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Modeling a business informational system for a primary school

Project from subject: IT Systems 1

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Contents

0. Introduction	3
0.1 System analysis	3
0.2 Actors	4
0.2.1 Director	4
0.2.2 Secretary	4
0.2.3 Teacher	4
0.2.4 Administrator	5
0.2.5 Parent	5
0.2.6 Student	5
1. Activity diagram	7
2. Use case diagram	9
2.3 Describing each use case scenario	10
2.2.1 Student	10
2.2.2 Parent	13
2.2.3 Teacher	18
2.2.4 Secretary	23
2.2.5 Director	26
2.2.6 Administrator	29
3. Class diagram	33
4. Dynamic models	35
5. Package diagram	41
6. Partially implemented system (MVP)	43
7. End note	47

0 Introduction

0.1 System analysis

The subject of this topic is the development of a software solution that would facilitate business in elementary school, both for employees, students and parents.

When analyzing this problem, the most significant items were :

- *Decentralized access to information - there isn't only one place where all relevant data are located, which makes it difficult to find them, and requires a greater amount of time to gather all the information you want.*
 - The problem is solved by centralizing information through a new information system. This allows the student to come up with all the materials, notifications and personal data intuitively in a few steps. Teachers also get a centralized place to publish notifications and materials, as well as a student overview and grade during the school year.
- *Communication - communication between parents and teachers is difficult because it requires parents to be physically in school during the working hours of the professor, and also out-of-school communication between teachers and pupils or parents is difficult.*
 - The problem is solved by the introduction of a messaging system, through which any two entities (teacher, parent, student) can get in touch with each other and resolve dilemmas.
- *Overview of relevant information related to the school year - Review of grades, notifications, activities, sections, debits, material plan, overview of absences. These are all items that must be done personally with an elder, which requires more time than the parents.*
 - The problem is solved by introducing a review of all the above information, which can be updated by a teacher or a secretary as needed, and the information is shared by all employees, as well as parents and pupils.

0.2 Actors

The analysis of the system has highlighted several actors representing participants in the future school business system. Their short description follows the text below.

0.2.1 Director

The Director is a school employee who will have the following responsibilities and access in the system:

- Overview of employees and their information.
- Overview of students and their information.
- Overview of the best students.
- Insights into finance.
- Direct connection to secretary.

0.2.2 Secretary

The secretary is a school worker who will have the following responsibilities and possibilities of using the system:

- Overview of students.
- Overview of parents.
- Teacher overview.
- Access to finance.
- Public Relations.
- Enrollment and Student Pupil.
- Organizing the entrance exam.
- Payments to teachers.
- Tracking employee holidays and sick leave.

0.2.3 Teacher

The teacher is a school worker who will have the following responsibilities and possibilities of using the system:

- Overview of students.
- Assessment of students.
- Sending messages to other professors, students, parents or the director.
- Overview and input of absences and notes.
- Review and publication of notifications.
- Changing the timetable.
- Publishing / editing subject plans.

0.2.4 Administrator

The administrator is a school worker who will have the following responsibilities and possibilities of using the system:

- Making an account.
- Editing and input of information.
- Class schedule.
- Assigning teachers to subjects and departments.
- Choosing of the class officer.
- Publishing the timetable.
- Creating a new section

0.2.5 Parent

Parent is an actor who represents a parent of a student which is listed in the school. His ability to use the system is reflected only on his / her own child (if the parent has more children who attend the same school), such as:

- Choosing a child to overview.
- Review of ratings.
- Review of absences.
- An overview of the timetable, and open doors.
- Overview of notifications.
- Sending messages to teachers.
- Fixing absences.
- Review and payment of finance.
- Teacher overview.

0.2.6 Student

The student is an actor who attends school. Its capabilities to use the system are:

- Review of grades.
- Review of absences.
- Schedule overview.
- Overview of notifications.
- Teacher overview.
- Sending messages

1 Activity diagram

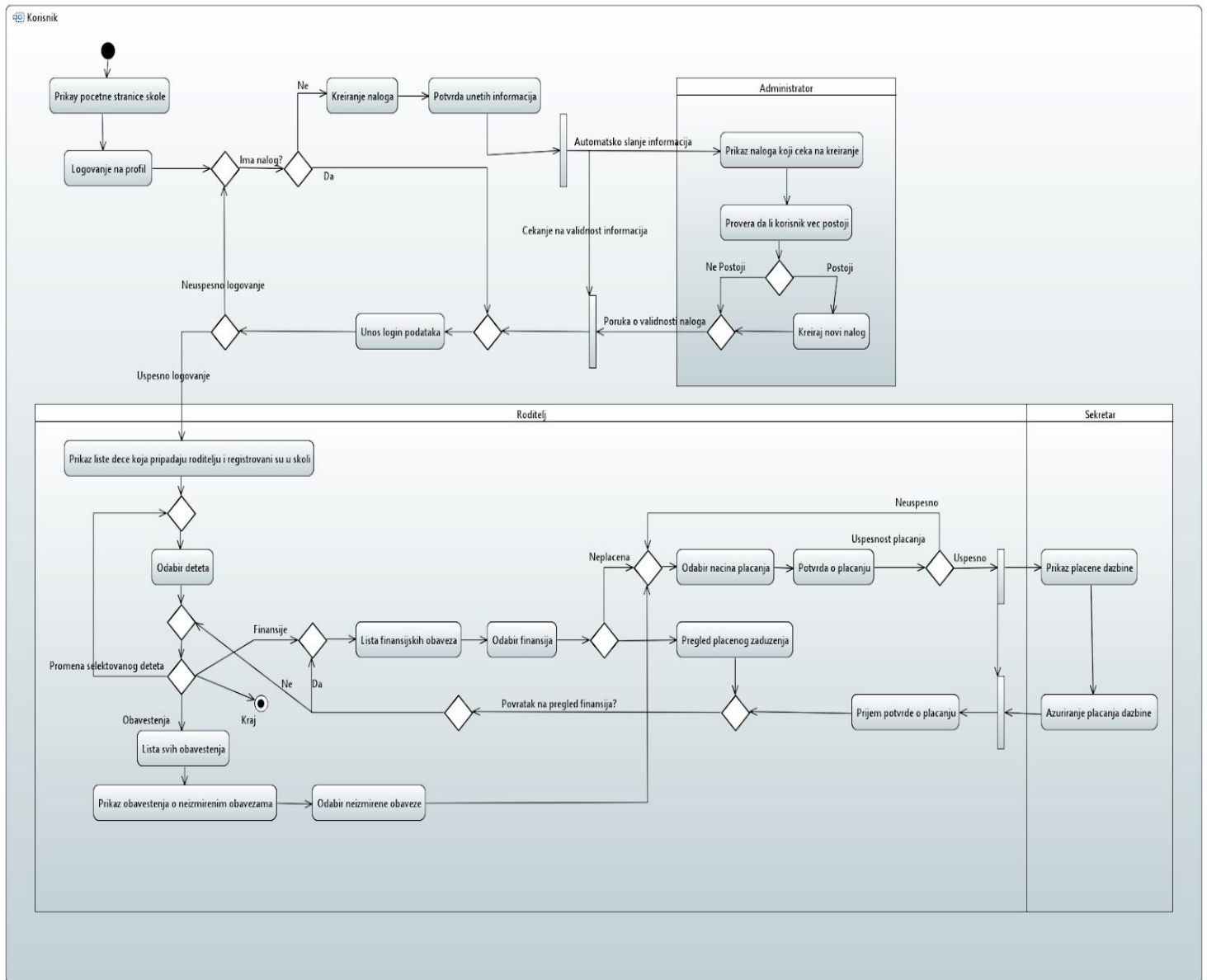


Figure 1.1: Parent activity diagram

In Figure 1.1, we can see an activity diagram showing actions related to parent finances.

Initially it is necessary for the parent to have his / her account. In the absence of the same, it is necessary to create it through a form by entering their information and information from the child, after which the Administrator must validate, whether the child is a student of the school, and whether the parent is actually the parent of that child.

After creating an account, the parent logs in: if the parent has more than one child who is a student of this school, he / she must choose which child he / she wants to observe.

From here, the parent would be able to access many information, as well as navigate to another child, but in this activity diagram, we will only describe a financial aspect.

Finances can be accessed in two ways - directly through the tab of finance, or by accessing a notification tab, where a notification alerting the user about unpaid charges can be selected.

Then, by choosing the method of payment and filling in the form correctly, the notification of the invoice is sent to the secretary who, after validating the payment, also updates the user profile, where the now paid fee can be found under the tab of finance in the already paid debts.

The user here has the option of returning and reviewing the financial status again and possibly making additional payments, or any further option including the completion of the session.

