

**Lab 03: Expressions**

**CSE 4108**

**Structured Programming I Lab**

JULY 2021

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**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**

Read the number using **%d**, then break it into two digits.

**Hint:** If **n** is an integer, then **n%10** is the last digit in **n** and **n/10** is n with the last digit removed.

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.

**Hint:** Remember the ***upc.c*** program in the class demo program file.

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. **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**

6. **The Swapperoo:**

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

two variables.

**Hint:** Use a temporary variable to store one value (a) and then overwrite a with other value

(b). Assign the temporary variable to b.

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

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

**Hint:** Think of the problem from a mathematical perspective.

8. **Blackjack:**

Log in to Codeforces using your ID and submit the solution to the following problem: https://codeforces.com/problemset/problem/104/A