Tutorial 1: Getting Started

ELEC 278: Fundamentals of Information Structures

The goals for Lab 1 are:

- Install your development environment and run your first `Hello World!` in this class.
- Perform an array manipulation function to get you started on programming in C.

Problem 1. In the following C program, identify the scope of the variables `x` and `ptr`, and describe how their lifetimes relate. Does this program have an object lifetime bug? How do you know?

```c
void test(int *ptr) {
    *ptr += 7;
}

int main() {
    int x = 0;
    test(&x);
    printf("%d\n", x);
}
```

Problem 2. Complete `main()` with a simple program to print out the tax form contents in a human-readable way.

```c
#include <stdio.h>

// Always '0' through '9'.
typedef char digit;

// Numeric values match T1 form.
enum marital {
  MARRIED = 1,
  COMMON_LAW = 2,
  WIDOWED = 3,
  DIVORCED = 4,
  SEPARATED = 5,
  SINGLE = 6,
};

struct numeric_date {
  digit year[4];
  digit month[2];
  digit day[2];
};

struct tax_info {
  // Social insurance number.
  digit sin[9];
  // Always a valid date.
```

```
  struct numeric_date date_of_birth;
  // Always a valid date, or all zeros if empty.
  struct numeric_date date_of_death;
  // Always a valid enum value.
  enum marital marital_status;
};

int main() {
  struct tax_info my_tax_info = {
    .sin = {'1', '2', '3', '4', '5', '6', '7', '8', '9'},
    .date_of_birth = {
      .year = {'1', '9', '9', '7'},
      .month = {'0', '3'},
      .day = {'2', '9'},
    },
    .date_of_death = {
      .year = {'0', '0', '0', '0'},
      .month = {'0', '0'},
      .day = {'0', '0'},
    },
    .marital_status = SINGLE,
  };

  // TODO: print out the contents of the form.

  return 0;
}
```