

# Re-design of Databases Course Curriculum and Students' Satisfaction

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# About Database course

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- DB course is held at the second year of an undergraduate study of informatics
- DB course continues on an Introduction to databases (IDB) course, which covers:
  - all the fundamental database related topics,
  - early database development,
  - relational theory and relational algebra,



# About Database course

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- normalization,
  - relational database management systems
  - practical work in SQL
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- The course consists of theoretical lectures and practical exercises on the computer



# Database course

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- The main objectives are to:
  - introduce students to various types of databases (multimedia, distributed, NoSQL, cloud, analytical/data warehouses, etc.)
  - introduce students to database security and administration aspects
  - train students to independently build business applications based on relational databases, using rapid application development (RAD) tools



# Lectures (before 2014)

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- Before 2014 lectures were organized:
  - Traditional lectures in classroom for more than half of the semester
  - For the rest time of the semester students worked in pairs or small groups (up to 4 students) on a essay with preferred topic
    - something in the area of multimedia databases, distributed databases, NoSQL databases, cloud databases, analytical databases/data warehouses, etc.

# Lectures (before 2014)

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- Problems:
  - boring lectures,
  - minimum of interaction,
  - no motivation,
  - ‘no good’ energy in the classroom.



# Lectures (after 2014)

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- After 2014 we changed:
  - Theoretical lectures are substituted with 5 team game quizzes (5 team quiz competitions)
  - No face-to-face lectures, except on 5 quiz dates
  - 5 quiz topics:
    - multimedia databases,
    - database security,
    - NoSQL databases,
    - data warehousing,
    - cloud computing





# Lectures (after 2014)

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- The goal was to:
  - make the lectures more interactive, competitive and fun
  - motivate students for studying and achieving better grades
  - force students to become more independent
  - promote teamwork and cooperation
  - better prepare students for future work



# Lectures (after 2014)

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- Teams of 4 students
- For every quiz students have 2-3 weeks to prepare
- On the quiz date we all meet in the classroom
- first we prepared powerpoint presentations with questions
  - two main teams for that quiz answered the questions
  - if they both didn't answer correctly, other teams also had a chance to answer (principle of rising the hand)
- Problems:
  - we often couldn't see who was first, and students were not satisfied
  - students learn only for the topic where they are one of the two main teams

# Lectures (in 2018)

- Quizzes are implemented in the *Kahoot* (<https://kahoot.it/>)
- All questions are multiple choice
- Students join quiz and answer questions with their smartphones – 1 smartphone per team
- For each question 5 seconds for team talk and 10 seconds choosing the answer (15 seconds in total)
- Correct answer = 1 point, Incorrect answer = -1 point, No answer = 0 points
- All teams answer all quiz questions
- At the end of the semester their quiz points are translated into course points – there is a translation scale