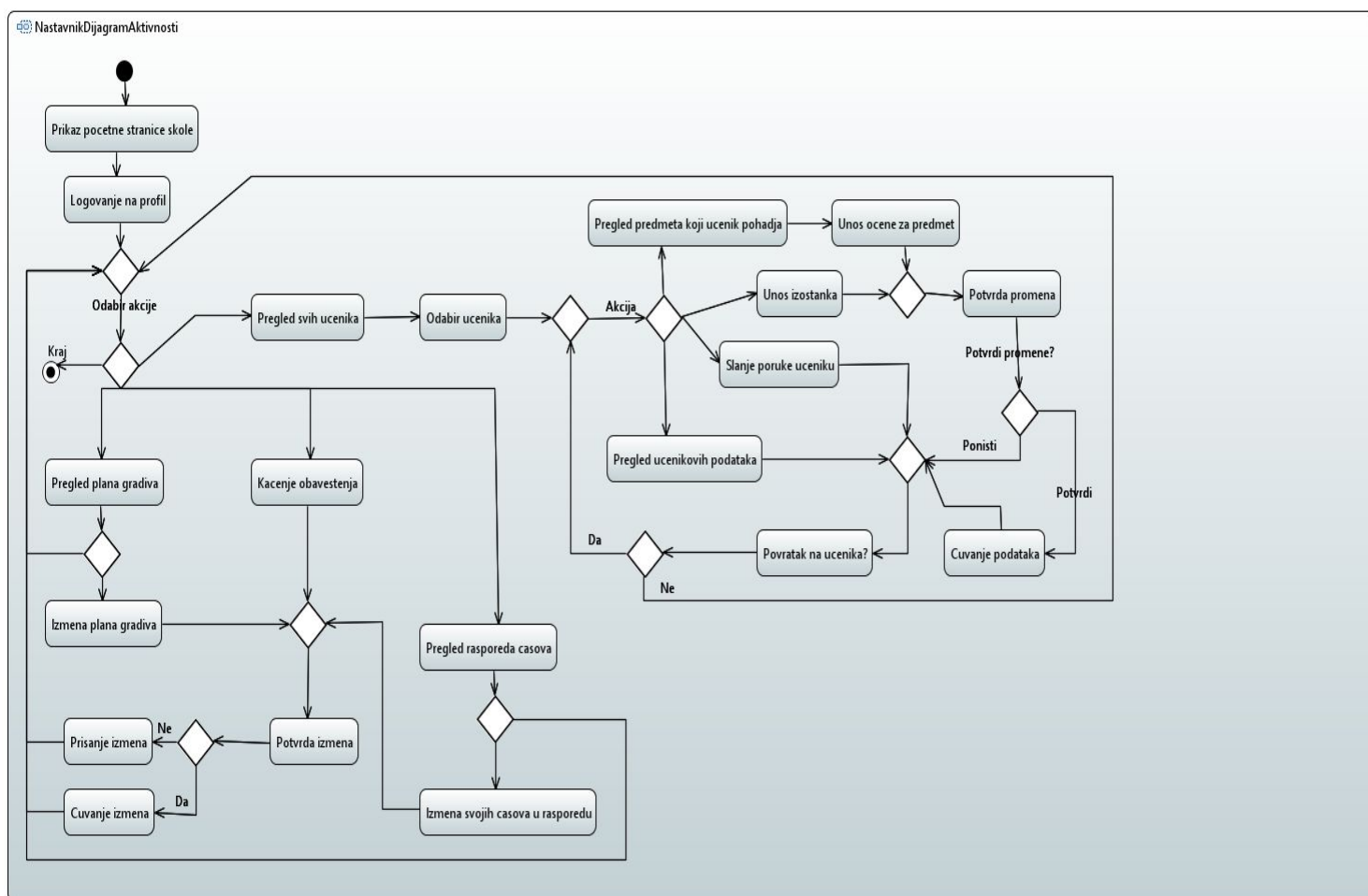


Figure 1.2: Student activity diagram in school

In Figure 1.2, we can see an activity diagram that shows actions related to a teacher.

After logging, the teacher has a set of options that can be selected.

If you need to change the grade, enter the absence, note, review the progress in the section, send the message to the selected student, or view student data, this can be done by selecting the option to view all students, after which the desired person will be selected from the student list.

Teachers are also able to view, or change the material plan for their own subjects, attach notifications, create a new section that needs to be added to the timetable, as well as to change the hours of your own classes in the timetable.

For security reasons, after each change the system has made it necessary for the user to either save it or cancel it.

2 Use case diagram

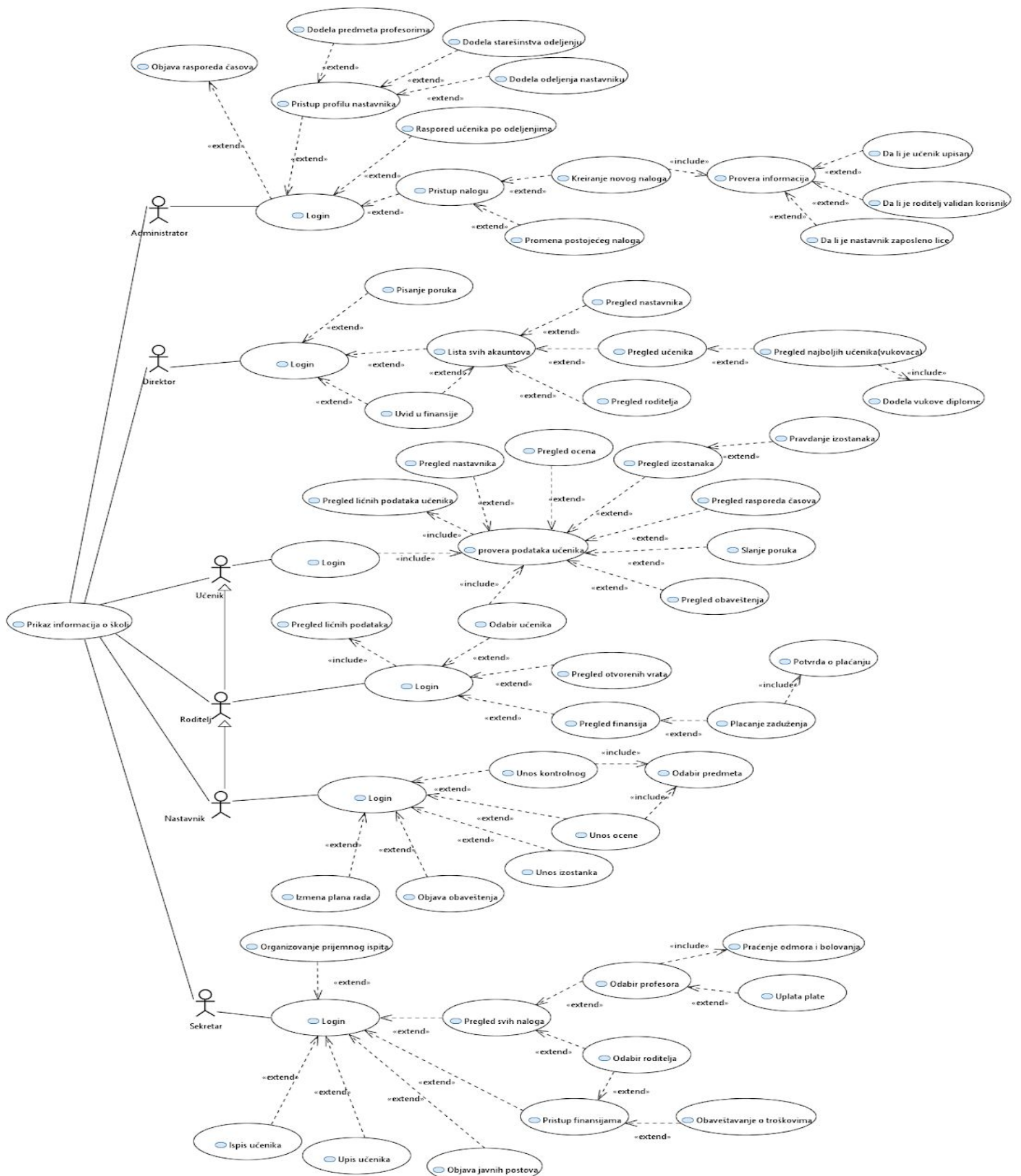


Figure 2.1: Use case diagram from the angle of: Student, Parent, Teacher, Secretary, Director, Administrator

2.2 Describing each use case scenario

2.2.1 Student

USE CASE	
<i>Title:</i>	<i>Review of personal information.</i>
<i>Actors:</i>	<i>Student.</i>
<i>Precondition:</i>	<i>Student must be logged in.</i>
<i>Postcondition:</i>	<i>Successfully displayed personal information on the home page.</i>
<i>Description:</i>	<i>After logging in, the student has the option to view personal information</i>
<i>Exceptions:</i>	<i>None.</i>
USE CASE	
<i>Title:</i>	<i>Login</i>
<i>Actors:</i>	<i>Student.</i>
<i>Precondition:</i>	<i>Student must have a profile created.</i>
<i>Postcondition:</i>	<i>Successful login.</i>
<i>Description:</i>	<i>The user logs in to the system using username and password.</i>
<i>Exceptions:</i>	<i>Unsuccessful logging.Wrong username or password.</i>
USE CASE	
<i>Title:</i>	<i>Teacher overview</i>
<i>Actors:</i>	<i>Student.</i>
<i>Precondition:</i>	<i>Student must be logged in.</i>
<i>Postcondition:</i>	<i>List of all teachers who are assigned to the student.</i>
<i>Description:</i>	<i>The student has the opportunity to view all teachers as well as the low-risk information related to teachers who teach him (name, surname, email,working hours, etc)</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Assessment Score.</i>
<i>Actors:</i>	<i>Student.</i>
<i>Precondition:</i>	<i>Student must be logged in.</i>
<i>Postcondition:</i>	<i>Successfully displayed list of subjects with all the grades.</i>
<i>Description:</i>	<i>The student has the opportunity to review grades that teachers have given him throughout the year.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Review of absences.</i>
<i>Actors:</i>	<i>Student.</i>
<i>Precondition:</i>	<i>Student must be logged in.</i>
<i>Postcondition:</i>	<i>Successfully displayed number of absences with dates and time of the lesson from which the student was absent.</i>
<i>Description:</i>	<i>The student can weather he/she was absent on a class.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Class schedule.</i>
<i>Actors:</i>	<i>Student.</i>
<i>Precondition:</i>	<i>Student must be logged in.</i>
<i>Postcondition:</i>	<i>Successfully displayed class schedule.</i>
<i>Description:</i>	<i>A student can access and view the class schedule.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Sending messages.</i>
<i>Actors:</i>	<i>Student.</i>
<i>Precondition:</i>	<i>Student must be logged in.</i>
<i>Postcondition:</i>	<i>The student successfully sent a message through the client.</i>
<i>Description:</i>	<i>The student can send messages to teachers,or other students using the messaging client.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Notification Overview.</i>
<i>Actors:</i>	<i>Student.</i>
<i>Precondition:</i>	<i>Student must be logged in.</i>
<i>Postcondition:</i>	<i>Successfully displayed list of notifications which a student can view and read.</i>
<i>Description:</i>	<i>By accessing the notification tab,a student gets a a list of notifications, where he can then access each individual text.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Display of school information.</i>
<i>Actors:</i>	<i>Student,Parent,Teacher,Secretary,Director,Admin.</i>
<i>Precondition:</i>	<i>None.</i>
<i>Postcondition:</i>	<i>Displaying the primary school page.</i>
<i>Description:</i>	<i>Everyone has the right to access the home page of the school,where basic information related to school,employees,contacts can be found.</i>
<i>Exceptions:</i>	<i>None.</i>

2.2.2 Parent

USE CASE

<i>Title:</i>	<i>Child selection.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>Parent must be logged in.</i>
<i>Postcondition:</i>	<i>Display the home page of the selected child.</i>
<i>Description:</i>	<i>After logging in,the parent will be shown a list with one or more children,depending on how many attend the same school.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Personal information review.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>Parent must be logged in,and a child must be selected.</i>
<i>Postcondition:</i>	<i>Successful display of student's personal information.</i>
<i>Description:</i>	<i>After choosing a child, the parent has the option to review their child's personal information.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Login.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>Parent must have a verified profile.</i>
<i>Postcondition:</i>	<i>Successful login.</i>
<i>Description:</i>	<i>Logging in by using username / password combination.</i>
<i>Exceptions:</i>	<i>Unsuccessful login due to wrong username/password.</i>

USE CASE	
Title:	Teacher overview.
Actors:	Parent.
Precondition:	Parent must be logged in, and a child must be selected.
Postcondition:	A list of all teachers who teach the student is shown successfully.
Description:	The parent has the ability to view all teachers as well as low-risk information related to teachers who teach him (name, surname, email, working hours, teaching hours etc.).
Exceptions:	None.
USE CASE	
Title:	Assessment score.
Actors:	Parent.
Precondition:	A parent must be logged in to his / her profile, and must select a child whose profile he / she wants to observe.
Postcondition:	Successfully displayed a list of subjects with all the grades that a student received.
Description:	A parent has the ability to review her child's profile through her profile.
Exceptions:	None.
USE CASE	
Title:	Review of absences.
Actors:	Parent.
Precondition:	A parent must be logged in to his / her profile, and must select a child whose profile he / she wants to observe
Postcondition:	Successfully displayed the list and the number of absences with the date and time of the lesson from which the student was absent.
Description:	A parent has the ability to check the number and date of absence when his child has missed out.
Exceptions:	None.

