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Software Engineering Project Report

ProMA+ MPRT

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Declaration

Hereby, we declare that we have written this softwareproject report and have not used any other sources from the books, journals and specially internet, which are not cited here.

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Abstract

In this project the software ProMA+ is developed. The purpose of this project is to support the CEO of a company in the selection and organization of personnel. For the development of the software an integrated development environment (IDE) and a Database are needed, therefore the idea of the project is implemented using Netbeans to create the Graphical User Interface being programmed in Java language and SQLite was chosen as database. Three main functions were created to perform the goals of the software: create a new profile, visualize information and analysis tools. The first function works as an input, the information entered is used and processed by a criteria system of points to be later shown and organized by the other two functions. Special emphasis is dedicated to the Database management and connection with the Graphical User Interface as well as what were the reasons of choosing SQLite as database. All functions and elements working together provide a very easy to use software with a friendly GUI being functional at the same time.

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1 Introduction and Motivation

With the continued growth of competences in human resources as well as the number of people applying for getting a specific job in a company, nowadays it is becoming very important or even essential for the CEO of a company to find a fast and trustworthy way to evaluate and to organize information of such applicants.

The current report presents the development of the software ProMA+ which has three main functions of inputting and viewing applicants data to the system, with the ability to analyse these data. The ideas and programming code to carry out the desing and programming of all the functions are described in their respective sections.

This document also presents the organization and management of the team during the development of the software.

1.1 Problem statement

Recruitment process nowadays has become versatile and to keep information organized and readily available electronic means such as recruitment software are required. The goal of this project was to create a software to assist CEO in selection of job applicants including the necessary tools for the organization and evaluation of the applicants with an easy and friendly interface for the user and the possibility of having all the information by using of a standalone database.

2 Project description

- Planning and organization
- User interface and basic functions
- Program functions
- Database and Integration

2.1 Planning and organization

During the planning of the project we set up the following:

- Java as programming language. The fact that this language is worldwide accepted and standardized in a wide range of applications as well as the flexibility of it, were the main reasons of this decision. The programmers in our team were also more familiarized with this language. NetBeans IDE 7.3 was selected as tool of programming and designing of the GUI.

- SQLite as Database. Taking into consideration that one of the prerequisites were to have a standalone database in addition to the high compatibility with Java, SQLite was the most factible and easy way to achieve those requirements.

- Ease & Simplicity of use of the software. For the final user, the software should be easy to use and understand, showing all the necessary information and arranged in an optimal way.

- V-Model as software development process model. The V-Model allowed us to verify that we were going in the right way. After every phase during the software development a test should be performed.

- Structure of the group:

- Project manager.
- Chief Programmer.
- Database Management.
- Design & Documentation.

-Workbreakdown structure.