# Lectures (in 2018)

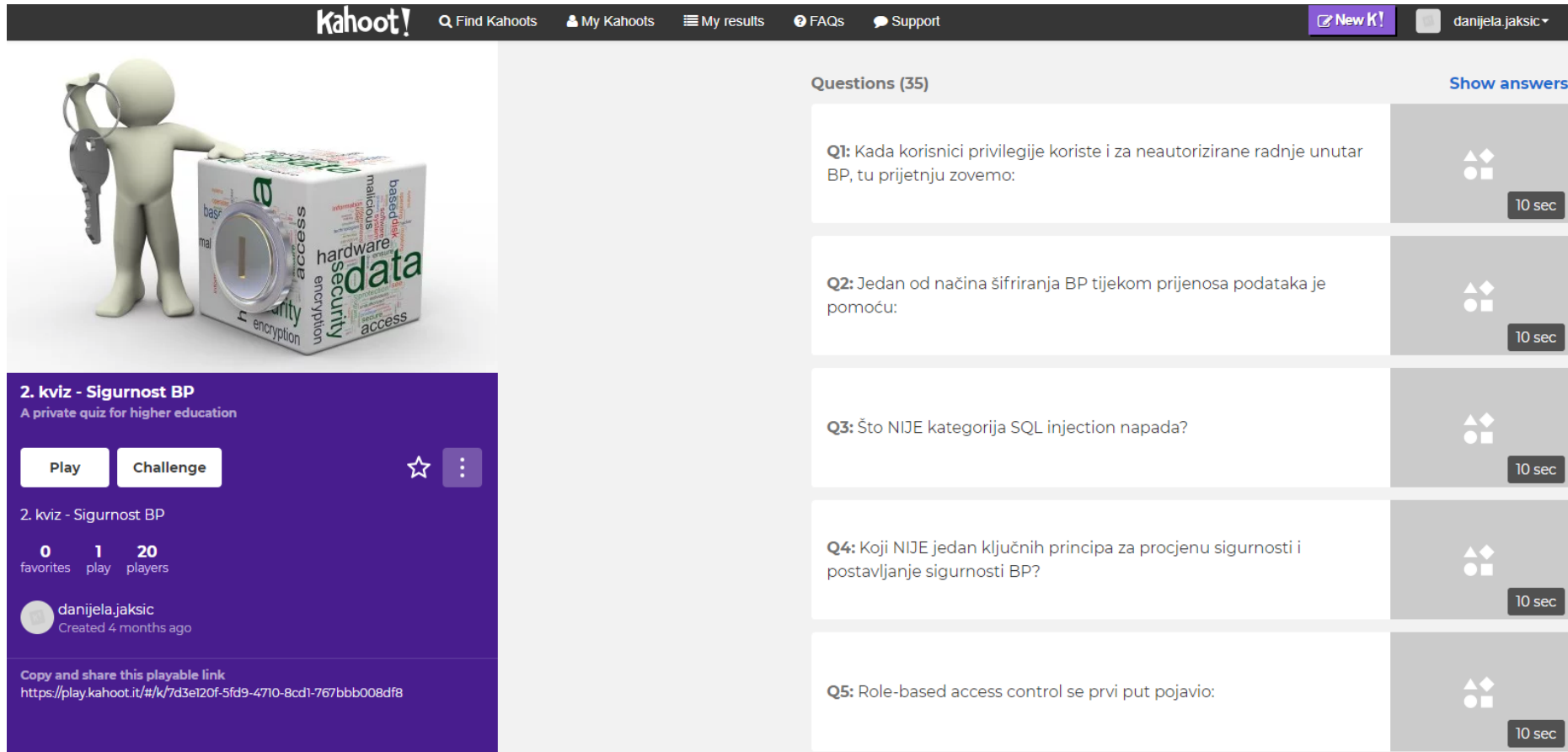
The screenshot displays the Kahoot! desktop admin interface. At the top, there is a navigation bar with the Kahoot! logo, search options for finding Kahoots, My Kahoots, My results, FAQs, and Support, a 'New K!' button, and the user's name 'danijela.jaksic'. Below the navigation bar, there are filters for 'Created by me (5)', 'My Favorites (0)', and 'Shared with me (0)'. A search bar is present with the placeholder text 'Title, subject, tag or username', dropdown menus for 'All audiences' and 'All kahoot types', and a 'Search' button. A 'More actions' dropdown menu is visible. The main content area lists five quizzes, each with a thumbnail, title, author, creation time, question count, privacy status, and action buttons for 'Play', 'Challenge', and 'Share'. The quizzes are:

- 5. kviz - BP u oblaku (by danijela.jaksic, 2 months ago, 30 questions, Private)
- 4. kviz - Skladišta podataka (by danijela.jaksic, 2 months ago, 35 questions, Private)
- 3. Kviz - NoSQL BP (by danijela.jaksic, 3 months ago, 35 questions, Private)
- 2. kviz - Sigurnost BP (by danijela.jaksic, 4 months ago, 35 questions, Private)
- 1. kviz - Multimedijske BP (by danijela.jaksic, 6 months ago, 30 questions, Private)

At the bottom of the list, there is another 'More actions' dropdown menu.

