Python Mini Project

Library Management System (LIMBS)

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This project is a joint collaboration of the above-mentioned members. All three have contributed to the code, with efforts aided by help from other classmates. This report was made on Monday, 4th July, 2022.

Problem Statement

The Library Management System (LIMBS) is an attempt to automatize the process of Library Management by including the following features – collecting personal data, displaying the list of available books, and levying an appropriate fine for late submission of books, if that is the case. The Library Management needs to be automatized due to the following reasons:

1. Too much of paperwork involved in a manual Library Management can lead to wastage of human labor.
2. Too much paperwork also increases maintenance costs as more paper is required, more space is required to store those papers and more expensive high-quality storage is required for long-term storage for future reference.
3. Because of the complexity of a manual system, the chance of errors increases which can result in loss of revenue for the library and worse, dissatisfied customers.

Advantage of automatizing the system:

1. Everything is stored in digital files and databases, thereby saving time and labor.
2. Less resources are required as a large amount of data can be stored in relatively small memory space. Further, a normal microprocessor is also sufficient to meet the processing requirements of a general-sized Library. So generally, there shouldn’t be too much hardware and software costs. Of course, for a larger system, more memory and processing power would be required, but considering the amount of paper, money and time saved, among other resources, it is well worth the cost.

System Architecture

There are seven files in total as of the final version, whose names are FY\_BTECH\_BOOKS, SY\_BTECH\_COMPS, SY\_BTECH\_ETRX, SY\_BTECH\_EXTC, SY\_BTECH\_IT, SY\_BTECH\_MECH and BOOKS\_ISSUE. Each of these files stores the subjects relevant to the courses and the books relevant to those subjects. Any one of these files is displayed to the user, depending on the name of the course inputted by the user. It also uses nested if-else statement. The outer if-else statement checks whether the user has chosen to issue books and the second if-else statement checks whether the maximum number of books that can be issued has been exceeded. There are five functions in the program named btech(), mtech(), phd(), issue() and choice(). The btech(), mtech() and phd() functions are for the three main programs viz. B. Tech., M. Tech. and Ph.D. respectively. The issue() function is related to the issuing of books and the choice() function is related to user choice. The choice() function has the nested if-else statement. Also, a for loop is used so that the book titles are displayed properly. The for loop uses the split function so as to split the book titles whenever a comma appears. Also, the program uses a global counter variable in order to count the number of books issued by the student.

Features of the Designed System

The star aspect of this program is the use of file handling. Although in its primitive stage, the benefits of the usage of file handling is evident in this system. Instead of having to write hundreds of lines of code for the many textbook titles, the coder simply has to call the text file which is stored in .csv (Comma Seperated Values) format. Read, write and truncate operations were performed on the files. First, the ISSUE\_BOOKS file is truncated so that it is empty for a new user to enter data. Then, the write operation is performed on the ISSUE\_BOOKS file. The books desired by the student are typed by the student into that file through the console. Thus, the user does not have to change platforms to enter the data; through the same console the student can enter the desired books to be issued. Finally, the list of issued books is displayed to the user by performing the read operation. Thus, the program looks elegant and it is also easier to debug the program if required. The program also performs access verification. Only those who are above 18 years of age and who are students can issue books online. This is a step forward in the security of the system. Further, the program uses a nested if-else statement. The outer if-else checks if the user desires to issue a book, and the inner if-else checks if the maximum number of books issued. Thus, two purposes are served – there is an alternative to the do… while loop (function call is used depending on whether the user enters the appropriate choice) and there is a cap on the maximum number of books. The program is also modular in approach. It uses function calls. For example, if the pogramme entered by the user is B. Tech., then the btech() function is called. Thus, the code is neat and easy to debug. At the end of the program, the user is asked to enter the number of days passed since issuing of the books. Based on that, it is decided whether to impose a fine or not.

Output

In the output, the user is first asked to enter personal details – name, age, gender and role. These details are used to determine whether the user is qualified to go deeper into the program. Then, if the user is qualified, the user is aked to enter the programme in which the book may be found. Also, the user is asked to enter the relevant year during which the subject is taught. Accordingly, an appropriate file containing the list of books is opened and displayed to the user. The user is asked to enter an appropriate choice if books are required to be issued. For students, maximum three books can be issued per person. Finally, the user is asked to enter the number of days passed since issuing the book and accordingly penalty fine is levied.

Conclusion

Thus, this Library Management System (LIMBS) is a practical demonstration of how computers can automate the process of Library Management making it more efficient and fool-proof. The applications of Computers and Programming can also be extended beyond Library Management and can be applied in almost every activity in our day-to-day life. Especially, computers can be used to perform repetitive tasks and storage tasks. Programming is the essential way through which the computers are instructed to perform the required tasks. Python programming is a very suitable language for passing instructions to the computer. Its level of object orientedness and its many features like vast libraries for various types of operations, code portability, etc. make it a highly versatile language. File Handling is one of the advantages offered by the Python language. It can be used to fill tabular data into a file which can be stored for future reference. Thus, when required in the future, the file can be called and its contents would be available. Further, the contents of the file can outlive the program itself. Even after the program stops executing, the contents of the file continue to exist. Thus, when the user logs in the future to return the issued books, the same file can be called again and the list of issued books would be displayed.

References

The project could be carried out due to help from websites like GeeksforGeeks, Techvidvan, Data Flair and our classmate Aatmaj Mhatre’s blogs on python programming in Dev website. We understood how to implement file handling by referring to the websites.

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Thank you.