USE CASE

<i>Title:</i>	<i>Time Schedule Review.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>A parent must be logged in to his / her profile, and must select a child whose profile he / she wants to observe</i>
<i>Postcondition:</i>	<i>Successfully displayed timetable.</i>
<i>Description:</i>	<i>Parent has the ability to access the calendar of timetables.</i>
<i>Exceptions:</i>	<i>The timetable has not yet been created.</i>

USE CASE

<i>Title:</i>	<i>Sending messages.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>The parent must be logged into his profile.</i>
<i>Postcondition:</i>	<i>Successfully sending a message.</i>
<i>Description:</i>	<i>Parent has the ability to send messages to teachers using the messaging client.</i>
<i>Exceptions:</i>	<i>The message was not sent either due to an error.</i>

USE CASE

<i>Title:</i>	<i>Notification Overview.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>A parent must be logged in to his / her profile, and must select a child whose profile he / she wants to observe.</i>
<i>Postcondition:</i>	<i>The notification list is successfully displayed.</i>
<i>Description:</i>	<i>By accessing a notification tab, the parent receives a notice sheet, where he can then access each individual text.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>"Open door" view.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>A parent must be logged in to his / her profile, and must select a child whose profile he / she wants to observe.</i>
<i>Postcondition:</i>	<i>The open door list is successfully displayed.</i>
<i>Description:</i>	<i>Accessing the open door option, the parent can get information about both the location and the time when he/she can visit the teachers.</i>
<i>Exceptions:</i>	<i>None.</i>
USE CASE	
<i>Title:</i>	<i>Justifying an absence.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>A parent must be logged in to his / her profile, and must select a child whose profile he / she wants to observe. There must be at least one absence.</i>
<i>Postcondition:</i>	<i>A request for justify an absence has been sent.</i>
<i>Description:</i>	<i>Parent has the option to justify absences.</i>
<i>Exceptions:</i>	<i>None.</i>
USE CASE	
<i>Title:</i>	<i>Finance Overview.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>A parent must be logged in to his / her profile, and must select a child whose profile he / she wants to observe.</i>
<i>Postcondition:</i>	<i>List of all financial obligations.</i>
<i>Description:</i>	<i>The parent has the option to check the financial obligations of his child.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Payment of finances.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>A parent must be logged in to his / her profile, and must select a child whose profile he / she wants to observe. There must be an unpaid fee to access it.</i>
<i>Postcondition:</i>	<i>Received payment processing request. If the payment has been made, the parent receives a confirmation. If not, get a notification.</i>
<i>Description:</i>	<i>A parent has the option of paying finances by selecting the unpaid finances, then entering their data and selecting the method of payment. In case of successful payment, the parent receives an invoice and notification that the transaction has been successful and the information on the site is updated and, in case of unsuccessful payment, the ability to re-pay in some other way.</i>
<i>Exceptions:</i>	<i>The parent does not have enough available funds in the account, and the transaction is rejected.</i>

USE CASE

<i>Title:</i>	<i>Review of personal information.</i>
<i>Actors:</i>	<i>Parent.</i>
<i>Precondition:</i>	<i>A parent must be logged in to his / her profile.</i>
<i>Postcondition:</i>	<i>Successfully displayed personal information.</i>
<i>Description:</i>	<i>After logging into your profile, your personal information will be displayed to the parent.</i>
<i>Exceptions:</i>	<i>None.</i>

2.2.3 Teacher

USE CASE	
Title:	<i>Selection of students.</i>
Actors:	<i>Teacher.</i>
Precondition:	<i>The teacher must be logged into his profile. The teacher must teach some students.</i>
Postcondition:	<i>Display the homepage of the selected student.</i>
Description:	<i>After logging into your profile, the teacher will display a list of all students to whom he / she is teaching, and can choose the desired student.</i>
Exceptions:	<i>None.</i>
USE CASE	
Title:	<i>Overview of student personal information.</i>
Actors:	<i>Teacher.</i>
Precondition:	<i>A teacher must be logged in to his / her profile and selected by the student he / she wants to observe.</i>
Postcondition:	<i>Successfully displayed student information.</i>
Description:	<i>After choosing a student, the teacher gets the option to view the personal information of the selected student.</i>
Exceptions:	<i>None.</i>
USE CASE	
Title:	<i>Review of personal information.</i>
Actors:	<i>Teacher.</i>
Precondition:	<i>The teacher must be logged into his profile.</i>
Postcondition:	<i>Successfully displayed personal information.</i>
Description:	<i>After logging into your profile, the teacher will show personal information.</i>
Exceptions:	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Login.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>The teacher must be logged into his profile.</i>
<i>Postcondition:</i>	<i>Successful login to the system.</i>
<i>Description:</i>	<i>The teacher logs on to the system using his username and password.</i>
<i>Exceptions:</i>	<i>Failed logging due to lack of profile. Unsuccessful logging in the middle of a wrong username or password.</i>
USE CASE	
<i>Title:</i>	<i>Overview of teachers who teach the student.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>A teacher must be logged in to his / her profile, and must select a student whose profile he / she wants to observe.</i>
<i>Postcondition:</i>	<i>A list of all teachers who teach the student is shown successfully.</i>
<i>Description:</i>	<i>The teacher has the ability to view all teachers as well as low-risk information related to teachers who teach the student (name, surname, email, working hours, teaching hours etc.).</i>
<i>Exceptions:</i>	<i>Failed logging due to lack of profile. Unsuccessful logging in the middle of a wrong username or password.</i>
USE CASE	
<i>Title:</i>	<i>Overview of all teachers.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>The teacher must be logged into his profile.</i>
<i>Postcondition:</i>	<i>The list of all teachers is displayed.</i>
<i>Description:</i>	<i>The teacher has the ability to view all teachers as well as low-risk information related to teachers (name, surname, email, working hours, teaching hours etc.).</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Assessment Score.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>A teacher must be logged in to his / her profile, and must select a student whose profile he / she wants to observe.</i>
<i>Postcondition:</i>	<i>Successfully displayed a list of subjects with all the grades that a student received.</i>
<i>Description:</i>	<i>The teacher has the ability to review her students' grades through her profile.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Review of absences.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>A teacher must be logged in to his / her profile, and must select a student whose profile he / she wants to observe</i>
<i>Postcondition:</i>	<i>Successfully displayed the list and the number of absences with the date and time of the lesson from which the student was absent.</i>
<i>Description:</i>	<i>The teacher has the ability to check the number and date of absence when the selected student is absent from a certain time.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Insertion of absences.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>A teacher must be logged in to his / her profile, and must select a student to whom he / she wants to assign absenteeism.</i>
<i>Postcondition:</i>	<i>The student was added to the database and the database was updated so that both parents and teachers can see it.</i>
<i>Description:</i>	<i>The teacher has the ability to allocate absenteeism to students if they were not on time with all the recorded date and the name of the time.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Time Schedule Review.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>The teacher must be logged into his profile.</i>
<i>Postcondition:</i>	<i>Successfully displayed the timetable.</i>
<i>Description:</i>	<i>The teacher has the ability to access the timetable calendar.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Sending messages.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>The teacher must be logged into his profile.</i>
<i>Postcondition:</i>	<i>Successfully sending a message.</i>
<i>Description:</i>	<i>The teacher has the ability to send messages from a repackaged client directly on the site.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Notification Overview.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>The teacher must be logged into his profile.</i>
<i>Postcondition:</i>	<i>The notification list is successfully displayed.</i>
<i>Description:</i>	<i>By accessing the notification tab, the extension gets a list of notifications, where it can then access each individual text.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Publication of notice.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>The teacher must be logged into his profile.</i>
<i>Postcondition:</i>	<i>Successfully published notice.</i>
<i>Description:</i>	<i>The extension has the option to publish a new notification, which will be updated immediately and displayed in the notification list.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Entering the rating.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>The extension must be logged in to your profile. The teacher must select the subject for which he / she wants to enter the grade, or select the individual student for whom he / she wants to enter the grade.</i>
<i>Postcondition:</i>	<i>Successfully published notice.</i>
<i>Description:</i>	<i>The teacher has the option to evaluate the student and enter those grades on the site, where he will have to select the subject and the student he / she wants to enter the grade, which will then be updated on the site so that everyone can see the changes.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Insertion of absences.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>A teacher must be logged in to his / her profile and must select a student to whom he / she wants to make a statement.</i>
<i>Postcondition:</i>	<i>Unset and updated information on the site.</i>
<i>Description:</i>	<i>The teacher can insert an absence to the students if they did not attend the time by entering the name of the time and the absentee date.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Work plan change.</i>
<i>Actors:</i>	<i>Teacher.</i>
<i>Precondition:</i>	<i>The extension must be logged in to your profile. The teacher must have a teaching subject.</i>
<i>Postcondition:</i>	<i>A modified work plan.</i>
<i>Description:</i>	<i>The extension has the option to change the work plan and make the new plan appear on the site.</i>
<i>Exceptions:</i>	<i>None.</i>

2.2.4 Secretary

USE CASE	
<i>Title:</i>	<i>Login.</i>
<i>Actors:</i>	<i>Secretary.</i>
<i>Precondition:</i>	<i>The secretary must have a profile created.</i>
<i>Postcondition:</i>	<i>Successful login to the system.</i>
<i>Description:</i>	<i>The secretary logs on to the system using his username and password.</i>
<i>Exceptions:</i>	<i>Failed logging due to lack of profile. Unsuccessful logging in the middle of a wrong username or password.</i>

