

Object-Oriented Thinking Practice  
[LatAm] Introduction to Java Development

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For this exercise it was chosen “**a public printer at a university**” to develop all the points in the practice.

## **Functional Requirements**

*The system must:*

- Identify authorized personnel through a card id scan
- Allow a connection through a physical device (USB) to upload or download data
- Print documents in black and white or color
- Scan documents
- Photocopy documents
- Show the total cost of the job previous confirmation and execution
- Notify the user when the job is done

## **Non-Functional Requirements**

*The system should:*

- Be connected 24/7
- Be ready for use (have sufficient paper and ink at all times)
- Attend one person at a time
- Not take more than 6 seconds for every print/scan/photocopy page
- Inform at the person using it if there was some technical problem that prevent completing the task

## Use Cases

<i>Title</i>	Identify authorized personnel
<i>Primary Actor</i>	User or Technician
<i>Success Scenario</i>	<ol style="list-style-type: none"><li>1. The user places his card id to be scanned by the printer</li><li>2. The printer communicates with a DB to determine if the user card id is valid</li><li>3. The printer communicates with a DB to determine if the user is allowed to use the printer</li><li>4. The printer grant access to the user</li></ol>
<i>Extensions</i>	4b.The printer informs the user that the access is denied
<i>Preconditions</i>	The user has a card id

<i>Title</i>	Pass files to the printer
<i>Primary Actor</i>	User
<i>Success Scenario</i>	<ol style="list-style-type: none"><li>1. The user makes a connection with the printer via usb port</li><li>2. The user uses the printer interface to browse to the file(s) needed</li><li>3. The user selected the file(s) to be used</li><li>4. The printer determines if the files are valid to be printed (e.g.: text files or images)</li></ol>
<i>Extensions</i>	4b.The printer informs the user that the files selected are invalid and can't be used
<i>Preconditions</i>	The user has been identified and authorized by the printer

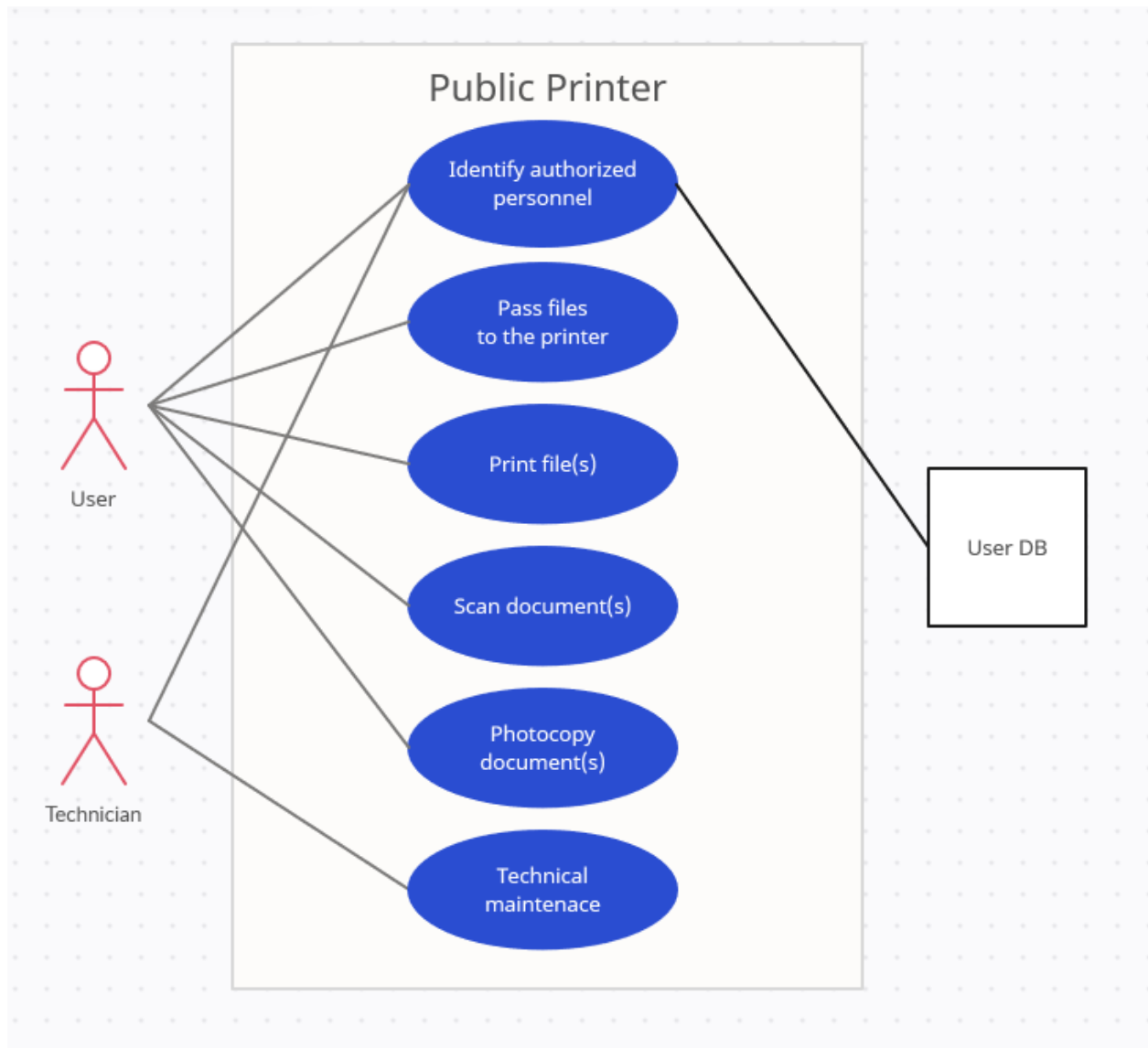
<i>Title</i>	Print file(s)
<i>Primary Actor</i>	User
<i>Success Scenario</i>	<ol style="list-style-type: none"> <li>1. The user chooses the mode to be used by the printer: B&amp;W or Color</li> <li>2. The user chooses the specific pages to be printed (if all or a specific range)</li> <li>3. The printer offers a preview on how the files will look once they are printed</li> <li>4. The printer will inform how much will cost to print with the specify parameters</li> <li>5. The user confirms the operation and the cost is added to his personal balance</li> </ol>
<i>Extensions</i>	5a.The user pauses or resumes the execution 5b.The user cancels the execution 5c.The printer informs the user that a technical problem occurred (insufficient paper, ink, etc)
<i>Preconditions</i>	File(s) has been uploaded to the printer

