CS142 **Practice for Test 1** Spring 2025

Books, notes, calculators, computers and phones are *not* permitted.

If a question asks for C++ code, don't worry about remembering every little detail of C++ syntax. Minor details will not affect your grade.

1. (16%) Answer each of the following questions briefly but precisely.

   (a) When should an argument be passed by constant reference? [Section 1.1]

   (b) What exactly is a modular program? [Section 1.3]

2. (60%) Create a class `Date`. Each object in this class represents a date such as January 22, 2022. To keep things simple, assume that every month of every year has exactly 30 days and that the year is positive. The class should enforce data abstraction and provide the following operations. (Don't forget to implement the operations.) [Exercise 1.5.4]

   (a) A default constructor that initializes the date to January 1, 2000. [Exercise 1.7.14(a)]

   (b) A constructor `Date(month, day, year)` that initializes the date to the given month, day and year. The arguments `month`, `day` and `year` are integers. [Exercise 1.7.14(b)]

   (c) A method `year()` that returns the year of the date. [Similar to Figure 2.5]

   (d) A method `set(month, day)` that sets the date to the given month and day. The year is left unchanged. The arguments are integers. [Exercise 2.2.6]

   (e) A method `print(out)` that prints the date to output stream `out`. Dates are printed in numerical format, as in `1/22/2022`. The stream argument has `cout` as a default value. [Exercises 1.5.4, 1.6.3 and 2.1.3]

   (f) An input operator (>>). Dates are read in numerical format, as in `1/22/2022`. [Exercise 2.3.6]

   (g) An equality operator (==) that returns **`true`** if the dates are identical. Identical means the same month, day and year. [Similar to Exercise 2.3.5]

3. (12%) Implement the C string function `strcpy(dest, source)`. Recall that this function makes C string `dest` become a copy of C string `source`. The function simply assumes that the array that holds `dest` is large enough. Implement the function as efficiently as possible. [Exercise 3.1.6(a)]

4. (12%) Create a function `concatenate(v1, v2, v3)` that takes as arguments three vectors of integers `v1`, `v2` and `v3` and makes `v3` contain a copy of all the elements of `v1` followed by a copy of all the elements of `v2`. [Exercise 4.2.8 but don't worry about efficiency and reserving enough capacity]