Exercise 15: DArray Class Template

For this exercise, you may work with another student. If you do so, write **both names in the header**, but turn in **two copies** of the project, one with your name on the folder and the other with the other student's name on the folder.

Due Date:

- **MW class:** Wednesday, October 28, at the beginning of class.
- **TTh class:** Thursday, October 28, at the beginning of class.

Folder name: A250_E15_YourLastName_YourFirstName

Using the project **DArray_Template**, add the following **member** functions to the class **DArray**:

- **full**
  - Returns true if the array is full; false otherwise
  - This is a one-statement function
- **getCapacity**
  - Returns the capacity of the array
  - This is a one-statement function
- **getNumberUsed**
  - Returns the number of elements in the array
  - This is a one-statement function
- **emptyArray**
  - Empties the array
  - This is a one-statement function
- **getElementAt**
  - Returns an element at a given index
    - The index is passed as an integer
    - The return value is a constant and it is returned as a reference

In the same project, create the class **Student** that has the following properties:

- **Constructor**
- **Overloaded constructor** to initialize member variables to given values
- **Accessor functions** that return member variables
- **Mutator functions** that modify member variables
- Function **print** that prints out information about a student
- **Destructor**
- Member variables:
  - The ID number of the student, stored as an **int**
  - The student's major, stored as a **string**

Make sure you add the **const** modifier where necessary.

Test your program by asking the user to enter **integers** for the class **DArray** and the necessary data for the class **Student**. The file **TestingCases.cpp** contains testing cases you can include in the main function.

Once you have tested your program, change the class **DArray** to a **template class**.

Test your class by asking the user to input data for four different types of arrays:

- An array of **integers**
- An array of **doubles**
- An array of **strings**
- An array of objects of type **Student**

Your **output** should be similar to the output shown below.

```
Enter the capacity of the array: 10

Enter positive numbers (enter -1 to quit):
1 2 3 -1
Array of integers: 1 2 3

Enter the capacity of the array: 8

Enter positive decimal numbers (enter -1 to quit):
1.3 4.5 2.4 -1
Array of doubles: 1.3 4.5 2.4

Enter the capacity of the array: 6

Enter words (enter -1 to quit):
what ever whatever -1
Array of strings: what ever whatever

Enter the capacity of the array: 10

Enter student id and major (enter -1 to quit):
111 CS

Enter student id and major (enter -1 to quit):
222 CIS

Enter student id and major (enter -1 to quit):
333 ENG

Enter student id and major (enter -1 to quit):
-1
Array of objects:
111 CS
222 CIS
333 ENG

Press any key to continue . . .
```