

# Homework 1

## TEXT BOOK CH. 6 Overloaded Hospital (P.438)

### 16. Overloaded Hospital

Write a program that computes and displays the charges for a patient's hospital stay. First, the program should ask if the patient was admitted as an inpatient or an outpatient. If the patient was an inpatient, the following data should be entered:

- The number of days spent in the hospital
- The daily rate
- Charges for hospital services (lab tests, etc.)
- Hospital medication charges

If the patient was an outpatient, the following data should be entered:

- Charges for hospital services (lab tests, etc.)
- Hospital medication charges

Use a single, separate function to validate that no input is less than zero. If it is, it should be reentered before being returned.

Once the required data has been input and validated, the program should use two overloaded functions to calculate the total charges. One of the functions should accept arguments for the inpatient data, while the other function accepts arguments for outpatient data. Both functions should return the total charges.

# Homework 2

## TEXT BOOK CH. 10

### Programming Challenges 2. Test Scores #2 (P.735)

#### 1. Test Scores #1

Write a program that dynamically allocates an array large enough to hold a user-defined number of test scores. Once all the scores are entered, the array should be passed to a function that sorts them in ascending order. Another function should be called that calculates the average score. The program should display the sorted list of scores and averages with appropriate headings. Use pointer notation rather than array notation whenever possible.

*Input Validation: Do not accept negative numbers for test scores.*

#### 2. Test Scores #2

Modify the program of Programming Challenge 1 to allow the user to enter name-score pairs. For each student taking a test, the user types a string representing the name of the student, followed by an integer representing the student's score. Modify both the sorting and average-calculating functions so they take arrays of structures, with each structure containing the name and score of a single student. In traversing the arrays, use pointers rather than array indices.

# Homework 3 (1/2)

## TEXT BOOK CH. 7

Programming Challenges 19. Patient Fees (P.539, [eP.502](#))

### Group Project (1、2或4人) (禁止3人)

要求：

作業總共四個部分，需要平均分配工作量，

並請在你負責的部份註解上你的學號姓名，

最後必須要在有 **main**的檔案開頭

註解小組成員的 學號、姓名、負責部份、開發中遇到的問題  
& 解決方案（最少兩個，獨立開發則不用）

# Homework 3 (2/2)

## 19. Patient Fees

This program should be designed and written by a team of students. Here are some suggestions:

- One or more students may work on a single class.
- The requirements of the program should be analyzed so each student is given about the same workload.
- The names, parameters, and return types of each function and class member function should be decided in advance.
- The program will be best implemented as a multifile program.

Write a program that computes a patient's bill for a hospital stay. The different components of the program are

- The `PatientAccount` class will keep a total of the patient's charges. It will also keep track of the number of days spent in the hospital. The group must decide on the hospital's daily rate.
- The `surgery` class will have stored within it the charges for at least five types of surgery. It can update the `charges` variable of the `PatientAccount` class.
- The `Pharmacy` class will have stored within it the price of at least five types of medication. It can update the `charges` variable of the `PatientAccount` class.
- The main program.

The student who designs the main program will design a menu that allows the user to enter a type of surgery, enter one or more types of medication, and check the patient out of the hospital. When the patient checks out, the total charges should be displayed.

## Homework 4

TEXT BOOK CH. 7 (P.513, eP.477)

課本513頁(電子書477頁)有一段對於Joe's Automotive Shop的需求描述，以此為基礎再加上manager可隨時刪除、查詢估價單(service quote)，查詢時可以"客戶名字"或"估價單日期"作為關鍵字，列出所有符合關鍵字的估價單。

請依上述需求，實作一object-based program，並製作使用說明文件，說明如何使用你的程式，若有特殊功能亦請詳述。

## Homework 5

TEXT BOOK CH. 11 (P846) Programming Challenges

### 7. Rectangle Class (Aggregation)

Design a `Length` class having two member variables: `centimeters` and `millimeters`. The class should have constructors and member functions to input and return member variables. It should also overload the operators `==`, `+` and `*`.

Design another class `Rectangle` that should comprise two `Length` objects, representing the two adjacent sides of a rectangle. The class should have the following member functions:

**setSides:** This member function should ask the user to input the values of the sides of the rectangle and accordingly set the value of the lengths by calling the `set` function of the `Length` class.

**getSides:** This member function should call the `get` function of the `Length` class to display the sides of the rectangle.

**isSquare:** This function should return a Boolean value `True` if the rectangle is a square, that is, if its sides are equal; otherwise it should return `False`.

**getArea :** This should return the area of the rectangle, which is the product of its two adjacent sides.

**getPerimeter:** This should return the perimeter of the rectangle, which is the sum of all its four sides.

Demonstrate the classes in a program that creates a `Rectangle` object and calls all its member functions.



# Homework 6

## TEXT BOOK CH. 11 (P845) Programming Challenges

### 5. Book, Journal and Magazine Classes

A certain publisher publishes both books and journals. Design a class `Publication`, which has member variables, `title`, `volume` and `year`. Publicly derive three classes from this class:

`Book` class: that adds member variables `author`, `ISBN` and `price`.

`Journal` class: that adds member variables `month`, `ISSN`, `impactFactor` and `annualSubscription`

`Magazine` class: that adds member variables `month`, `editor` and `annualSubscription`

Include appropriate member functions in each class to input the data members in each class and display them. Demonstrate the classes in a complete program. The main program should declare objects of classes `Book`, `Journal` and `Magazine` and call their public member functions.

# Homework 7

## TEXT BOOK CH. 15 Programming Challenges

### 6. Removal of Line Breaks (P1020)

#### 5. File Filter

A file filter reads an input file, transforms it in some way, and writes the results to an output file. Write an abstract file filter class that defines a pure virtual function for transforming a character. Create one subclass of your file filter class that performs encryption, another that transforms a file to all uppercase, and another that creates an unchanged copy of the original file.

The class should have a member function

```
void doFilter(istream &in, ostream &out)
```

that is called to perform the actual filtering. The member function for transforming a single character should have the prototype

```
char transform(char ch)
```

The encryption class should have a constructor that takes an integer as an argument and uses it as the encryption key.

#### 6. Removal of Line Breaks

Create a subclass of the abstract filter class of Programming Challenge 5 that replaces every line break in a file with a single space.

# Homework 8

## TEXT BOOK CH. 13 Programming Challenges 15. Inventory Program (P947)

Write a program that uses a structure to store the following inventory information in a file:

Item description  
Quantity on hand  
Wholesale cost  
Retail cost  
Date added to inventory

The program should have a menu that allows the user to perform the following tasks:

- Add new records to the file.
- Display any record in the file.
- Change any record in the file.