Problem 1 (100pt): Templated Heap

Recall that a maximum heap is a data structure that always has the "largest" value at the top. This value can be popped out. We shall allow the user to specify a custom means of sorting and storing the values.

The template heap class should

- be templated by the type of data it stores, `T`, and a comparison operator, `CMP`, which should be `std::less<T>` by default;
- store a `std::vector<T>` called `data` and a `CMP` called `comparator` as member variables;
- have a default constructor that initialize the heap as an empty heap;
- have a constructor with a single argument of type `std::vector<T>`, constructing the heap with all elements in the vector;
- (20pt) have a `push` function that, accepts a variadic list of arguments of type `T` and places the objects into the data structure;
- have a `top` function that returns the "maximum" value from the heap (as defined by `comparator`), assuming `top` won't be called for an empty heap;
- (20pt) have a `pop` function that, when called, removes the "maximum" value from the heap (as defined by `comparator`), making no effect to the heap if the heap is empty at the call.
- You are allowed to define other member or non-member functions as helper functions.

In addition, construct

- (20pt) a `print` function that takes a variadic list of `Heap<T,CMP>` type containers and print elements in the order defined by `CMP`.

For this homework, the only library header files you are allowed to use are:

- iostream
- iomanip
- vector

A `main.cpp` file is given showing how we will use your class. `Employee` class is defined as in class. Do not submit `Employee` class related code. The sample output is given below. Your code should work for other test cases as well.

```
*************** Case 1: test an empty heap **********

*************** Case 2: constructor **********
*************** Case 3: push function **********
20      10      10      3       2       2       1       1       0
A       B       C       D
Tom     Jerry   Jim
*************** Case 4: top and pop  ****
A
B       C       D
B
D
```

Instructions:

- (5pt) Put your code in `Heap.h` and submit to CCLE. Add description of this file in the beginning to show your ownership. A sample description may look like:

```
/*
    PIC 10C Homework 1, Heap.h
    Purpose: Define a template heap class
    Author: John Doe
    Date: 01/01/2021
*/
```

- (10pt) Write your code with good coding practice, including commenting your code, using descriptive variable/function names, using efficient algorithms, etc. Coding practice will be graded into three levels: 0, 5, 10.
- (25pt) Your code accomplishes all features described above and outputs correct results.
- The official grading compiler is Visual Studio 2019 and you may lose majority of points if your code does not compile. If you don't have VS2019 installed in your computer, you are welcome to check your homework using virtual machines before submission. Please only check your homework after it has satisfying results on your local computer. Manually log out your account after using the machine.