COMP 204

PROGRAMMING STUDIO

Project 2:
QR-Based Exam Grading Tool

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Contents

1. Abstract

This report covers an assignment on developing a QR Based Exam Grading Tool. Exam Grading Tool which focuses on pdf to png conversion, decoding QR code.

2. Problem Specification

- In this project, the job was to develop a program in Java which will scan exam papers, grade the questions and save grades of students into an excel file.
- Input to program will be a collection of exam pages scanned in pdf format including a QR code at every page.
- First program will convert the input pdf file to an image file to find and read the QR code.
- The QR-code includes information about the page such as exam ID, student ID, student name, page number, locations of the students' answers in the page etc.
- Than program will find and read the QR code on each page, cuts and saves the students' answers and show them to the instructor.
- User will give points and comments for each question and program will store all information.
- Output will be an excel file including all scores of students from every question in the exam.

3. Problem Design

- First, to read QR codes we converted pdf files to png files. After that in png files we determined the QR code spot and cut it to read the QR code.
- We read student and exam information from the QR code.
- We created a QR Code Class which stores QR Code information and performs some operations. According to this information we split the questions in each page.
- We created the GUI (Graphical User Interface). GUI represents data such as student information, grading section, commenting section and graph section to the user.
- We stored data in the text file to make the user continue to read exams where (s)he left. After grading, we created an Excel file to represent students points for each question and their total points.

3.1. Functions

- **GUI Controller Class**
  - **PDFtoPng():**
    - Converts single pdf page to png files
  - **countTotalQıuestion():**
    - Counts solved questions
  - **createGraph():**
    - Implements graph pane
  - **isMac()/isWindows():**
    - Checks operating system
  - **loadCurrentInfo():**
    - Loads saved information to GUI
  - **loadData():**
    - Loads saved data memory to GUI
  - **popUpError():**
    - Creates pop-up error window
  - **readEachPdfFile():**
    - Sends all pdf files in a directory to PDFtoPNG function
  - **regExCheck():**
    - Checks input string with the given input
  - **resetAllData():**
    - Clears all the data

- **savePng():**
    - Crops the QR code
    - Saves page information from QR code

- **setGradeScreen():**
    - Stores students' grades on each question

- **setPage():**
    - Refreshes the question when previous and next button is used

- **splitPage():**
    - Crops the questions in each page

- **storeComment():**
    - Stores comment prompt text

- **storeCurrentInfo():**
    - Stores saved information to GUI

- **storeData():**
    - Loads saved data memory to GUI

- **storeStudentTotalGrade():**
    - Stores students' total grade

- **QRCode Class**
  - **decodeQRCode():**
    - Decodes QR Code
  - **writeInfo():**
    - Store decoded QR Code information
  - **splitResult():**
    - Splits decoded QR Code

- **ExcelWriter Class**
  - **writeExcel():**
    - Prints informations into excel file
  - **createCells():**
    - Puts data in excel