USE CASE	
<i>Title:</i>	<i>Organizing the entrance exam.</i>
<i>Actors:</i>	<i>Secretary.</i>
<i>Precondition:</i>	<i>The secretary must have a profile created.</i>
<i>Postcondition:</i>	<i>Successfully organizing the entrance exam.</i>
<i>Description:</i>	<i>The secretary logs on to the system and announces the date time of the place and information on the entrance exam.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Monitoring of sick days.</i>
<i>Actors:</i>	<i>Secretary.</i>
<i>Precondition:</i>	<i>The secretary must be logged on to his profile. The secretary must select a professor from the list of professors.</i>
<i>Postcondition:</i>	<i>Display of leave days.</i>
<i>Description:</i>	<i>After logging into your profile, the secretary can check when the professor has used sick leave or when he has scheduled a next vacation.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE	
<i>Title:</i>	<i>Payment of salaries.</i>
<i>Actors:</i>	<i>Secretary.</i>
<i>Precondition:</i>	<i>The secretary must be logged on to his profile. The secretary must select a professor from the list of professors.</i>
<i>Postcondition:</i>	<i>Professor paid the amount to his current account.</i>
<i>Description:</i>	<i>After logging into your profile, the secretary can pay the salary to the selected professor.</i>
<i>Exceptions:</i>	<i>There is insufficient funds in the school account.</i>

USE CASE	
<i>Title:</i>	<i>Notification of Fees.</i>
<i>Actors:</i>	<i>Secretary.</i>
<i>Precondition:</i>	<i>The secretary must be logged on to his profile. The secretary must select a professor from the list of professors.</i>
<i>Postcondition:</i>	<i>A debit note was sent to the parent.</i>
<i>Description:</i>	<i>After logging into your profile, the secretary can choose a parent to whom he wants to send a message about the incoming monetary obligations, or to remind him of the current debts.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Publication of public posts.</i>
<i>Actors:</i>	<i>Secretary.</i>
<i>Precondition:</i>	<i>The secretary must be logged on to his profile.</i>
<i>Postcondition:</i>	<i>Information published on the faculty website.</i>
<i>Description:</i>	<i>After logging in to your profile, the secretary can publish publicly on the website of the faculty some content or notice.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Enrollment of new students.</i>
<i>Actors:</i>	<i>Secretary.</i>
<i>Precondition:</i>	<i>The secretary must be logged on to his profile.</i>
<i>Postcondition:</i>	<i>The student was enrolled in the school, and the database was updated.</i>
<i>Description:</i>	<i>After logging into your profile, the secretary can write a new student to the database.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Student print.</i>
<i>Actors:</i>	<i>Secretary.</i>
<i>Precondition:</i>	<i>The secretary must be logged on to his profile. The student must exist in the database.</i>
<i>Postcondition:</i>	<i>A student and an updated database.</i>
<i>Description:</i>	<i>After logging into your profile, the secretary can print a particular student if needed.</i>
<i>Exceptions:</i>	<i>None.</i>

2.2.5 Director

USE CASE

<i>Title:</i>	<i>Login.</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>The director must have a profile created.</i>
<i>Postcondition:</i>	<i>Successful login to the system.</i>
<i>Description:</i>	<i>The manager logs on to the system using his username and password.</i>
<i>Exceptions:</i>	<i>Failed logging due to lack of profile. Unsuccessful logging in the middle of a wrong username or password.</i>

USE CASE

<i>Title:</i>	<i>Writing messages.</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>The director must have a profile created.</i>
<i>Postcondition:</i>	<i>Message is sent to the desired user.</i>
<i>Description:</i>	<i>After logging into your profile, the manager can send messages to any user that is logged in the database.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Teacher overview.</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>The director must be logged into his profile.</i>
<i>Postcondition:</i>	<i>List of teachers who teach at school.</i>
<i>Description:</i>	<i>After logging into your profile, the director can view information about all teachers who teach at school.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Student overview.</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>The director must be logged into his profile.</i>
<i>Postcondition:</i>	<i>List of students enrolled in school.</i>
<i>Description:</i>	<i>After logging into your profile, the director can view all students who are enrolled in the school.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Overview of the best students.</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>The director must be logged into his profile.</i>
<i>Postcondition:</i>	<i>List of the best students enrolled in the school.</i>
<i>Description:</i>	<i>After logging in to your profile, the director can view the students who have most emphasized this school year.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Awarding the "Vuk's diploma".</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>The director must be logged into his profile.</i>
<i>Postcondition:</i>	<i>Add diplomas to the best students.</i>
<i>Description:</i>	<i>After logging into your profile, the director can view the students who have most emphasized this school year and give them their diplomas.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Parent's review.</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>The director must be logged into his profile.</i>
<i>Postcondition:</i>	<i>List of parents whose children are members of this school.</i>
<i>Description:</i>	<i>After logging into your profile, the director can view all parents whose children are members of this school.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Financial Insights.</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>The director must be logged into his profile.</i>
<i>Postcondition:</i>	<i>The director receives a list of all finances.</i>
<i>Description:</i>	<i>After logging into your profile, the director can view all finances within the school.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>View information about school.</i>
<i>Actors:</i>	<i>Director.</i>
<i>Precondition:</i>	<i>None.</i>
<i>Postcondition:</i>	<i>The director gets general information about the school.</i>
<i>Description:</i>	<i>The director receives general information about the school on the home page.</i>
<i>Exceptions:</i>	<i>None.</i>

2.2.6 Administrator

USE CASE

<i>Title:</i>	<i>View information about school.</i>
<i>Actors:</i>	<i>Administrator.</i>
<i>Precondition:</i>	<i>None.</i>
<i>Postcondition:</i>	<i>The Administrator gets general information about the school.</i>
<i>Description:</i>	<i>The Administrator receives general information about the school on the home page.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Publishing the timetable.</i>
<i>Actors:</i>	<i>Administrator.</i>
<i>Precondition:</i>	<i>The administrator must be logged in to your profile.</i>
<i>Postcondition:</i>	<i>Published schedule of classes.</i>
<i>Description:</i>	<i>After logging into your profile, the administrator can announce a new timetable that will be available to everyone.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Assignment to the teacher.</i>
<i>Actors:</i>	<i>Administrator.</i>
<i>Precondition:</i>	<i>The administrator must be logged in to your profile. The administrator must select a teacher.</i>
<i>Postcondition:</i>	<i>Teacher is assigned a department.</i>
<i>Description:</i>	<i>After logging into your profile, the administrator can assign classes to teachers when needed.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Awarding seniority to teacher.</i>
<i>Actors:</i>	<i>Administrator.</i>
<i>Precondition:</i>	<i>The administrator must be logged in to your profile. The administrator must select a teacher. The teacher should no longer be an elder.</i>
<i>Postcondition:</i>	<i>Teacher is assigned a department.</i>
<i>Description:</i>	<i>After logging into your profile, the administrator can assign seniority to teachers in case they are not already assigned to a class.</i>
<i>Exceptions:</i>	<i>A teacher is already an elder in a department, and an error is returned.</i>

USE CASE

<i>Title:</i>	<i>Awarding the subject to the teacher.</i>
<i>Actors:</i>	<i>Administrator.</i>
<i>Precondition:</i>	<i>The administrator must be logged in to your profile. The administrator must select a teacher.</i>
<i>Postcondition:</i>	<i>The lecturer is assigned a lecture course.</i>
<i>Description:</i>	<i>After logging into your profile, the administrator can assign the item to the selected teacher.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Disposition of students by class.</i>
<i>Actors:</i>	<i>Administrator.</i>
<i>Precondition:</i>	<i>The administrator must be logged in to your profile. Students must be enrolled.</i>
<i>Postcondition:</i>	<i>Created a schedule for students.</i>
<i>Description:</i>	<i>After logging into your profile, the administrator can determine which student of this school year will be in each department.</i>
<i>Exceptions:</i>	<i>None.</i>

USE CASE

<i>Title:</i>	<i>Create a new account.</i>
<i>Actors:</i>	<i>Administrator.</i>
<i>Precondition:</i>	<i>The administrator must be logged in to your profile. The selected entity (student parent or employee) must be valid persons in the school institution, that is, the student must be enrolled, the parent assigned to the student, and the employed persons registered as valid employees in this institution.</i>
<i>Postcondition:</i>	<i>A new account was created.</i>
<i>Description:</i>	<i>After logging into your profile, the administrator can make a new order for the student, parent to the professor's director or secretary by first checking whether they are valid persons in this school institution.</i>
<i>Exceptions:</i>	<i>The order already exists, please do another. The student does not exist in the database. Parent is not assigned to a student.</i>

USE CASE

<i>Title:</i>	<i>Change existing account.</i>
<i>Actors:</i>	<i>Administrator.</i>
<i>Precondition:</i>	<i>The administrator must be logged in to your profile. The account must already exist.</i>
<i>Postcondition:</i>	<i>The account has been changed</i>
<i>Description:</i>	<i>After logging into your profile, the administrator can make changes to an existing account.</i>
<i>Exceptions:</i>	<i>The account does not exist.</i>

