8 A program is being developed to manage student book loans from a college library. Students may borrow up to five books at a time from the library.

The programmer has defined a record type to define each loan.

The record data items are:

Data item	Data type	Comment
`StudentID`	`STRING`	the unique ID of the student who has borrowed the book
`BookID`	`STRING`	the unique ID of the book being borrowed
`OnLoan`	`BOOLEAN`	`TRUE` if the book has **not** been returned

The programmer has defined a global array `Loan` to store 5000 loan records.

There are more elements in the array than books in the library. Unused elements have the `StudentID` set to an empty string. These may occur anywhere in the array.

The programmer has defined the first program module:

Module	Description
`OKToBorrow()`	• called with a parameter of type `STRING` representing a `StudentID` • search the array for loan records for the specified student • output a suitable message to say whether the student may, or may not, borrow another book

(a) Write efficient pseudocode for the module `OKToBorrow()`

.... [7]

(b) A second module is defined:

Module	Description
`ReturnBook()`	• called with two parameters of type `STRING` representing a `StudentID` and a `BookID` • searches the array for the relevant loan record • when found, sets `OnLoan` to `FALSE` and returns `TRUE` • if a loan record is **not** found, or the book has already been returned, then returns `FALSE`

Write efficient pseudocode for the module `ReturnBook()`

Assume that each student is only allowed to borrow each book only once. That means that there will be no more than **one** loan record for a given combination of student and book.

.... [8]

(c) It is decided to introduce a system of fines for books that have been borrowed for too long.

Two new requirements are defined:

1. Each loan has a maximum length, represented as a number of days.
2. Each book in the library will be assigned one of three categories. Each category has a different maximum loan length.

Record structure and program design changes are needed to meet these two requirements.

Outline the changes that are necessary to meet the **two** requirements.

.... [2]