<i>Title</i>	Scan document(s)
<i>Primary Actor</i>	User
<i>Success Scenario</i>	<ol style="list-style-type: none"> <li>1. The user makes a connection with the printer via usb port</li> <li>2. The user browses and select a folder where the file(s) will be saved</li> <li>3. The user places the document(s) and indicates the printer to do the scan</li> <li>4. The printer saves the file(s) in the folder</li> <li>5. The printer shows how much cost the operation and added to his personal balance</li> </ol>
<i>Extensions</i>	4a.The printer lose connection and couldn't save the files
<i>Preconditions</i>	The user has been identified and authorized by the printer

<i>Title</i>	Photocopy document(s)
<i>Primary Actor</i>	User
<i>Success Scenario</i>	<ol style="list-style-type: none"> <li>1. The user places the document(s) to be photocopied</li> <li>2. The user indicates the printer to do the photocopy</li> <li>3. The printer places the photocopy(es) in an exit tray</li> <li>4. The printer shows how much cost the operation and added to his personal balance</li> </ol>
<i>Extensions</i>	3a.The printer got stuck and was unable to put the photocopy(es) in the exit tray
<i>Preconditions</i>	The user has been identified and authorized by the printer

<i>Title</i>	Technical maintenance
<i>Primary Actor</i>	Technician
<i>Success Scenario</i>	<ol style="list-style-type: none"> <li>1. The technician put the printer in maintenance mode</li> <li>2. The technician resupplies the printer with paper</li> <li>3. The technician changes the empty ink cartridges with full ones</li> <li>4. The technician does a check to verify the printer is working as intended</li> <li>5. The technician exits the maintenance mode and put the printer in operational mode</li> </ol>
<i>Extensions</i>	4a.The technician can't verify that the printer is working as intended
<i>Preconditions</i>	The user has been identified and authorized by the printer