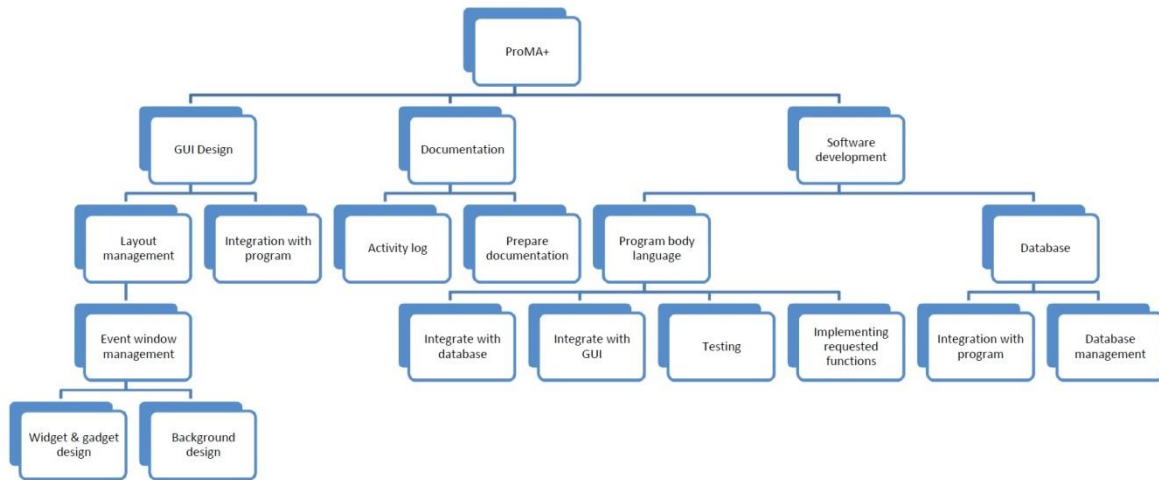


Figure 1: WBS

2.2 User interface and basic functions

Program menus

- Login menu

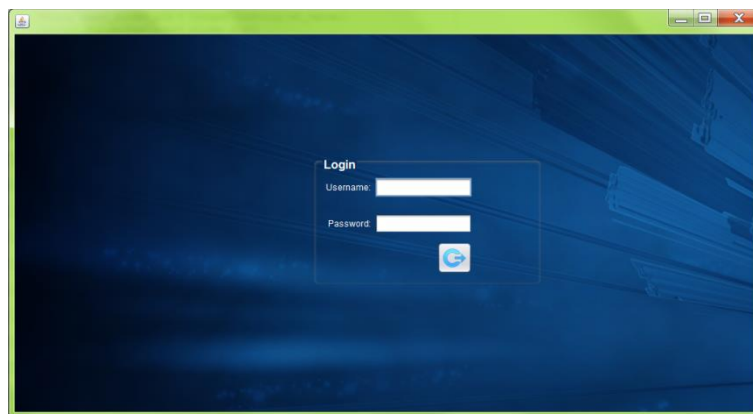


Figure 2: Login Menu

The login menu used to verify the user identity by inputting the “Username” and “Password” which are “root” and “root” respectively.

- Main menu

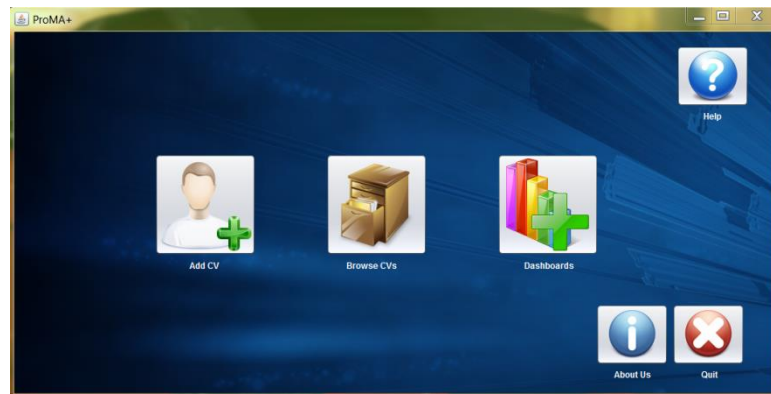


Figure 3: Main Menu

The main menu consists of a window showing the three buttons, these three buttons represent the main functions (Creating a profile, viewing and selecting applicants and analysis dashboards), the “help” menu button, the “About us” button and the “Quit” button.

