CISC 3130

Program #1

Due date

This assignment is due at 11:59pm on Thursday, September 15. Four total late days are available to you for this course. One point will be deducted for each unexcused late day. Homework submissions will not be accepted after 11:59pm on Thursday, September 22.

Description

Design and implement a Vector class. The goal of this assignment is for you to demonstrate mastery of vectors, templates, C++ classes and dynamic memory allocation.

Requirements and grading

- Your Vector class should be implemented in a file called Vector.h. (5 points)
- It should be templated (able to be instantiated with any object type). (5 points)
- It should have a constructor that creates an empty vector and a destructor (4 points each).
- Capacity should be implemented correctly such that capacity is >= size and doubles if necessary. (8 points)
- It should have the following methods: (4 points each)

```
-- unsigned int size()                    // returns the current size of the vector
-- void push_back(const T& elt)           // insert element elt at end of vector
                                          (grow by a factor of 2 if necessary)
-- void pop_back()                        // delete last element
-- T& at(int pos)                         // return reference to element at position pos
                                          // if pos is valid
-- T& front()                             // return reference to first element
-- T& back()                              // return reference to last element
-- bool empty()                           // return true if vector is empty
-- void insert (const T& elt, int pos)    // insert element elt at position pos
-- void erase (int pos)                   // delete element at position pos
```

- and overload the following operators: (4 points each)

```
-- Vector<T>& operator=(const Vector& v)  // assignment operator
-- T& operator[](int n)                    // returns reference to element at position n
```

- Your program should compile and execute correctly. (15 points)
- Your code should be readable, organized, and well-documented. Comments and meaningful variable names are essential, as is proper indentation and formatting. (15 points)
- Note: You may not include the STL vector header file; you should implement each method on your own.

Submission

To submit: Upload your Vector.h file to Blackboard.