MEDGAR EVERS COLLEGE
The City University of New York

Project:
Bus Program

Directions:

For your computer program, you will need to create a means for the computer components (processor and memory) to communicate with each other considering that all of their methods must be void methods that take no parameters. For single processor computers, their components communicated by use of *buses*, which are collections of lines that are each capable of transmitting a single binary digit at a time. These lines are divided into three categories: *data*, *address*, and *control*. Each collection of same type lines are called buses as well.

You will be creating a **Bus** class. The class must

- Represent each category of the bus as bnary arrays. They can be represented with a single binary array, multiple binary arrays or a two-dimensional binary array. The choice is ultimately up to you. These buses, however, must have fixed sizes and be private fields.
- Make the copy constructor and assignment operator private. This means you do not need to define them, however, you must write their prototypes under the private access specifier.
- The default constructor must assign false to all lines, and the destuctor should do nothing.
- Write public methods to access each individual line of each bus type. These methods must have a bool reference return type and accept a index (an int) as a parameter. However, if you desire, can define a single method such as the subscript operator, for all the lines (you may need to offset the index for each category if you declared multiple fields or a two-dimensional array field). For all the methods, if an invalid index is entered, an error must be thrown.

When creating your class, remember that the data for your computer must be 4 bytes (32 bits) [likewise, you will not be performing multiple pulls for information; so make all of bus categories capable of reading and writing the necessary amount of bits]. Furthermore, remember any constraints mentioned before must be maintained.

Last, besides creating the class, you must write a test program that stores random values in a **Bus** object, and then, display the data of each bus category. Each category must be labeled, that is, precede the display of the data of each bus category with the string `"data"`, `"address"` or `"control"` for the respective category. Your test must display the data as binary strings.