3.2. Graphical User Interface

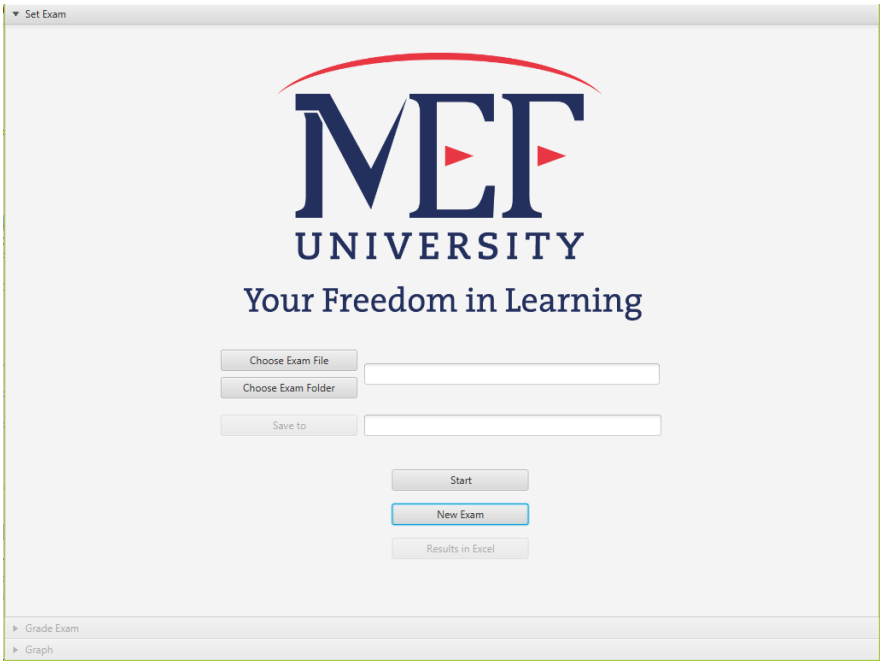

Figure 1.1: Set Exam Screen

4. Sample Execution

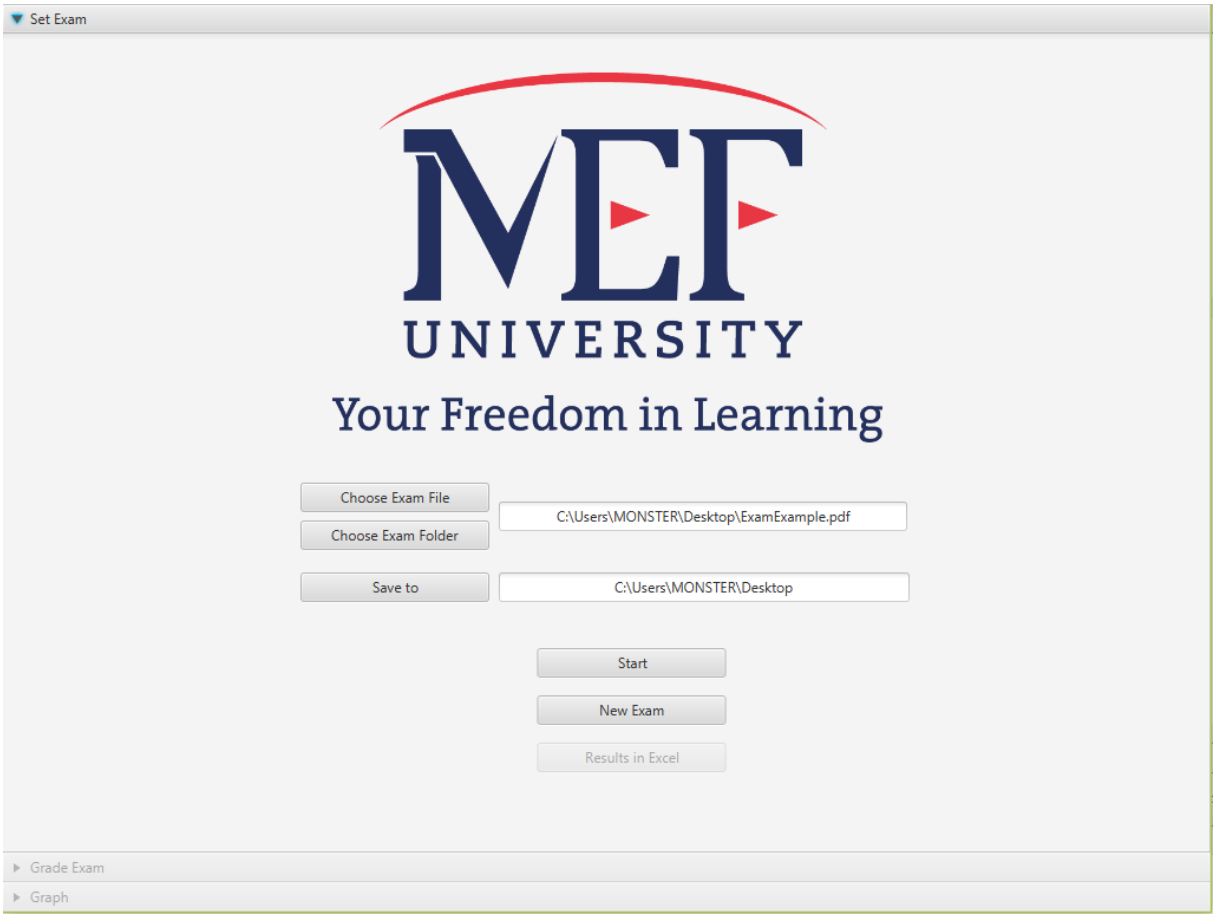

Figure 1.3: Set Exam Screen with Input Paths

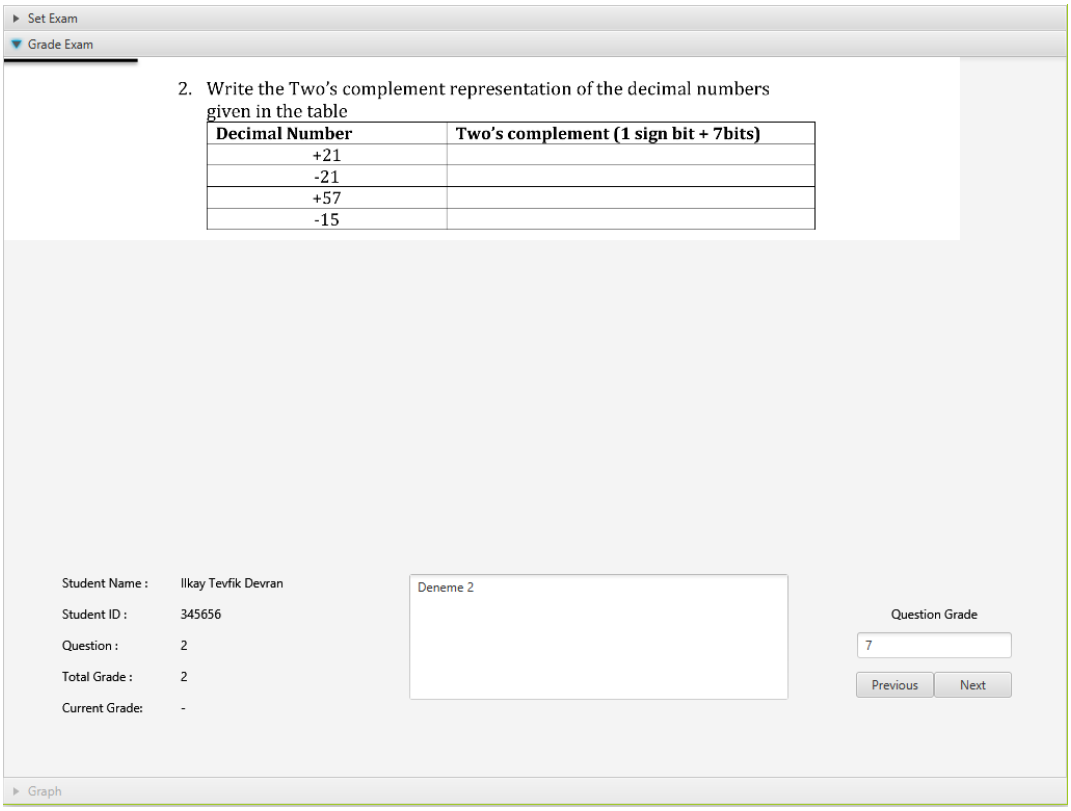

Figure 2.1: Grade Exam Sample Question Screen

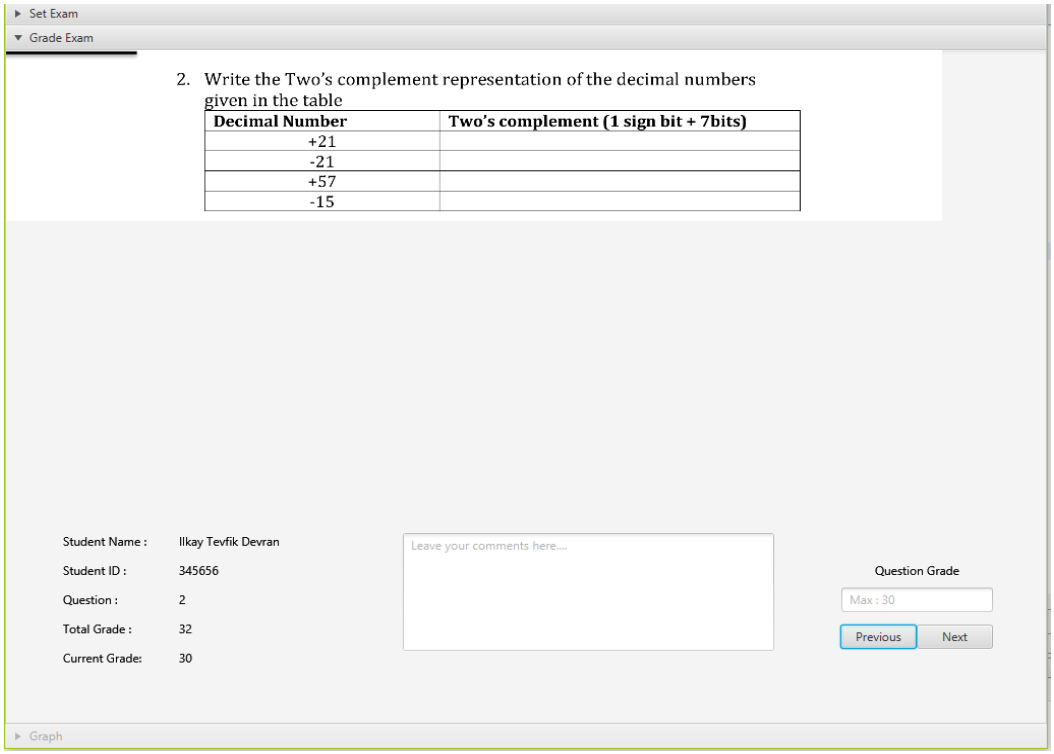