3 Class Diagram

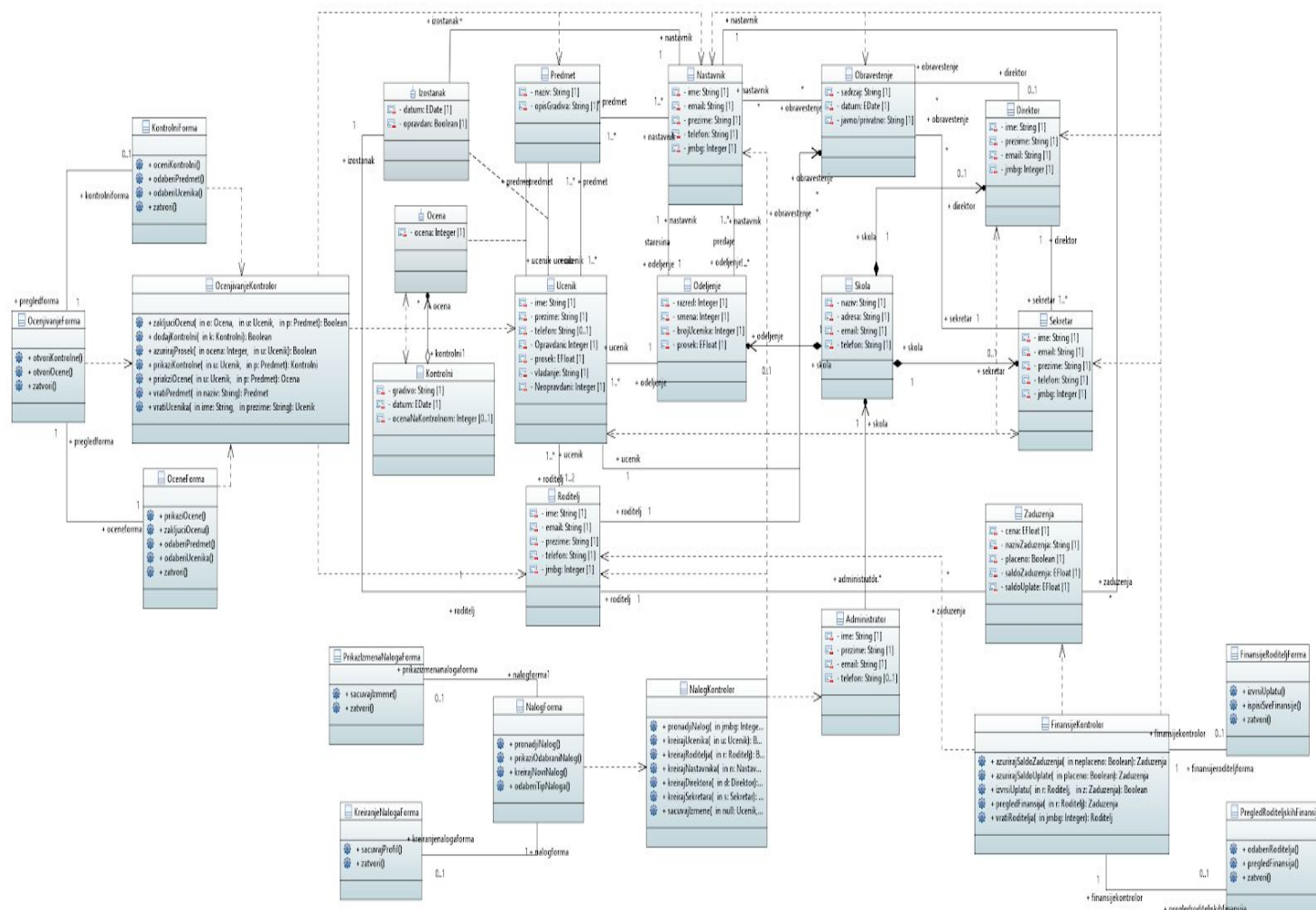


Figure 3.1. School Information System Diagram.

The previous diagram shows the main classes as well as the links between them:

- ☐ School
- ☐ A pupil
- ☐ Parent
- ☐ Teacher
- ☐ Director
- ☐ Secretary
- ☐ Administrator
- ☐ Department
- ☐ Subject
- ☐ Control
- ☐ Marks
- ☐ Absence
- ☐ Notice
- ☐ Borrowings.

In addition, they also show control classes:

- ☐ Order Controller
- ☐ Evaluation Controller
- ☐ Finance Controller

System users are associated with the corresponding control classes, through which they communicate with the system.

4 Dynamic models

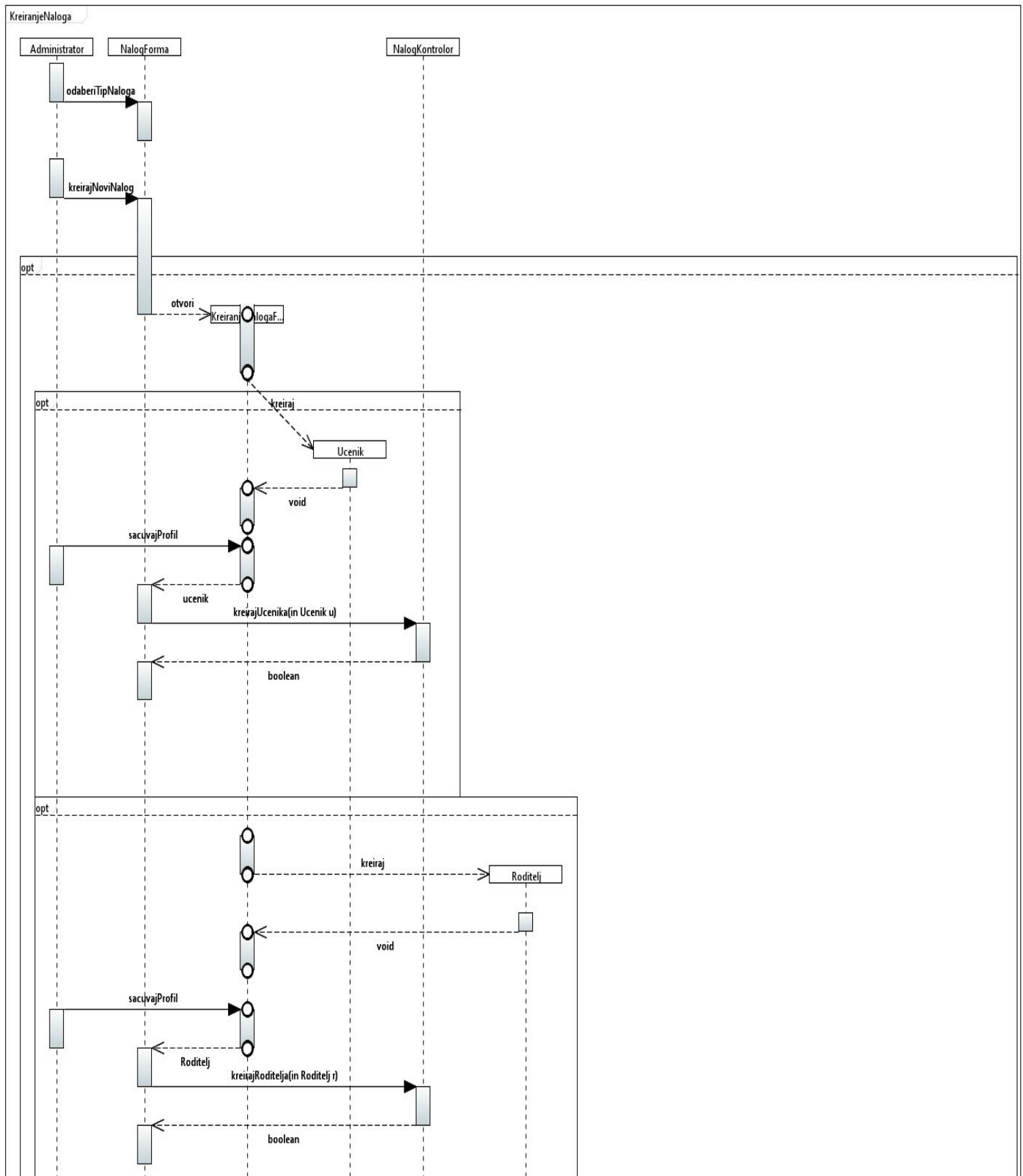


Figure 4.1. Sequence diagram - Creating profiles of the Student and the Parent

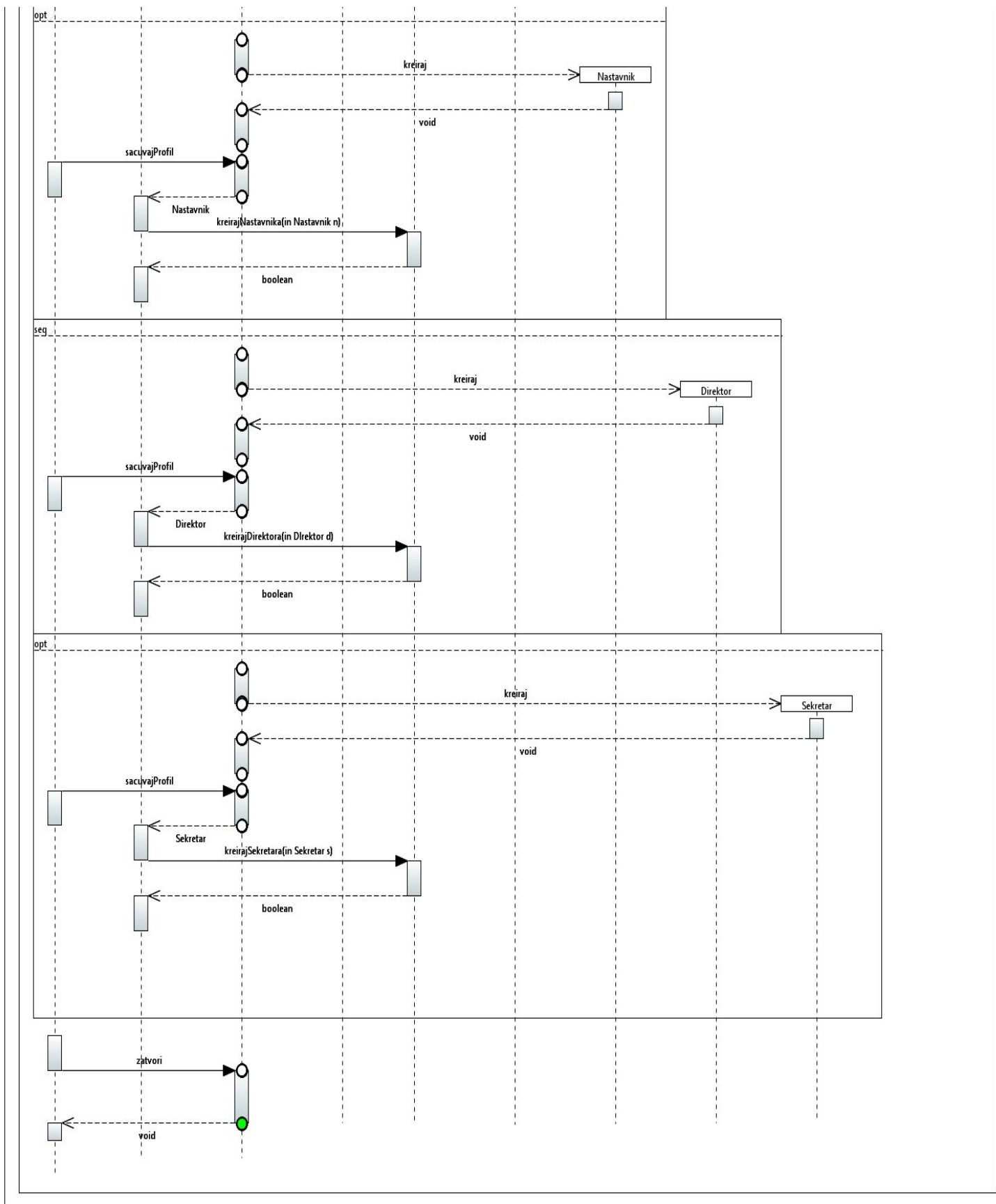


Figure 4.2. Sequence Diagram - Creating the Profile of the Teacher's Director and the Secretary

Figures 4.1 and 4.2 show a sequence diagram showing the flow of data during the creation of the Student and Parent profiles, then the Teacher Director and the Secretary using the appropriate control classes and form.

