Exercise 2: Faculty

The problem keeps track of the graduate and undergraduate students of a faculty. The system consists of 4 classes: **Student** class which is the base class of **Graduate** and **Undergraduate** classes. It also includes class **Faculty** that contains a list of students.

1- Create class **Student** that contains:
- ❑ student name and id data members
- ❑ **a non-default constructor** that initializes its data members and validates them
- ❑ **getters** for data members
- ❑ a member function **PrintInfo()** that prints the data members of the student

2- Create class **Graduate** student that contains:
- ❑ grad_year data member which represents the graduation year
- ❑ **a non-default constructor** that initializes its data members and validates them
- ❑ a member function **PrintInfo()** that prints the data members of the graduate student

3- Create class **Undergraduate** student that contains:
- ❑ current_year that represents the faculty year the student currently in (**Assume:** the number of years of this faculty is 4 years)
- ❑ **a non-default constructor** that initializes its data members and validates them
- ❑ **getters** for data members
- ❑ a member function **bool Pass()** that increments the current_year of the student and returns true if he passed his 4^{th} year and graduated, otherwise returns false.
- ❑ a member function **PrintInfo()** that prints the data members of the undergraduate student

4- Create another class, **Faculty**, which contains:
- ❑ an array of 200 **Student pointers**
- ❑ **a default constructor** that makes any needed initializations
- ❑ a member function **AddStudent (Student * pS)** that adds a student to the list
- ❑ a member function **DropStudent (int index)** that takes an array index and drops the student (that pointed to by the pointer of this index) from the array by:
  - making its pointer points to the last array element and making the pointer of the

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- **a default constructor** that makes any needed initializations
- a member function **AddStudent (Student * pS)** that adds a student to the list
- a member function **DropStudent (int index)** that takes an array index and drops the student (that pointed to by the pointer of this index) from the array by:
  - making its pointer points to the last array element and making the pointer of the last element points to NULL then decrementing the elements count of the array.
- a member function **PassAll()** that:
  - calls function **Undergraduate::Pass()** for all undergraduate students in the list
  - if the **Undergraduate::Pass()** of a student returns true (he finished the 4 years of the faculty), the **PassAll()** function should:
    - drops this student from the list using function **DropStudent**
    - creates a new **Graduate** student with the same information of the just-graduated student (***Assume*:** the current year is 2017)
    - adds this graduate student to the list using **AddStudent** function
- a member function **PrintInfo()** that prints this information of the faculty:
  - the number of its undergraduate students
  - the number of its graduate students
  - the basic information of its graduate students.

5- Write the **main program** to test your classes. You first need to

- create one object of class **Graduate** student
- create two objects of class **Undergraduate** student with current_year: 3 and 4
- creates a **Faculty** object and adds the 3 created students to it using **AddStudent**
- calls **PrintInfo()** function of the faculty object
- repeats the following 2 steps 3 times:
  - calls **PassAll()** function of the faculty object
  - calls **PrintInfo()** function of the faculty object