TEST 1:

This is a marked test which will count

25%

toward the final course mark

At the end of the session the students MUST submit the work to the course organiser electronically BEFORE leaving the room

- The test is open book:
  - you can use WWW notes
  - you can ask "reference book" type questions of the staff
  - you can consult any C++ text book

- The time allocated is 2.5 hours (14.15-16.45)

DO NOT waste undue time on solving compiler bugs. You will be mainly marked on having the right idea, and not significantly upon whether you can get all of the syntax correct in 3 hours

Administrative details:

- Write all of your code in a SINGLE file called test1.cpp.

- Put your name in a comment line at the top of the file:

```
// Test 1/ Group1 from J.Bloggs
```

- At the end of the test

- **Email me test1.cpp as an attachment.**
  Put your full name on the subject line.

- **Copy test1.cpp onto a formatted floppy disk with your name on it**

You must do this before you leave the room, and verify with me that I have received the work from you.

Context:

This test is designed to see whether you have practiced and understood all of topics covered so far in the course including:

- **The concept of writing a simple class to represent some entity**
- **A program to make and use objects of a class**
- **Reading and writing of data to/from the keyboard and or a file**
- **Program flow control statements**
- **Collections of objects**
- **The concept of a class to perform some sort of control or service.**

Context (contd):

You are going to make your fortune by writing some library Software.

This software will deal with creating and storing book objects.

Part 1 (approx 50%): Write a class suitable for representing a Book

You must include member variables to:

(i) Represent the title, author and ISBN
(ii) Record whether the book is currently on loan
(iii) Store the identity code of the borrower (a simple integer)
(iv) Store the date it is due back from loan
(for this just assume dates are measured in days 1-365)

You must include methods to:
(i) Initialise all the member variables.
(ii) Set the book into a state of "being on loan"
(such that all the relevant member variables are suitably modified)
(iii) Return a boolean variable to indicate whether the Book is on loan and overdue
(iv) Print out the book title and author to std::cout
(you need to think of the return types and arguments !)

Write a program (a main function) to:
- **Create two Book objects**
- **Demonstrate the use of all of these methods.**

Part 2 (approx 30%):

Add the following actions to the program you wrote at the end of Part 1:

(i) Read in the attributes for 10 new books from a file which is supplied. It is called "booklist.dat" and can be found on the WWW pages under the test1 instructions. It has the form:

```
Title    Author   ISBN
```

(ii) Create a corresponding Book object for each new book

(iii) Store each new Book object in a vector

(iv) After all such books have been created and placed in the vector then pass through this vector, and for each stored Book invoke the print out method provided in part1.

Part 3 (approx 20%):

Finally you are going to upgrade your library software by adding a class called `LoanChecker`.

This class should have the following methods available:

(i) A method to initialise it which takes as argument a vector of Books and todays date.

(ii) A method which causes `LoanChecker` to write out to a file called `overdue.dat` the identity of the borrower for all overdue books.

(hint: you will probably have to modify the book class to do this)

Modify your program in order to demonstrate the use of this class.

Marking criteria include :

- **Comments explaining the code in DETAIL**
- **Structure and readability (indentation will be taken into account !)**
- **Code organisation into suitable #include files**
- **Understanding of the concept of a class and objects of a class**
- **Well formed classes**
- **Data encapsulation**
- **Demonstration of use of C++ language constructs appropriate for problem**
- **Does it compile and run ?**