- Sub-menus

1.-Add CV menu

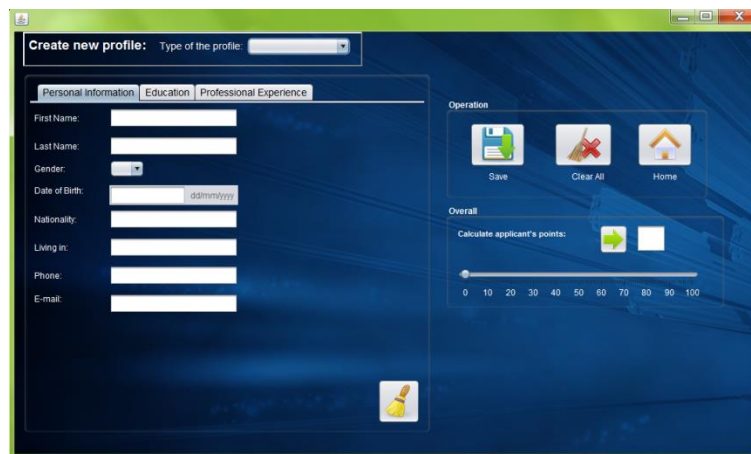


Figure 4: Add CV Menu

2.-Browse CV menu

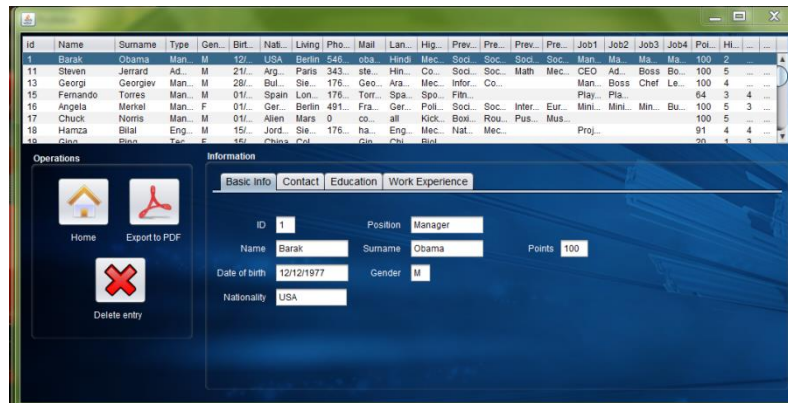


Figure 5: Browse CV Menu

3.-Dashboards menu



Figure 6: Dashboards Menu

- Navigation tools

In ProMA+ for navigating across windows or performing any of the functions, just one click is needed. The “Home” button is the best example, this button allows the user to return to the main menu in an very easy way.

2.3 Program functions

Creating a new Profile: This function takes place in the “Add CV” menu (Fig. 3). Here the user can input all the necessary information about an applicant filling in the corresponding blank spaces. The entered information will be needed to carry out another important sub-function, this is the calculation of the applicant's points which is processed by the criteria evaluation algorithm of the program.

The evaluation criteria consists of giving points to the applicants according to the preparation they have. The process to do it is the following:

- Education:

Table 1: Education Points

High school	20 points
Diploma	40 points
Bachelor	60 points
Master	80 points
Ph.D	100 points

- Number of languages:

Table 2: Languages Points

1	14 points
2	28 points
3	42 points
4	56 points
5	70 points

- Years of experience:

$$\text{Points} = \text{Number of years} * 5.5$$

To get the grade, the average of the sum of points of the three aspects is calculated.

Viewing and selecting applicants: This function is task of the “Browse CV” menu (Fig. 4). On the top a list of applicants is shown, when the user clicks on one of them the information is splitted and organized into the different fields of information below separated by tabs. In this window the user has the possibility to create a PDF file with the information of the applicant with the “Export to PDF” button, the location of the file will be shown, with a D drive should be present in the system. Another sub-function in this window is the ability to delete entries in the database with help of the “Delete entry” button.

Analysis tools: This function can be done by using of the “Dashboards” menu (Fig. 5). The information stored in the database is arranged to be presented in a way of the user’s choice. For the analysis the information of applicants can be displayed regarding:

- Education
- Total Points
- Experience
- Profession
- Gender

This information is shown with charts, two models of charts can be chosen.

1) Pie charts.