Figure 2.2: Grade Exam Previous Operation Screen

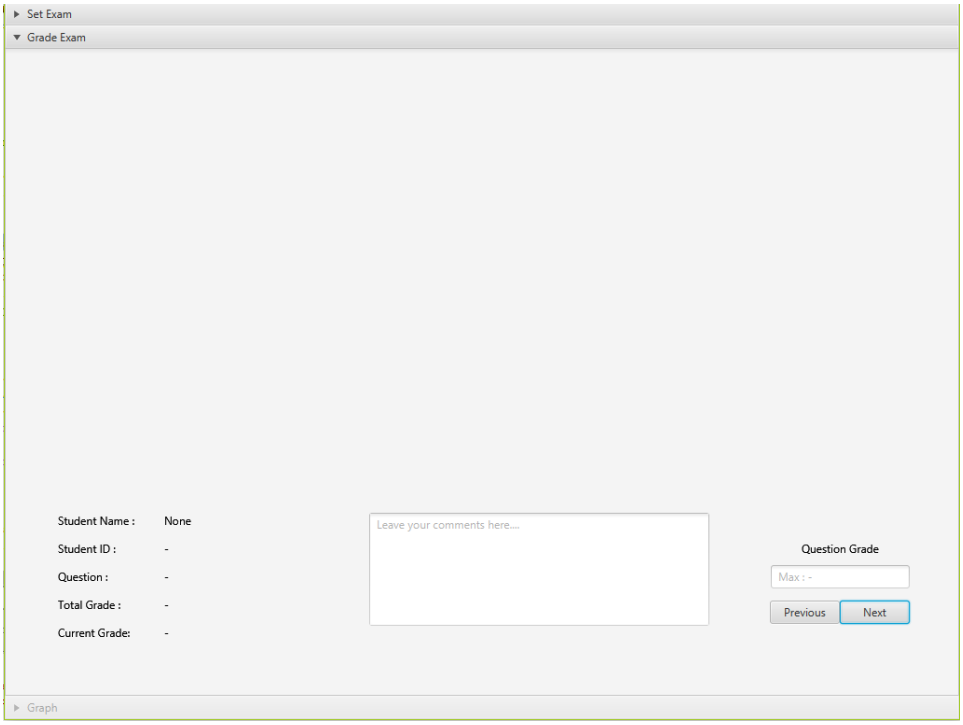

Figure 2.3: Grade Exam Last Page Screen

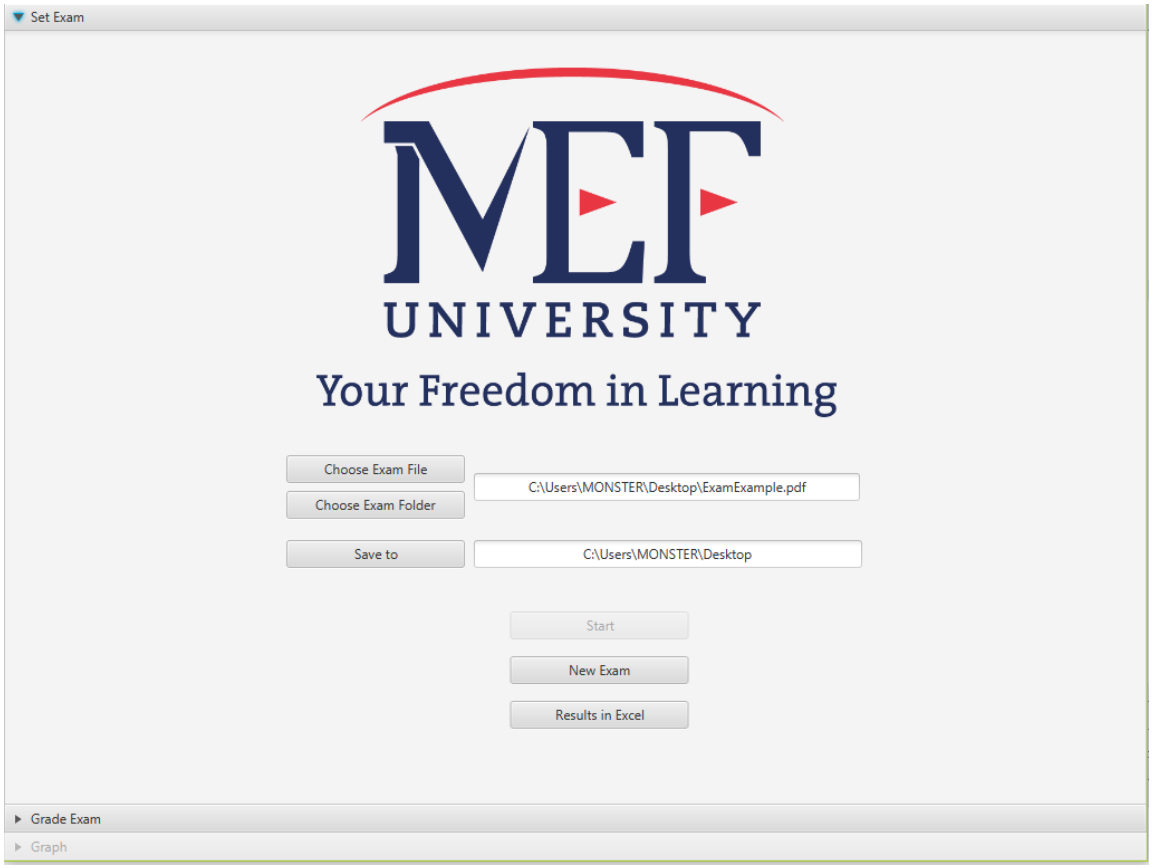

Figure 3.1: Set Exam Screen After All Exams Graded

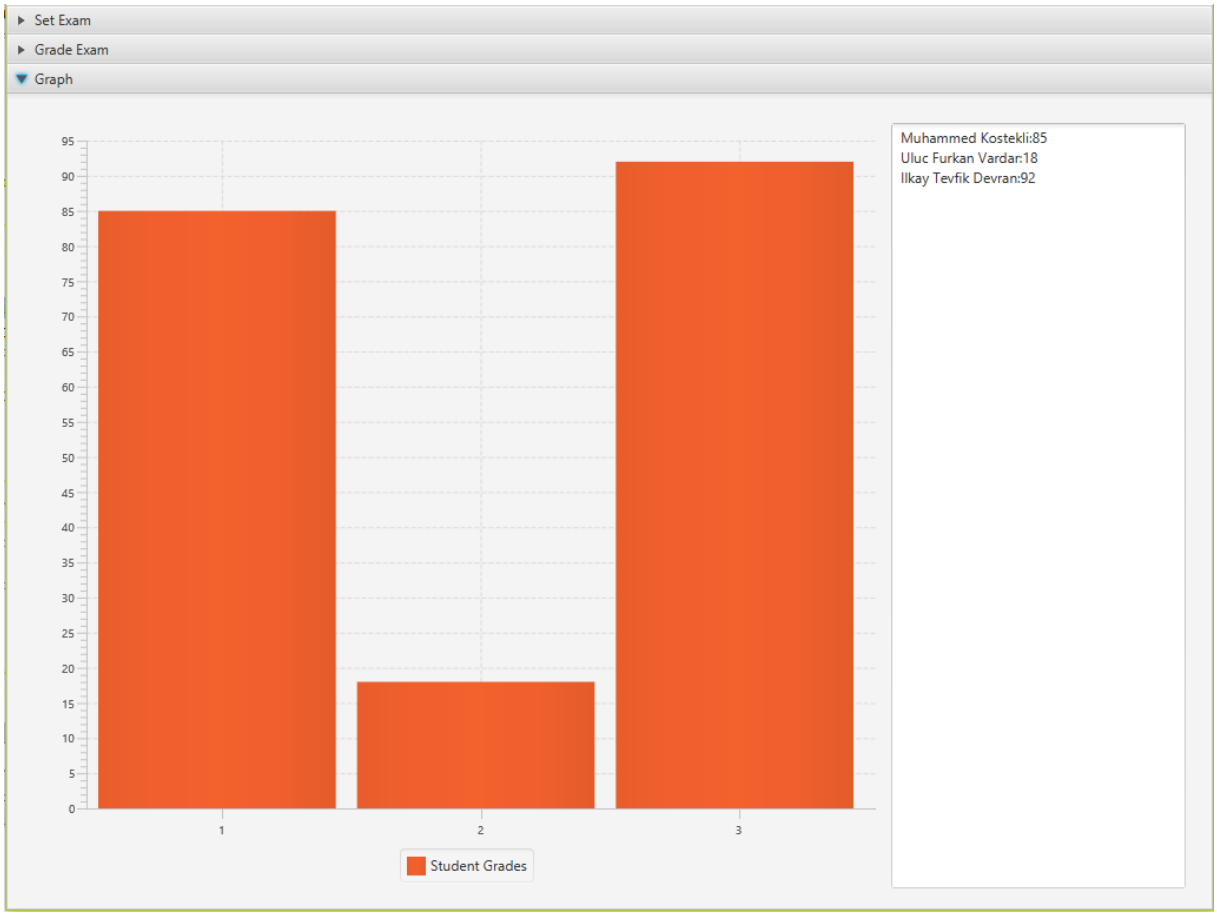

Figure 3.2: Grade Graph After All Exams Graded

