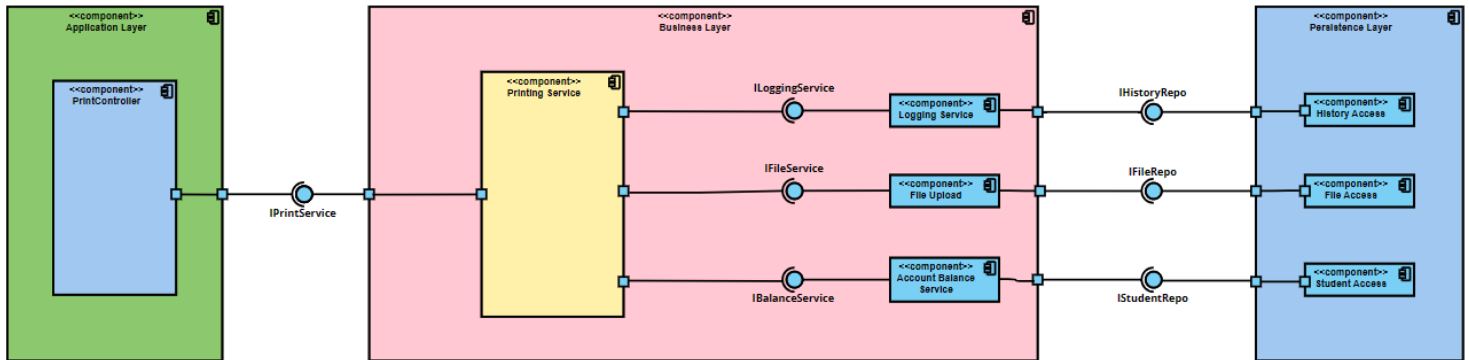


# COMPONENTS DIAGRAM FOR IMPORTANT MODULE

Description of the component diagram about the printing module of the SPSS app:



## 1. Application Layer

The *PrintController* component has a feature of receiving printing requests, then asking for services of *Printing Service* component in the lower layer through *IPrintService* interface.

## 2. Business Layer

*Printing Service* is the central component of the printing module. It is responsible for managing the printing process in the business layer. It provides interface *IPrintService* to the controller, which is used to handle the printing process corresponds to the users' data in the request. The *Printing Service* requires 3 interfaces, which are *ILoggingService*, *IFileService* and *IBalanceService*. The first one is provided by *Logging Service* component that is responsible for logging/recording all printing activities. This information can be used to review printing activities and to generate reports. The second one is provided by *File Upload* component which provides access to the file system. It is used by the *Print Service* component to read uploaded files. The last one is provided by *Account Balance Service*, this component aims to validate that student's page balance is not insufficient.

## 3. Persistence Layer

*History Access* component has the responsibility to access the record of printing activities in the database. Then it provides the service to its upper layer through *IHistoryRepo* interface. *File Access* component sends information about the file configuration to *File Upload* component through *IFileRepo* interface. *Student Access* component provides records about page balance of the students through *IStudentRepo* interface.

Interface	Methods	Description
IPrintService	handlePrint(studentId, file, config)	Handle user's print request.
ILoggingService	createLog(studentId, fileId, config)	Create a printing log.
IFileService	storeFile(file)	Store file to server storage and return path to the file.
	createFileRecord(stuld, fileName, filePath)	Create a file record.
IBalanceService	checkBalance(studentId, page)	Check if student's balance is sufficient.
	decrementBalance(studentId, page)	Decrement student's balance.
IHistoryRepo	createLog(studentId, fileId, config)	Create a printing log to the database.
IFileRepo	createFileRecord(studentId, fileName, filePath)	Create a file record to the database.
IStudentRepo	getBalance(studentId)	Retrieve the student's balance from the database.
	decrementBalance(studentId, page)	Decrement student's balance in the database.