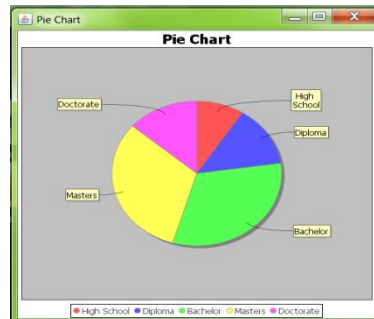


Figure 7: Pie Chart

2) Bar charts

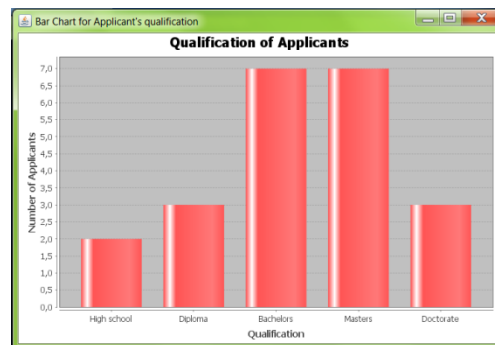


Figure 8: Bar Chart

2.4 Database and integration

In order to acquire data from the user and save it accordingly a database was required. In the early phase of the project we suggested to use Mongo DB due to its unique features for the data arrangement, however during the development phase it was discovered that Mongo would become a hectic job for the user to setup and run properly on their workstation. Thus it was decided at a not very advanced phase in the project to switch to SQLite instead which is rather much more userfriendly.

There are two tables that were generated in order to fulfill the requirement of our software. One of the table includes the employee info that is used for logging in to the software and the other tabe contains the entire data of all the applicants grouped in respective column fields as shown in fig. 8.

TABLE applicants																			
Search										Add Duplicate Edit Delete									
id	Name	Surname	Type	Gender	Birthdate	Nationality	Living	Phone	Mail	Languages	Highest_degree	Prev_degree1	Prev_degree2	Prev_degree3	Prev_degree4	Job1	Job2	Job3	Job4
1	Barak	Obama	Manager	M	12/12/19...	USA	Berlin	5465646...	obama...	Hindi	Mechatronics	Social Science	Social Science	Social Science	Social Science	Manager	Manager	Manager	Manager
11	Steven	Jerrard	Adminis...	M	21/04/19...	Argentina	Paris	343252623	steeve...	Hindi, Spa...	Computer Sci...	Social School	Social Science	Math	Mechatronics	CEO	Admin	Boss	Boss
13	Georgi	Georgiev	Manager	M	28/02/19...	Bulgaria	Siegen	1769999...	GeorgiG...	Arabic, Hi...	Mechatronics	Informatic	Computer sc...			Manager	Boss	Chef	Lead
15	Fernando	Torres	Manager	M	01/10/19...	Spain	London	176090909	Torres@...	Spanish, E...	Sports	Fitness				Player at...	Player at...		
16	Angela	Merkel	Manager	F	01/01/19...	Germany	Berlin	491001100	FrauMer...	German, E...	Politics	Social School	Social science	International...	European Law	Minister ...	Minister ...	Minister ...	Bunc
17	Chuck	Norris	Manager	M	01/01/00...	Alien	Mars	0	com@c...	all	Kicking rears	Boxing	Round House	Push ups	Muscles				
18	Hamza	Bilal	Engineer	M	15/05/19...	Jordan	Siegen	1769855...	hamza@...	English	Mechatronics	Natural scien...	Mechatronics			Project E...			
19	Ging	Ping	Technici...	F	15/07/19...	China	Cologne		GingPin...	Chinese	Biology								
21	Jan cload	Van Dam		M	25/05/19...	Austria	USA	01 555 234	Van.Da...	English	Arts	Sports				Actor			
22	Jessica	Alba	Adminis...	F	28/04/19...	USA	California		alba@ya...	English, S...	Theater	Arts	Arts			King Ko...	Hony, pl...	Dark An...	
23	Jennifer	Lawrence	Technici...	F	15/08/19...	USA	Kentucky		Law.ren...	English	Atrs	Acting				Hunger ...	Silver Li...	House a...	Wint
24	Madonna	Luiise		F	16/08/19...	USA	New Yo...		Madonn...	English	Music	Music	Music			Like a Vi...	America...	Bed tim...	
25	Charli	Sean		M	03/09/19...	Mexico	USA			Spanish, E...	Acting					Two and...	CEO at F...		
26	Mark	Zuckerb...	Manager	M	14/05/19...	German	USA		Mark@F...	English	Informatik	Informatik				Actor			
27	Johnny	Bravo	Technici...	M	12/12/19...	USA	Boston	3534664...	bravo@...	English, G...	Natural Science	Math				Actor			
28	Franche...	Totti	Engineer	M	12/06/19...	Italy	Lisabon	3563563...	tootti@...	Italian, En...	Football Orga...	Football Prof...				Attacker...			
29	Sandra	Milano	Adminis...	F	14/09/19...	Poland	London	5634732...	sandra...	English, P...	European Law	Economics	Bussiness law			CEO	Project ...	Project ...	
30	Arnold	Schwarz...	Adminis...	M	06/04/19...	USA	Toronto	3854953...	arni@ho...	English, Hi...	Fitness Culture	Sport School ...				Sport Eq...			
31	Steve	Johnson	Manager	M	11/02/19...	England	Dresden	487756242	steve@h...	French, En...	Management	Management	Economics			Project ...	Project ...	Project ...	Proje
32	Cleen	Eastwood	Manager	M	15/06/19...	USA	Boston	93849572	cleen_21...	English	Acting Styles	Human Reso...				Human ...	Human ...	Human ...	
46	Batman	Warner	Engineer	M	07/02/19...	US	United S...	9616135...	batman...	English, G...	Mecatronics	Mechatronics	Electric Tech...			Darknight	Batman ...		
47	Carlos	Doming...	Engineer	M	07/02/19...	Mexican	Germany	4916028...	gamz25...	Spanish, E...	Mechatronics ...	Electronics E...				Communi...			
48	Mustafa	Shuqair	Engineer	M	14/01/19...	Jordanian	German	4915236...	mustafa...	Arabic, En...	Mechatronics ...	Mechatronics...				Nat...	Communication Engineer		