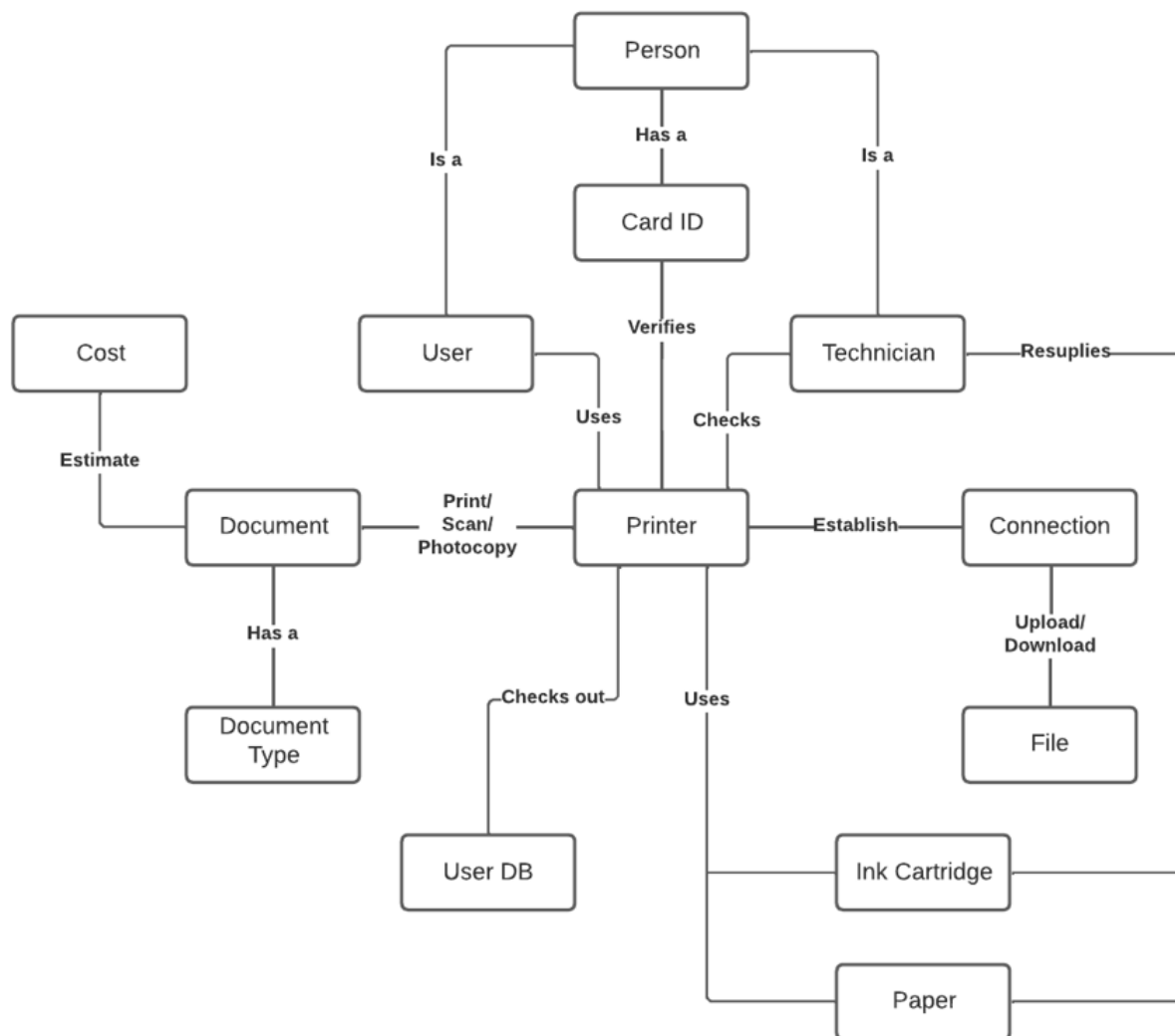
## Use Case Diagram



## Identifying Objects

Printer	Person	User	Technician
Card ID	File	Document	Connection
Cost	Paper	Ink Cartridge	User DB

## Class Relationships



## CRC Cards

<i>User</i>	
Places his card id to be scanned	Printer
Uses the printer	Card ID

<i>Technician</i>	
Places his card id to be scanned	Printer
Checks the printer	Card ID

<i>Card ID</i>	
Return an ID number	User DB
	User
	Technician

<i>Printer</i>	
Communicates with a DB	User DB
Chooses the mode to be used	Connection
Print/Photocopy document	Document
Scan document	Ink Cartridge / Paper

<i>Connection</i>	
Makes a connection with printer	Printer
Upload/Download file(s)	File



<i>File</i>	
Selects the file(s) needed	Connection
Determines if the files are valid	