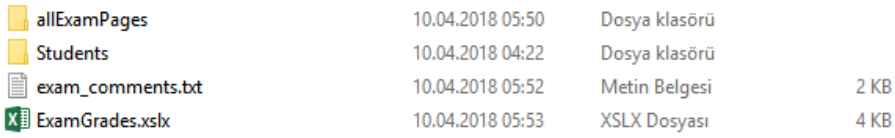

Figure 3.3: Example Output Directory

Course Name:	COMP204						
Exam Name	Midterm						
Questions		Q1.1	Q1.2	Q1.3	Q2.4	Q2.5	Total
Max Scores:		10	30	20	25	15	100
Student Name	Student No						
Ilkay Tevfik Devran	345656	2	30	20	25	15	92
Muhammed Kostekli	34598	10	30	20	15	10	85
Uluc Furkan Vardar	12345	0	1	5	10	2	18

Figure 4.1: Sample Excel Sheet

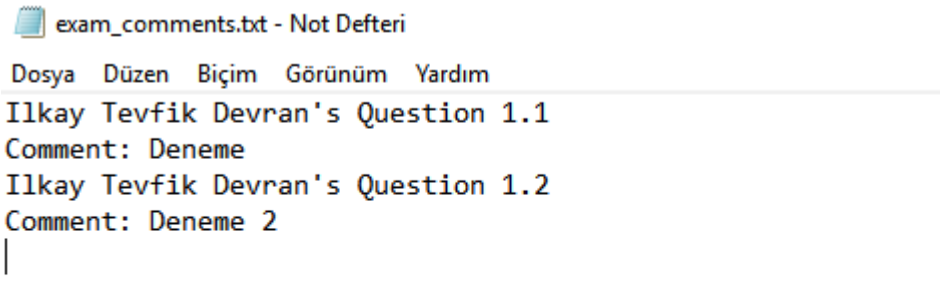

Figure 4.2: Sample Comment File

5. Conclusions

- We got experienced with Zxing, PDF Box and Apache POI libraries.
- We learned how to design user interface with Java FXML.
- We learned how to manipulate QR Code.

6. References

- Codejava.net. (2018). How to Write Excel Files in Java using Apache POI. [online] Available at: http://www.codejava.net/coding/how-to-write-excel-files-in-java-using-apache-poi [Accessed 10 Apr. 2018].
- Java Tutorial Blog. (2018). Java QR Code - Java Tutorial Blog. [online] Available at: https://javapapers.com/core-java/java-qr-code/ [Accessed 10 Apr. 2018].