

The final project consists of creating a program which allows us to provide some library functionality. To achieve this you will be provided 2 files.

The first called “booklist.txt” will contain a list of the books in the library. Each line of booklist.txt will be formatted as:

<name of book>#<number of copies>#<important>

This will indicate how many copies of each book there are and a Boolean value indicating if it is considered an important book or not.

Sample booklist.txt

```
Algorithm Design, Skeina#3#True
```

```
Eye of the world, Jordan#1#False
```

This indicates there are 3 copies of Algorithm design and one copy of Eye of the world in the library. Algorithm Design is classified an important book whereas Eye of the world is not.

The second file called “librarylog.txt” will contain a log of library activities. Each line of “librarylog.txt” will be one of the following

- <day>#<book name>#<student name>#<days borrowed>
 - This indicates which book was borrowed by whom on which day and for how many days
- <day>#<book name>#<student name>#RET
 - This indicates which book was returned by whom on which day
- <day>#<book name>#<Boolean value>
 - This indicates a book being added to the library’s catalogue and on which day it was done. The Boolean value indicates if it is important or not
- PAY#<day>#<Student name>#<number>
 - This the day a student made a payment for late fees and how much did that student pay

The log will end with a single number indicating the current day. You may assume the library started functioning on day 1.

Sample librarylog.txt

```
1#Algorithm Design, Skeina#Ishan Behoora#6
2#Eye of the world, Jordan#Jerome Guth#5
3#The count of Monte Cristo, Dumas#False
3#Algorithm Design,Skeina#Adam Smith#3
5#Algorithm Design,Skeina#Adam Smith#RET
5#Eye of the world, Jordan#Jerome Guth#RET
9#Algorithm Design, Skeina#Ishan Behoora#RET
PAY#9#Ishan Behoora#20
10
```

This is a log indicating the working of the library. It shows Ishan Behoora borrowed Algorithm Design on day 1 for 6 days and returned it two days late on day 9. Jerome Guth borrowed Eye of the world on day 2 and returned it on day 5. Adam smith borrowed Algorithm design on day 3 and returned it on day 5

A new book called The count of monte Cristo by Dumas was added on day 2. Note additional copies of an existing book can be added. Ishan Behoora made a payment of 30 dollars on day 9 towards his late fees. This list was the record of the library activities through day 9 as the current day is day 10.

Given the original booklist and the list of library activities in prior days in the above two files. Write a program using functions to answer each of the following questions for the current day:

- 1) Can a person check out a certain book?
- 2) Can a person return a certain book?
- 3) What is the list of people with late fees and how much?
- 4) What is the usage of each book? Which are the top used books.

A student is allowed to check out a book as long as:

- there is a copy available (book is in library and not all copies have been borrowed).
- A student is not allowed to check out a book if they have more than \$50 in fines.
- A student can borrow important books for upto 7 days
- A student can borrow non-important books for upto 28 days.

A student is always allowed to return a book.

Late fees are calculated as such

- For every day an important book is late the student is fined \$15
- For every day a non-important book is late the student is fined \$5

For the given log Ishan Behoora has a pending late fee of 10 dollars. Because he was 2 days late and got fined \$30 and thereafter made a payment of \$20.

The usage of each book is: $\frac{\text{number of days borrowed}}{\text{number of days available}} \times 100$

For the given library:

- Eye of the world was available for 9 days and was borrowed for 3 days. So its usage is 33.33%
- Count of Monte Cristo was available for 7 days and not borrowed so its usage is 0%
- One copy of Algorithm Design was borrowed for 8 days by Ishan and another copy by Adam for 2 days. So, it was borrowed for 10 days. However, the library has 3 copies and so the total available days it could have been borrowed is 27 days. Thus, its usage is $\frac{10}{27} \times 100$ which is 37.04%
- So if asked for the top 2 books usage wise we should say Algorithm Design, Skeina with 37.04% and Eye of the world, Jordan with 33.33%