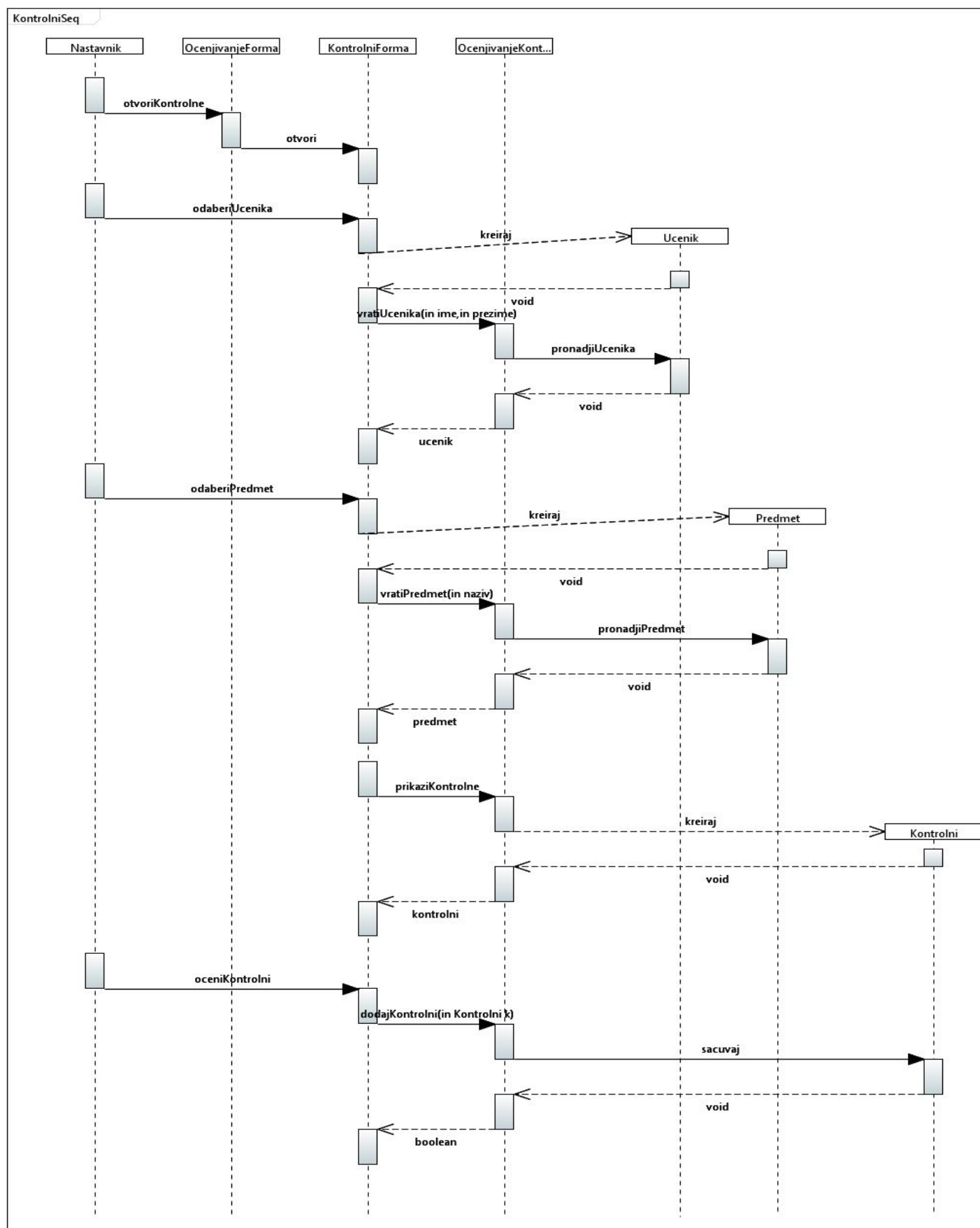


Figure 4.3. Sequence diagram - display of controls and evaluation of a new control task

Figure 4.3 shows a sequence diagram showing the flow of data in case of logging of a Teacher who wants to evaluate a new control task. As soon as the form has been accessed, and after selecting students and objects, it displays the already existing control tasks that the student laid down, where he can then add new control task.

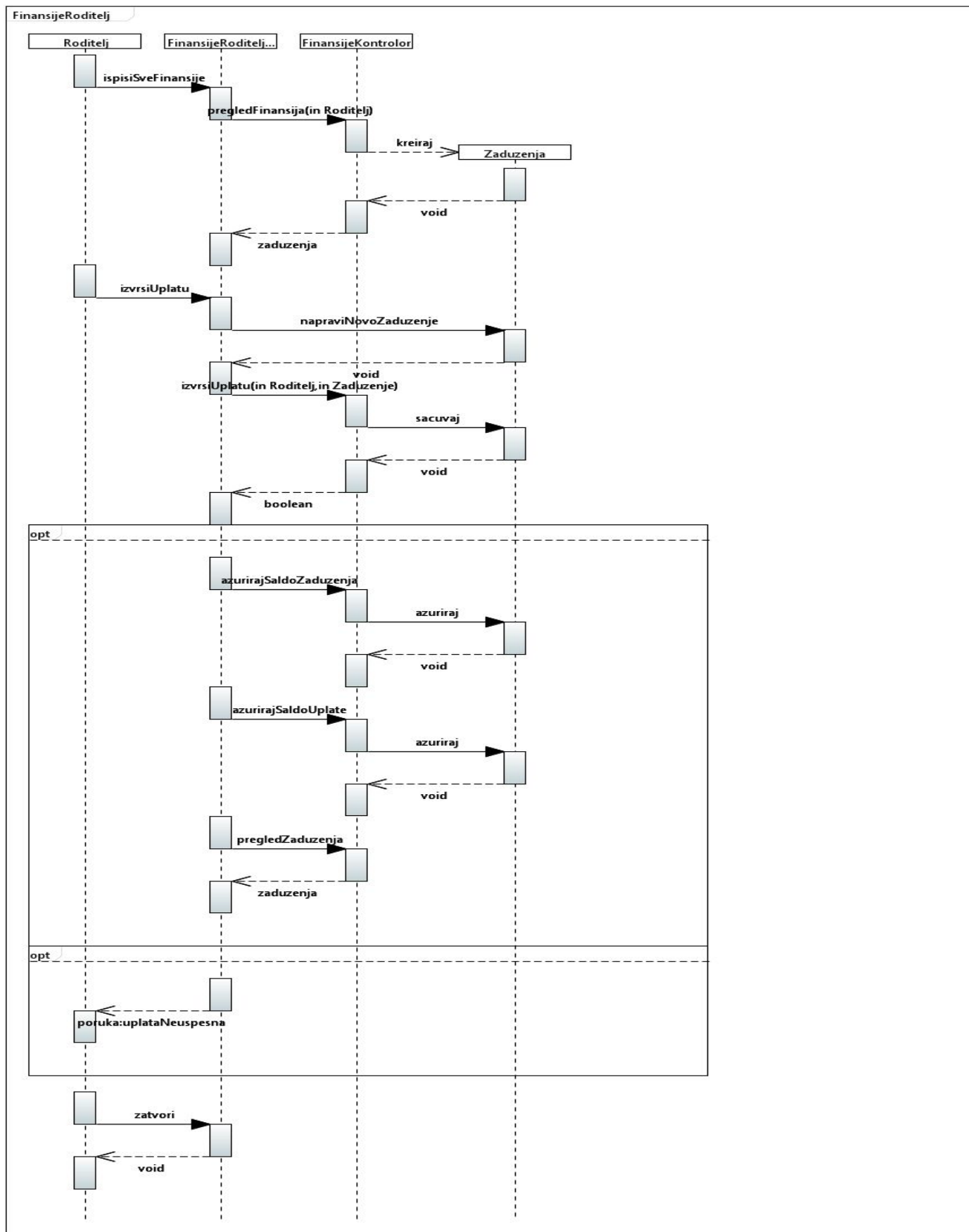


Figure 4.4. Sequence diagram - overview and debt settlement

Figure 4.4 shows a sequence diagram showing the flow of data in the event of a parent being asked to view their finances and possibly make a payment. If the payment is successful, the debts are updated and printed, otherwise, the user receives an error message.

