1. (15pt) Exercise 6.9
Multidimensional arrays can be stored in row major order, as in C++, or in column major order, as in Fortran. Develop the access functions for both of these arrangements for three-dimensional arrays.

Ans:
Let the subscript ranges of the three dimensions be named min(1), min(2), min(3), max(1), max(2), and max(3).
Let the sizes of the subscript ranges be size(1), size(2), and size(3).
Assume the element size is 1.

Row Major Order:
location(a[i,j,k]) = (address of a[min(1),min(2),min(3)]) +((i-min(1))*size(3) + (j-min(2)))*size(2) + (k-min(3))

Column Major Order:
location(a[i,j,k]) = (address of a[min(1),min(2),min(3)]) +((k-min(3))*size(1) + (j-min(2)))*size(2) + (i-min(1))

2. (15pt) Exercise 11.2
Suppose someone designed a stack abstract data type in which the function top returned an access path (or pointer) rather than returning a copy of the top element. This is not a true data abstraction. Why? Give an example that illustrates the problem.

Ans:
當 pointer 回傳 stack 的 top 值時，main program 可能竄改其資料內容，此舉違反 abstract data type 之定義。
EX：
```c
s: stack (int);
p: *int;
p = s.top;
*p = 123;
```
3. (20pt) Exercise 12.6
Compare the multiple inheritance of C++ with that provided by interfaces in Java.

Ans:
Unlike C++, Java doesn't support multiple inheritance. A class cannot inherit from more than one class. A class can implement multiple interfaces though.

4. (20pt) Exercise 12.16
What is the primary reason why all Java objects have a common ancestor?

Ans:
Java is an object oriented language, which means that one of its core principles is inheritance. All classes (and hence the objects created from them) are derived from a parent. In this way, classes inherit variables, methods, and classes from their parent so that they do not have to redefine them.

5. (15pt) Exercise 12.19
What are the differences between a C++ abstract class and a Java interface?

Ans:
1. An interface cannot implement any methods, whereas an abstract class can.
2. A class can implement many interfaces but can have only one superclass (abstract or not).
3. An interface is not part of the class hierarchy. Unrelated classes can implement the same interface

6. (15pt) Exercise 12.24
Study and explain the issue of why Java does not include C++'s destructor even though both these languages have constructors.

Ans:
Java 是一種 garbage collected 語言，有自己的一套記憶體回收機制；但 C++並沒有這樣的機制存在，因此須靠 programmer 自行使用 destructor 來進行回收。