



# Lab 04: Expressions

CSE 4108

Structured Programming I Lab

August 2022



# Lab Tasks

## 1. Reverse Digits (II):

Write a program that asks the user to enter a two-digit number, then prints the number with its digits reversed.

Sample Run:

**Enter a two-digit number: 28**

**The reversal is: 82**

## 2. Reverse Digits (III):

Extend the program from the previous task to handle three-digit numbers.

## 3. Reverse Digits (III) - Part 2:

Rewrite the program from the previous task so that it prints the reversal of a ***three-digit*** number without using ***arithmetic*** to split the number into digits.

## 4. Octal conversion:

Write a program that reads an integer entered by the user and displays it in **octal** (base 8).

Sample run:

**Enter a number between 0 and 32767: 1953**

**In octal, your number is: 03641**

The output should be displayed using five digits, even if fewer digits are sufficient.

**Hint:** To convert the number to **octal**, first divide it by 8; the remainder is the last digits of the octal number (1, in this case). Then divide the original number by 8 and repeat the process to arrive at the next-to-last digit. (**printf** is capable of displaying numbers in base 8, as we'll see later in chapter 7 that there's actually an easier way to write this program.)

## 5. Again UPC:

Rewrite the **Program: Computing a UPC Check Digit** from **Lecture 04**, so that the user enters **11** digits at one time, instead of entering one digit, then five digits, and then another five digits.

Sample run:

**Enter the first 11 digits of a UPC: 01380015173**

**Check digit: 5**

## 6. Check EAN:

European countries use a 13-digit code, known as a European Article Number (EAN) instead of the 12-digit Universal Product Code (UPC) found in North America. Each EAN ends with a check digit, just as a UPC does. The technique for calculating the check digit is also similar:

- (a) Add the 2nd,4th,6th,8th,10th,and 12th digits.
- (b) Add the 1st,3rd,5th,7th,9th,and 11th digits.
- (c) Multiply the first sum by 3 and add it to the second sum.
- (d) Subtract 1 from the total.
- (e) Compute the remainder when the adjusted total is divided by 10.
- (f) Subtract the remainder from 9.

For example, consider Güllüoglu Turkish Delight Pistachio & Coconut, which has an EAN of

**8691484260008.**

The first sum is  $6+1+8+2+0+0 = 17$ , and the second sum is  $8+9+4+4+6+0 = 31$ . Multiplying the first sum by 3 and adding the second yields **82**. Subtracting **1** gives **81**. The remainder on dividing by **10** is **1**. When the remainder is subtracted from **9**, the result is **8**, which matches the last digit of the original code. Your job is to modify the *upc.c* program so that it calculates the check digit for an EAN. The user will enter the first **12** digits of the EAN as a single number.

Sample run:

**Enter the first 12 digits of an EAN:****869148426000**

**Check digit:** 8

**7. The Swapperoo:**

Write a program that stores two integers in two variables and then swaps the values of the two variables.

**8. The Swapperoo II (Temp not allowed):**

Modify the program from the previous task so that it doesn't use any temporary variable.