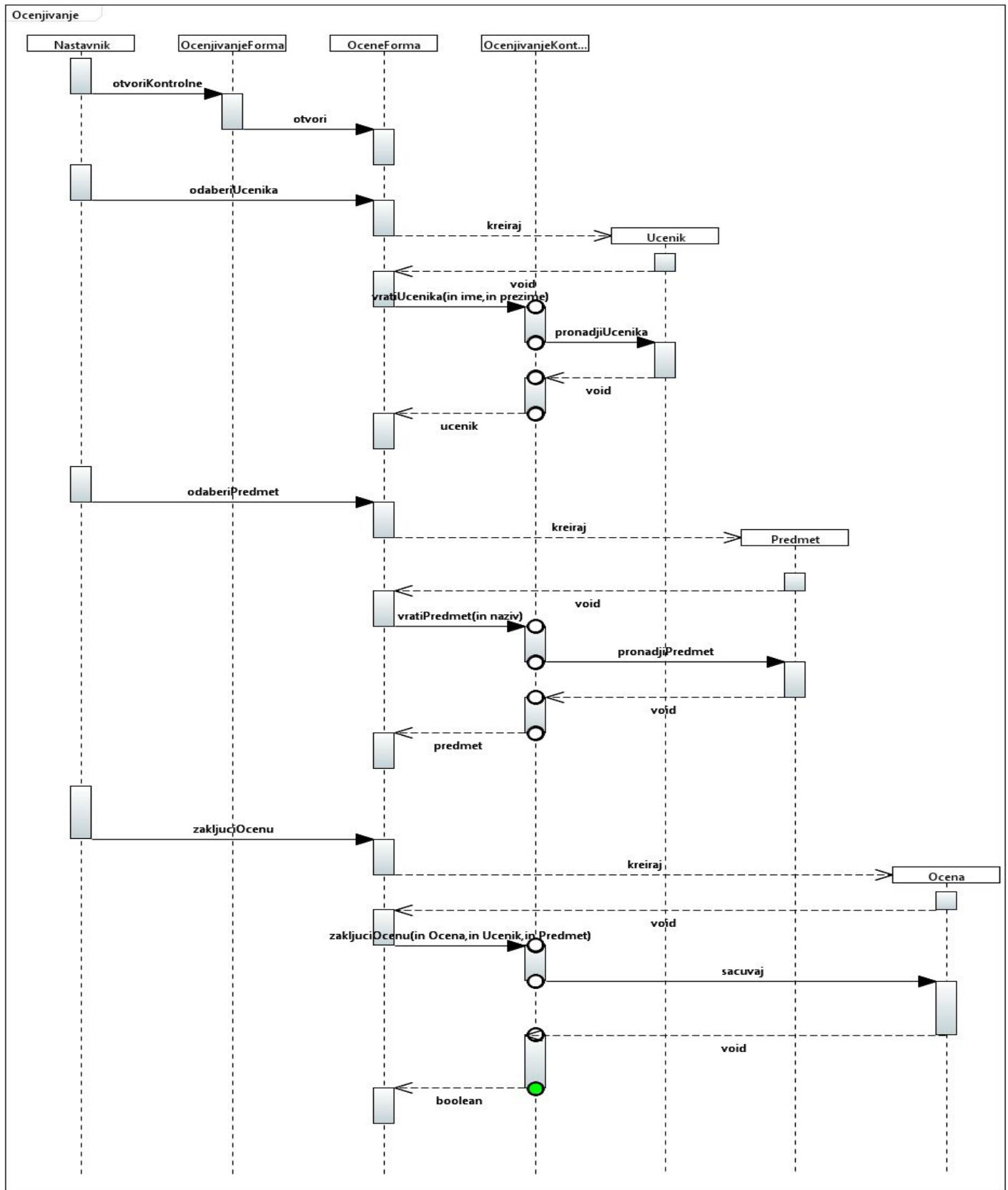


Figure 4.5. A sequence diagram - concludes a grade for a student for an object

Figure 4.4 shows a sequence diagram showing the flow of information in the case of logging a teacher who wants to conclude the student with a grade from an object. In Figure 4.3. , when accessing the form, and after selecting students and objects, it opens an additional form where it can conclude a student's grade.

5 Package Diagram

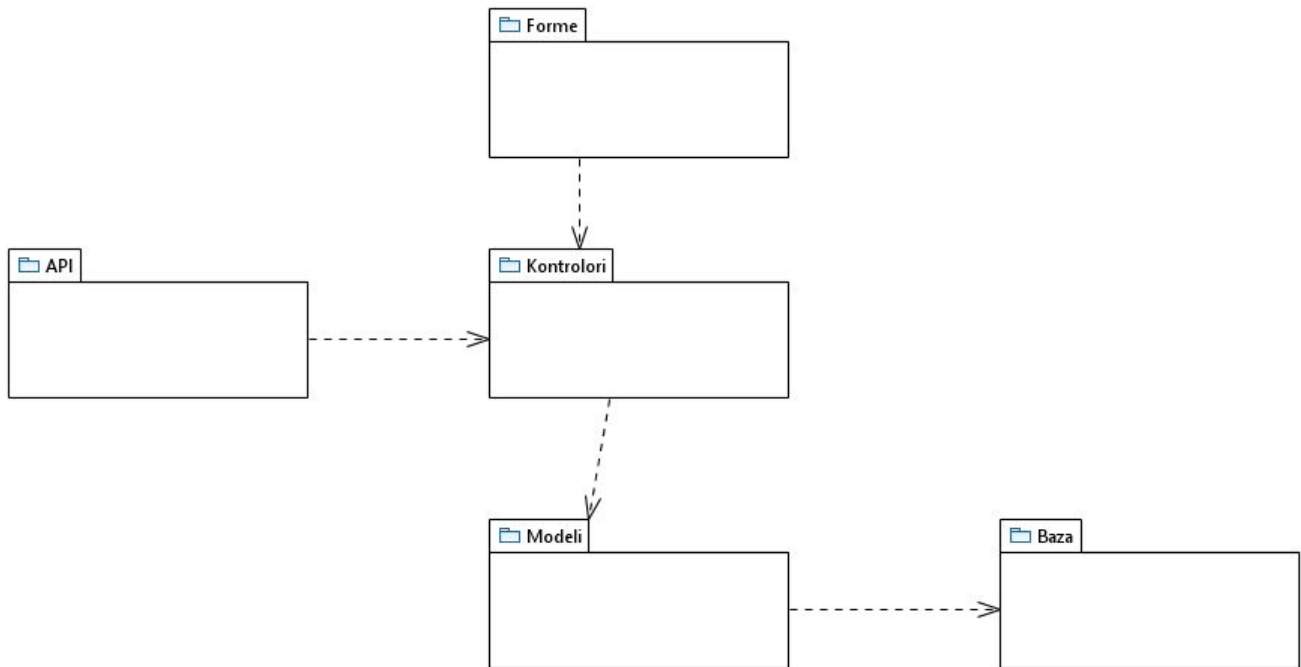


Figure 6.1. Package Diagram

The system package diagram consists of five classes:

1. Foms - class packages that display the graphical interface, which users use to communicate with the program.
2. Controllers - control class packets.
3. Models - basic classes such as Student, Teacher, Parent, Director, Secretary, Administrator ...
4. Base - refers to a packet of classes that communicate with the database and logs in, prints, erases, resets database data.
5. API (Application programming interface) - class packages that communicate with the API.

6 Implementation

In the first iteration of system implementation, the emphasis is on several points:

- Creating a log system - a basic login form that will, depending on the type of account, initiate the launch of the appropriate forms for the user who logs in successfully. (Figure 7.1)
- Creating an administrator profile - this profile was created manually when making the application because its functionality is reflected in working with other profiles (see - creating other profiles ...)
 - Overview of already existing profiles (Figure 7.3)
 - After that, assigns administrator privileges to create desired profiles that users will use with a username / password combination to access their profile. (Figures 7.4 and 7.5)
 - Automatically enter new profiles into the database.
- Allowing the teacher to enter after logging into his profile:
 - Control tasks for all of their students, whose list can be found after selecting the "Rating" option in the menu (Figure 7.8), where it can also select the subject for which the control task is entered, as well as the grade that the student received. Here you can also add a description of the control task to the professor to have information about the controlling task. (Figure 7.9)
 - Final grades (conclusion of grades at the end of the semester) to all students for the chosen subject (Figure 7.10)
- Allowing parents to regulate finances, ie paying expenses at school expense, as well as an overview of paid or matured and unexplained unpaid duties (Figures 7.11 and 7.12).

This first iteration facilitates the work of teachers by introducing functions such as reviewing assignments and control tasks, as well as their entry where everything is far away from you, which are one of the basic functionalities of this system, as well as an important factor of online payment and financial review, which does not require parents to separate time, where they would personally have to be informed and take care of the accounts.

In Figure 7.1. the login screen is displayed through which users log on to the screen - Figure 7.1 shows the functionality of the administrator.