<i>Document</i>	
Offers a preview of the file(s)	Printer
Establish the color mode	Cost

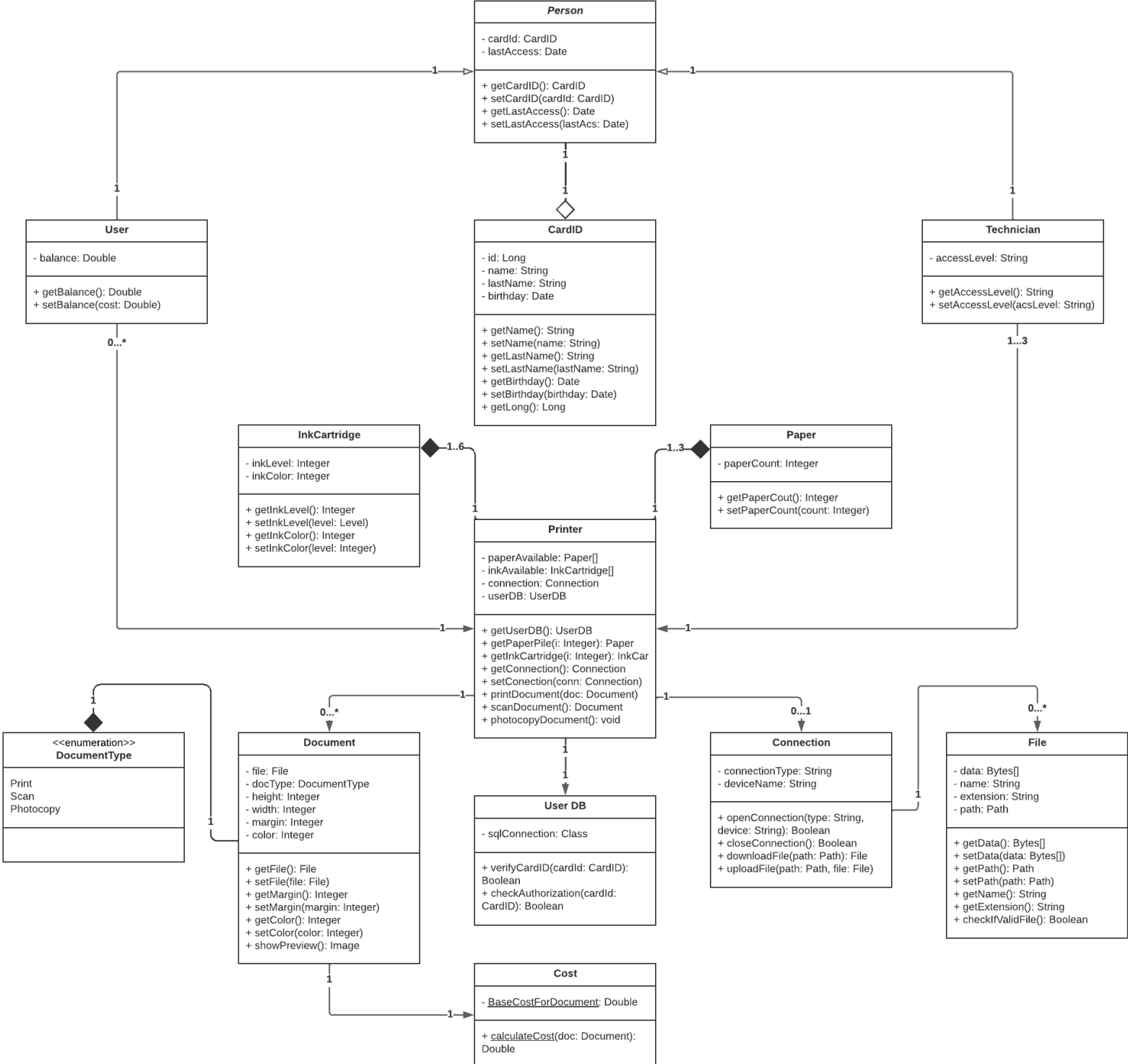
<i>Cost</i>	
Inform how much will cost	Document

<i>User DB</i>	
Determine if the user card id is valid	Card ID
Determine if the person is allowed	Printer

<i>Ink Cartridge</i>	
Calcule Ink levels	Printer

<i>Paper</i>	
Do a paper count	Printer

## Class Diagram



## **Repository with Java Classes**

<https://gitlab.com/JulianGaitan/object-oriented-thinking>