Figure 9: SQLite Database Table

The connection between the software GUI and the database itself is a crucial part. In this regard we created a java interface class for the sole purpose of creating a link between the GUI and the database. All the implemented functions have primarily a call to the interface class in order to first ensure that the database is available and connection is made before proceeding further.

Once the connection is established between the software and the database the data can be fetched using the query command in the source code for the respective event. The query command works in such a way that it compares the title of the table column with the given field name and fetches whatever the stored data is present at this location. Once fetched the data maybe displayed or used in further operation such as counting etc.

3 Conclusion and Future work

3.1 Summary

The basics of planning and design of the software ProMA+ were presented in this report. The development of this project was separated into phases,

The main functions necessary for the organization and evaluation of applicants were added to the program. However some adjustments were done during the development: the database was once changed from Mongo to SQLite due to the standalone property, the evaluation criteria was also modified once to make it more flexible, regarding the GUI design the position of some buttons in some windows were rearranged as well as the selection of images for the buttons.

The result was a very easy to use software with a friendly GUI. It is functional and at the same time it has a good view. The functions provide prudent results according to the a very reasonable criteria.

3.2 Outlook

As future tasks, adding further analysis tools are planned, the format of the PDF file generated is also intended to be improved as well as the design of the GUI and the addition of Online access capability.

4 Literature

Internet:

[www1]	NetBeans https://netbeans.org/
[www2]	JFree Chart http://www.jfree.org/jfreechart/
[www3]	iText http://itextpdf.com/
[www4]	Wikipedia en.wikipedia.org
[www5]	Stack overflow http://stackoverflow.com/
[www6]	MongoDB http://www.mongodb.org/

