COMP 53: Objects and Classes Lab, part 1

Instructions: In this lab, we are going to review objects and classes.

- Get into groups of **at most two people** to accomplish this lab.
- At the top of your source code list the group members as a comment.
- Each member of the group must individually submit the lab in Canvas.
- This lab includes **33 points** in aggregate. The details are given in the following.

1 Class `State`

In this lab, you are going to define class `State` consisting of the following details.

1. Each `State` has the following **data components**:

   - The name of the state: `name`
   - The population of the state: `population`

   Each of the aforementioned data components must be **hidden** from the class user ***(2 points)***.

2. For each of the aforementioned data components, define the **setter**. The setter of a data component assigns the input to that data component. Let the setter function for `name` and `population` be named `setName` and `setPopulation`, respectively. Both setters must be **visible** to the class users ***(6 points)***.

3. All setters must be defined in **inlined** form ***(2 points)***.

4. For each of the aforementioned data components, define the **getter**. The getter of a data component returns that data component. Let the getter function for `name` and `population` be named `getName` and `getPopulation`, respectively. Both getters must be **visible** to the class users. In addition, each getter must be **constant** ***(6 points)***.

5. All getters must be defined in **inlined** form ***(2 points)***.

6. The definition of class `State` includes the **default constructor** that sets

   - state name to `N/A`, and
   - state population to `0`.

   In addition, **avoid inlined** form for its definition ***(3 points)***.

7. The class `State` includes a **private helper function** `size()` that returns `small`, `medium`, or `large` according to the state's population. The details are as follows:

   - If the population is less than 1 million, then it returns `small`.
   - If the population is larger than 1 million but less than 5 million, then it returns `medium`.
   - If the population is larger than 5 million, then it returns `large`.

   This function must be a **constant** function. In addition, **avoid inlined** form for its definition ***(4 points)***.

8. The class `State` includes a **public function** `void printSize()` that invokes `getName()` along with `size()` to print the state name and its size in the standard output. `printSize()` must be a **constant** function. In addition, **avoid inlined** form for its definition ***(3 points)***.

2 `Main` function

Define `main` function that does the following step by step.

1. Create an object of class `State`, called `state1` ***(1 points)***.
2. Invoke `printSize()` function of `state1` object ***(1 points)***.
3. Set the name and population for `state1` to be `California` and `40000000`, respectively ***(2 points)***.
4. Invoke `printSize()` function of `state1` object ***(1 points)***.

The output of the program may look like the following:

```
N/A: small
California: large
```