Mastery Factor Overview

Students need to achieve a mastery of 10 from 15 mastery factors – see p.65 Subject Guide.

The purpose of this section is to briefly cover these mastery factors in terms of Java skills required. Teachers who have completed a face-to-face or online Computer Science workshop will have covered this material. It is provided here as a quick review and for those teachers who have not been able to undertake a workshop.

Each mastery factor is then addressed in detail over the remainder of the course.

Master Factors 1, 2 and 3.

Requires the student to use the RandomAccessFile class to manipulate data within a direct access file. Students need to demonstrate in their program:

Adding a record using the seek( ) method.
Deleting a record by packing or flagging the record as deleted.
Searching a random access file.

Mastery Factor 4

Requires students make us of recursion in an appropriate, non-trivial and well documented manner. In other words students need to have a sound reason for using recursion. The following example is likely to be considered trivial.

```
private int count(int n)
{
  if (n == 0)
    return 1;
  else
    return n + count(n-1);
}
```

Mastery Factor 5

Merging two or more sorted data structures. Usually lists or files.

Mastery Factor 6, 7 and 8

Object Oriented features: encapsulation, inheritance and polymorphism can be incorporated and used for mastery provided the students provides the direct implementation. Using Java classes that implement these OO features does not constitute mastery.

Mastery Factor 9

Parsing a text file or other data stream requires students to typically take a stream of data and to classify it into a record or interpret the contents in some other way (eg as commands).

Mastery Factor 10

Implementing a hierarchical composite data structure. The student needs to implement either an array or linked list of type record. The basic idea is to implement a data structure such as the one listed below.

```
public class Book
{
  private int id;
  private String title;
  private String author;
  private int year;
}

public class compositeDataStructure
{
  Book[] books = new Book[12];
```

`books` is a hierarchical composite data structure.

Mastery Factor 11: Any five SL mastery factors.

This mastery factor is not addressed in this HL course.

Mastery Factor 12 - 15

Abstract Data Type (ADT)

JETS and Java I/O Overview

OO HL concepts
Mastery Factor Overview
Specific master factor examples:
- Random Access Files – maintaining an ordered file
- OO Mastery Factors: Polymorphism, Inheritance and Encapsulation
- Hierarchical Composite Data Structures
- Dossier: algorithms – Merging and Parsing examples to cover mastery factors

Dossier Criteria Overview
Assignment: Some Java programming 15%