
Enter two integers: 17 5
Sum: 22
Difference: 12
Product: 85
Integer quotient: 3
Remainder: 2
Precise quotient: 3.4
```

### Problem 2: Coin Breakdown

Write a complete C++ program that:

1. Prompts the user to enter an amount of money in cents (as an `int`)
2. If the amount is negative, print an error message
3. Otherwise, calculates the minimum number of quarters (25¢), dimes (10¢), nickels (5¢), and pennies (1¢) needed to make that amount
4. Displays each denomination and the total dollar value (as a `double` with exactly 2 decimal places)

Your program should produce output similar to:

```
Enter amount in cents: 87
Quarters: 3
Dimes: 1
Nickels: 0
Pennies: 2
Total: $0.87
```

**Hint:** Use integer division and the modulus operator to break down the amount. Use `std::cout << std::fixed << std::setprecision(2)` from `<iomanip>` to format the dollar value.