



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.