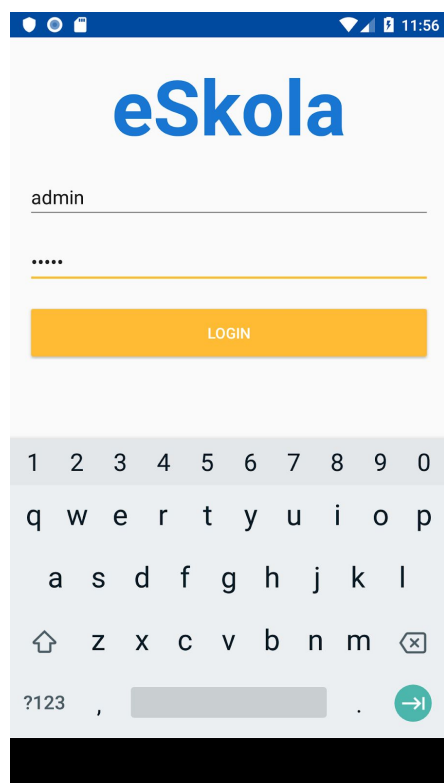


Figure 7.1 Administrator login

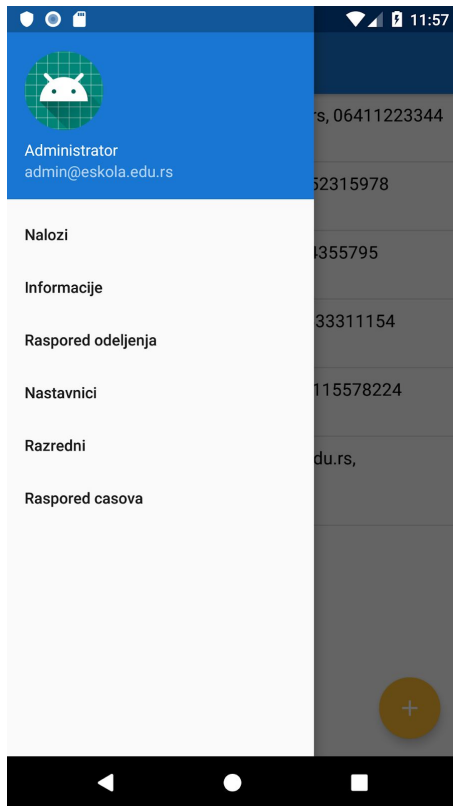


Figure 7.2 Administrator Menu

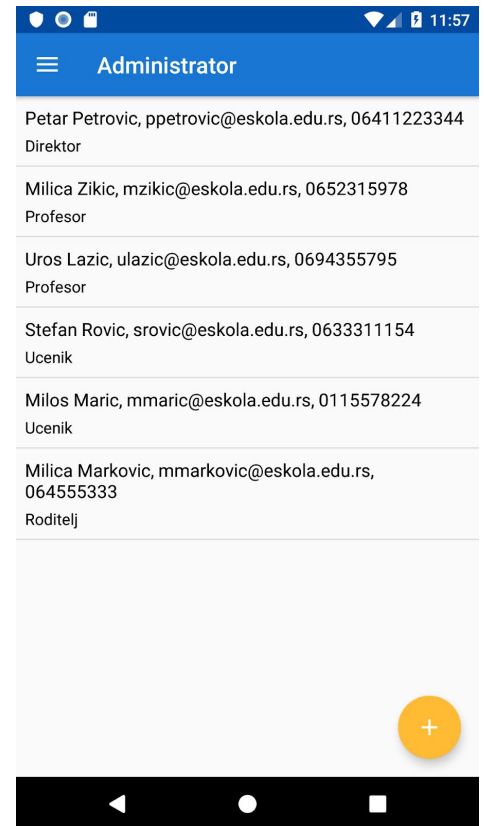


Figure 7.3 Attendance list

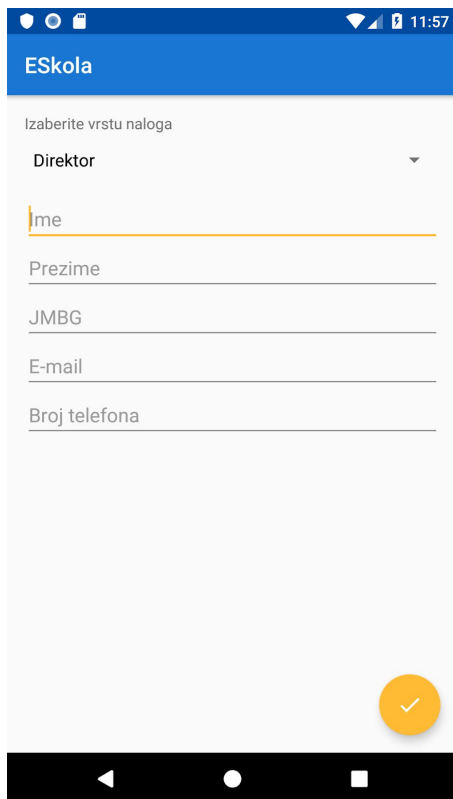
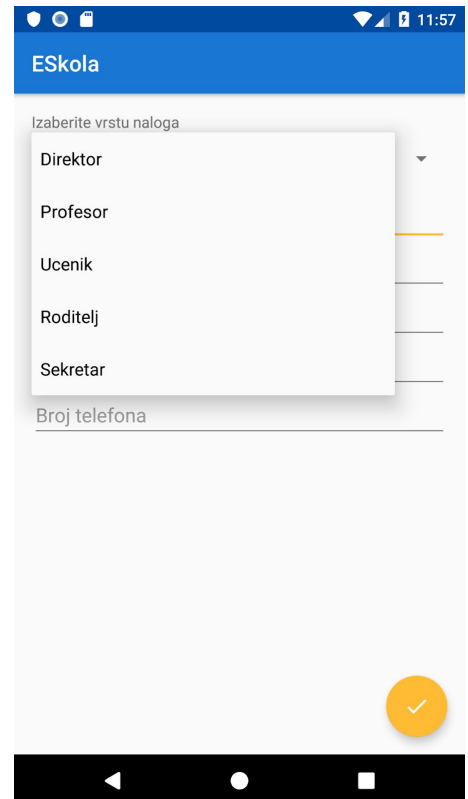


Figure 7.4 Create a new profile profile



7.5 Options when creating a

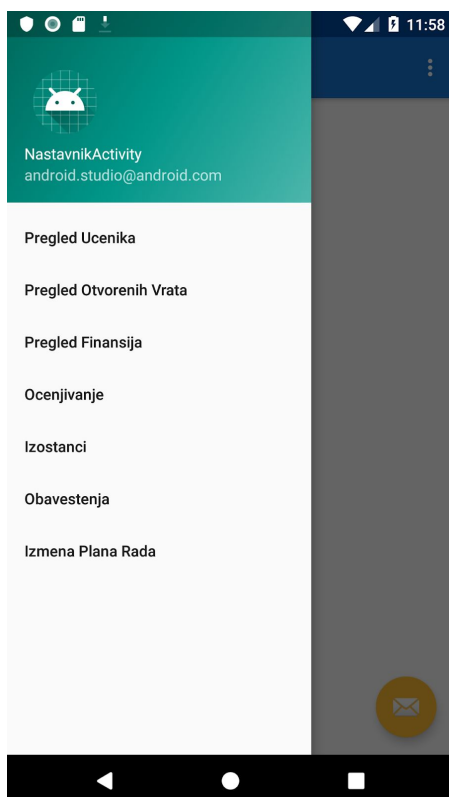


Figure 7.7 Menu menu

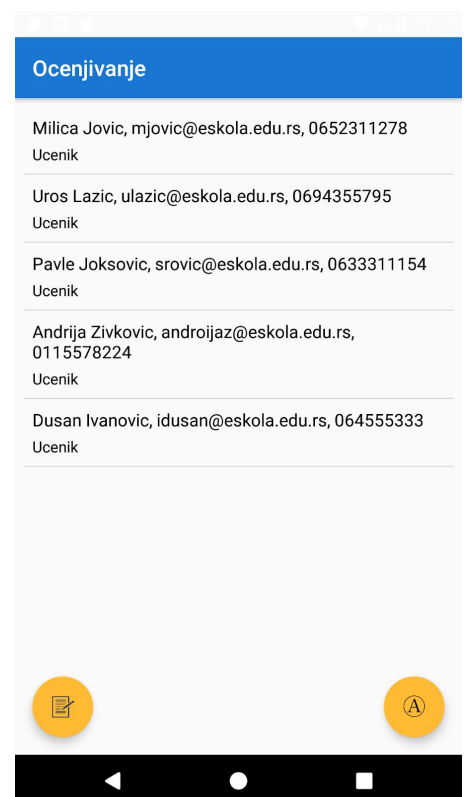


Figure 7.8 Option evaluation and student overview

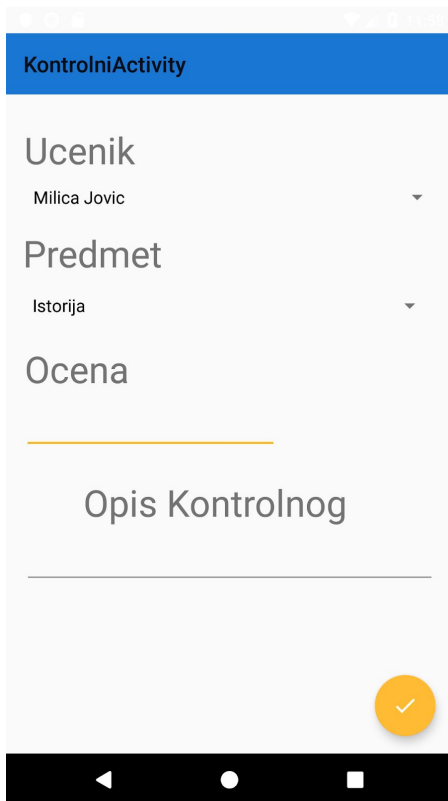


Figure 7.9 Inserting Test

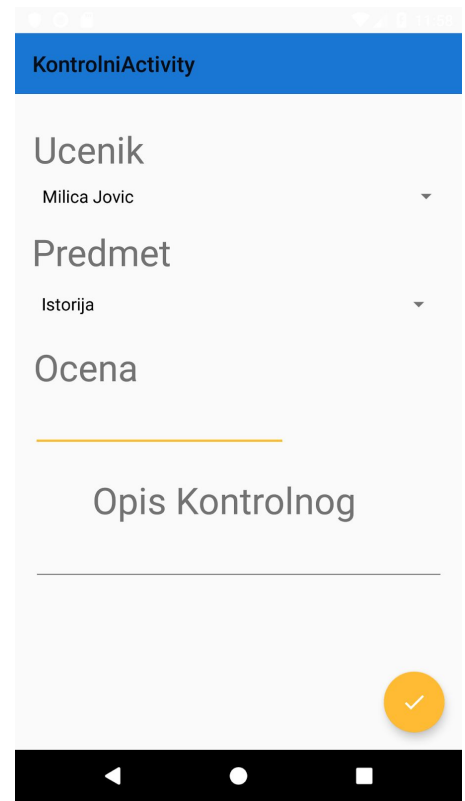


Figure 7.10 Completing the evaluation

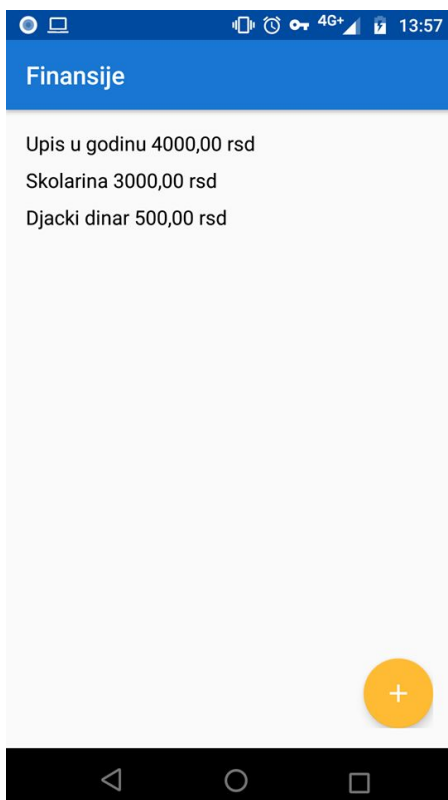


Figure 7.11 Financial Overview

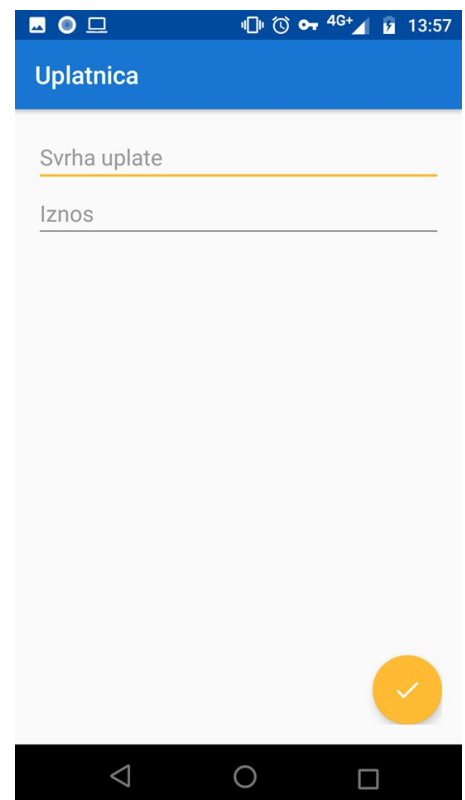


Figure 7.12 New payment

7 End note

In the first iteration of the development of the electronic school registry system, the basic principles under which the application should be further developed are described. The implemented functionality(MVP-minimum viable product in the Android Studio) is a template for the further development of this application, since many future iterations will be reduced to the development of similar forms similar to these already implemented.

In the next iteration it is planned to develop other basic models such as Student, Director, Secretary, as well as their basic functionalities, where they will be able to simultaneously review or send information, and link these models with the model that was created in the first iteration, therefore the system will start to gain a deeper meaning, and a greater function where these classes will interact with each other.

In future iterations, the development will focus on messaging systems and communication between objects, whether direct or indirect, such as sending messages between users,a notification system, scheduling consultations, announcing or changing the timetable ...