

**Problem 1 (40 pts):**

Modify the array-based UnsortedType (which uses ItemType class) based upon the following instructions:

- Modify the UnsortedType class to use a dynamically allocated array to store the items (this will replace the fixed size array info).
- Modify zero-parameter constructor so that it allocates an array of size 10 (default size)
- Modify the parameterized constructor that takes an int as parameter, specifying the size of array to allocate.
- Add a destructor for the class (why do you need to do so?). Write your answer as a comment above the destructor.
- Modify IsFull( ): It will return true, if the current length of list equals to the size of array; otherwise, it returns false.
- Overload index operator (i.e., []) to return the reference of i-th element in the list.
- Modify PutItem( ) so that it can be called to put an item into a “full” list:
  1. Allocate a larger array (which can be double of current size)
  2. Copy current array elements to the new array
  3. Delete current array
  4. insert item into new array
  5. set info points to new array

**Problem 2 (60 pts):**

Write a class named DateList to represent a linked list of dates. A node will represent a date, which consists of Year, Month, and Day. In this scenario, a node will have multiple info fields in addition to a pointer (Next).

Implement the following member functions:

1. Constructor
2. Destructor
3. PutItem: add a new date to the list
4. DeleteItem: delete an existing date
5. IsFull()
6. CompareDate: compare two dates
7. SearchItem: find whether a date exists in the list of dates
8. EmptyList: empty the list of dates
9. PrintList: display the list of existing dates

**Bonus/Extra Credit (10 pts):**

Write main function that runs in a loop that allow the user to choose a command:

1. Display: display all dates
2. Add: add a new date. If there is already a date in the list of dates, reports error.
3. Search: search for dates on a user specified month
4. Delete: delete a date on a user specified input
5. Quit: to quite the program

When a command is chosen, the program shall prompt the user to enter relevant info, for example, to add a new date, the program prompts the user to enter the year, month, and day, and then create a Date object, call PutItem() to add the item into the list.