**CS A250 – Programming Exam 1: Doubly-linked Lists**

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| **SAVE FREQUENTLY** |

**How to turn in your exam:**

1. Write the **name header** in the **TArray.h, and TArray.cpp** files.
2. Create a **folder** named **LastName\_FirstName\_A250\_PE3 \_TTPM**
3. Copy and paste the **TArray.h, and TArray.cpp** file into the newly created folder.
4. **Zip the folder**
5. **Submit**

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| **IMPORTANT -** Please note the following:   * Turn in a "**clean**" implementation; if your code is messy (poor indentation, unnecessary spacing, etc.) and does not conform to **readability** standards, you will lose points. * Do **NOT** add additional member variables to the class. * Write your code where indicated *without* moving items around. * Points for this exam also include **following** **instructions** and **paying attention to detail**.   **Other details:**   * Do **not** use a **return** statement in a **void** function. * Do **not** use the **break** and **continue** statements. * **No** need to write any comments. * The exam is worth **35 pts:**   + 1 pt. for the name header   + 3 pts. for readability |

The project contains the following files:

* **Main.cpp**
  + To **test** your functions. You will not be turning in this file.

Add the following:

* **Create a Templated Class called TArray. (use separate compilation and name the files TArray.h and TArray.cpp)**
  + The class has three private Member Variables.
    - **A** **pointer to an array of template type elements on the heap**
    - **An integer called capacity the maximum capacity of the array**
    - **An integer called numElem the number of elements in the array**
  + **Include the** **Default Constructor**
    - Initializes the array to the default length of 10
    - Initializes the Tarray to be empty
  + **Include an Overloaded Constructor that has one formal parameter**
    - The parameter is an integer used to set the capacity of the array
    - Initializes the Tarray to be empty
  + **Include the Big Three (all of the member functions of the Big Three)**
  + **Define a member function called insert**
    - Inserts elements in the array in ascending order but does not insert a value if that value is already in the array.
    - If the value is a duplicate it prints an error message
    - For example, if the duplicate value were a 5 it would print the error message “Can’t insert 5, it is a duplicate”
  + **Define a member function called find**
    - The function searches the array for the parameter value and returns true if it is found and false if it is not found in the array.
    - Uses the **binary search algorithm** to search the array.
  + **Define a member function called print**
    - Prints the elements in the array
    - Output would look like (1, 4, 0, -1] if the elements are integers
  + **Extra Credit (4 points) Overload the insertion operator to do the same thing as print**