I. Appendix

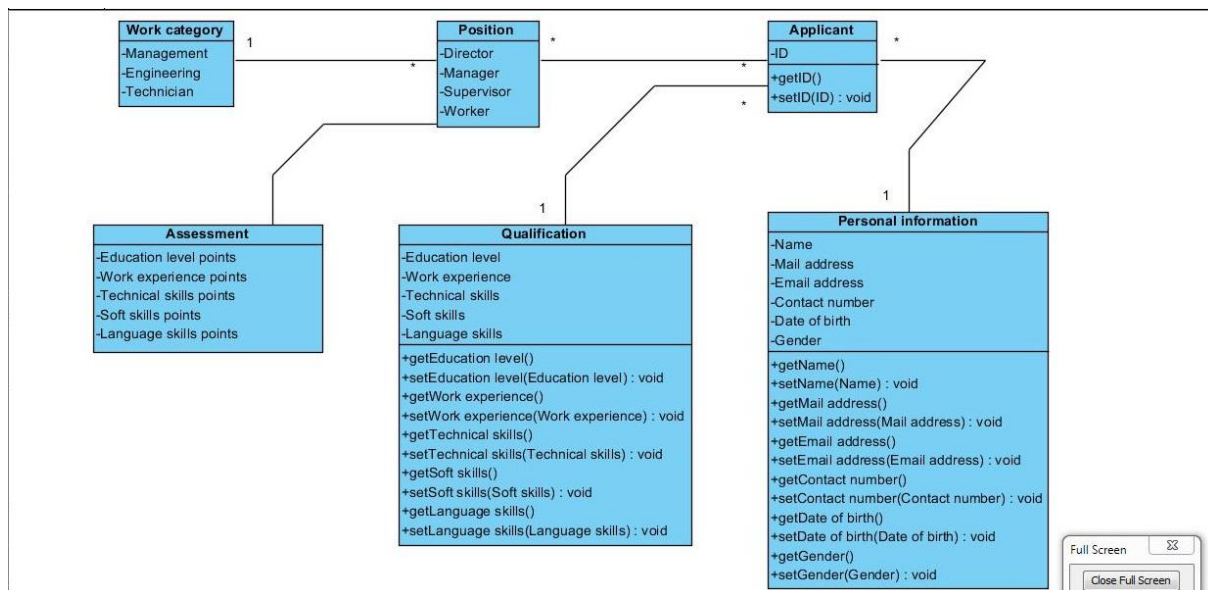


Figure 10: Class Diagram

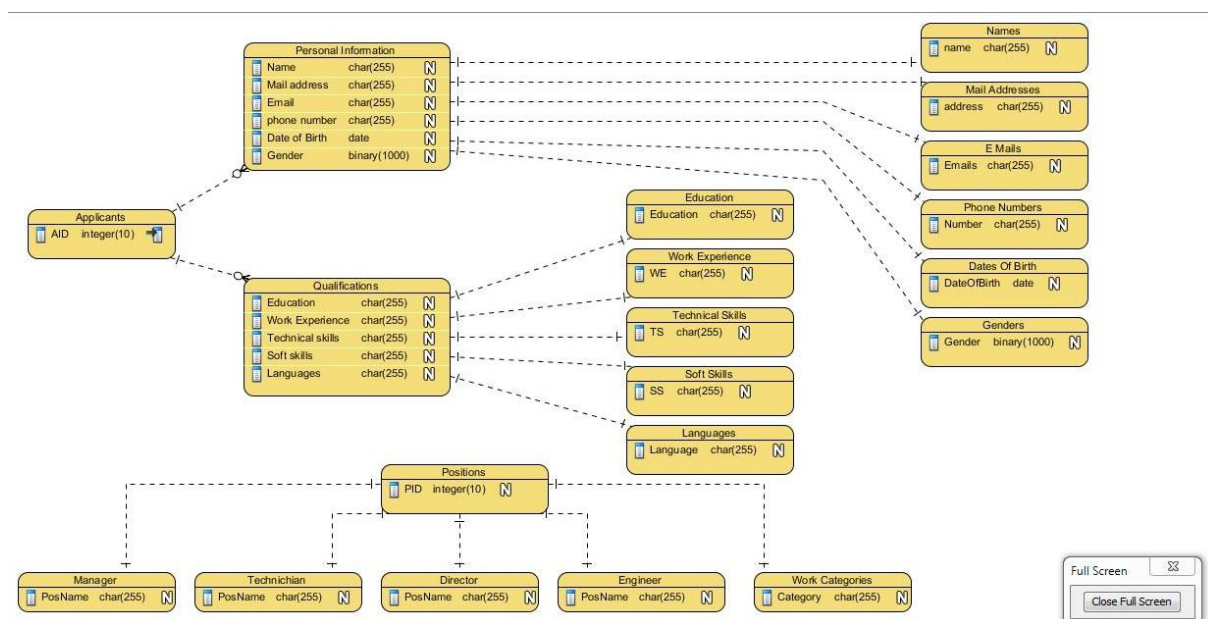


Figure 11: Data Model