Kahoot desktop admin interface – all quizzes

# Lectures (in 2018)

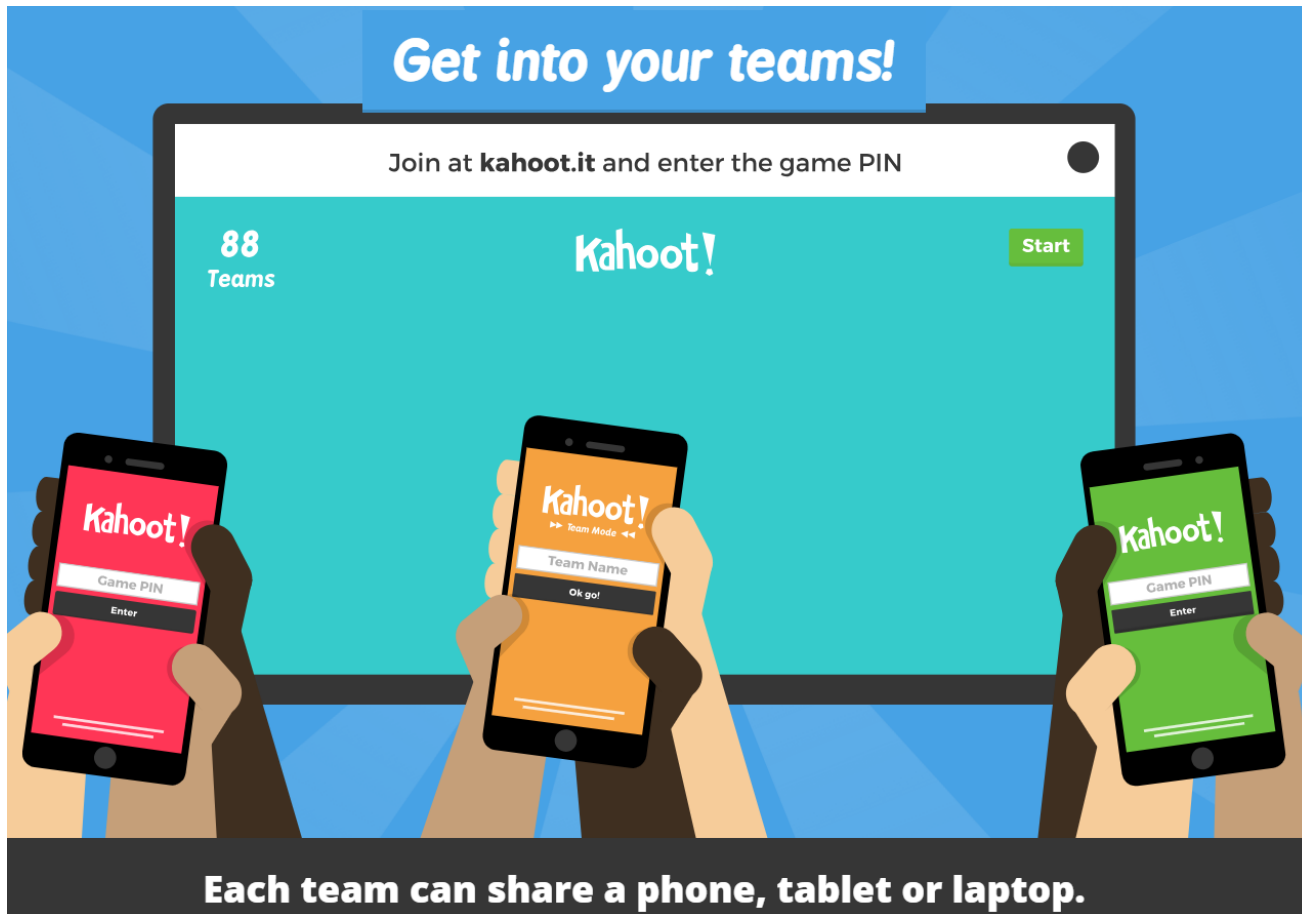


The screenshot displays the Kahoot! desktop admin interface. At the top, the navigation bar includes the Kahoot! logo, search options, and user information for 'danijela.jaksic'. The main content area is divided into two sections:

- Left Panel (Quiz Overview):**
  - 2. kviz - Sigurnost BP**: A private quiz for higher education.
  - Buttons for **Play** and **Challenge**.
  - Statistics: 0 favorites, 1 play, 20 players.
  - User profile: danijela.jaksic, Created 4 months ago.
  - Shareable link: <https://play.kahoot.it/#/k/7d3e120f-5fd9-4710-8cd1-767bbb008df8>
- Right Panel (Questions):**
  - Questions (35)**: A list of five questions with a 'Show answers' button.
  - Q1:** Kada korisnici privilegije koriste i za neautorizirane radnje unutar BP, tu prijetnju zovemo: (10 sec)
  - Q2:** Jedan od načina šifriranja BP tijekom prijenosa podataka je pomoću: (10 sec)
  - Q3:** Što NIJE kategorija SQL injection napada? (10 sec)
  - Q4:** Koji NIJE jedan ključnih principa za procjenu sigurnosti i postavljanje sigurnosti BP? (10 sec)
  - Q5:** Role-based access control se prvi put pojavio: (10 sec)

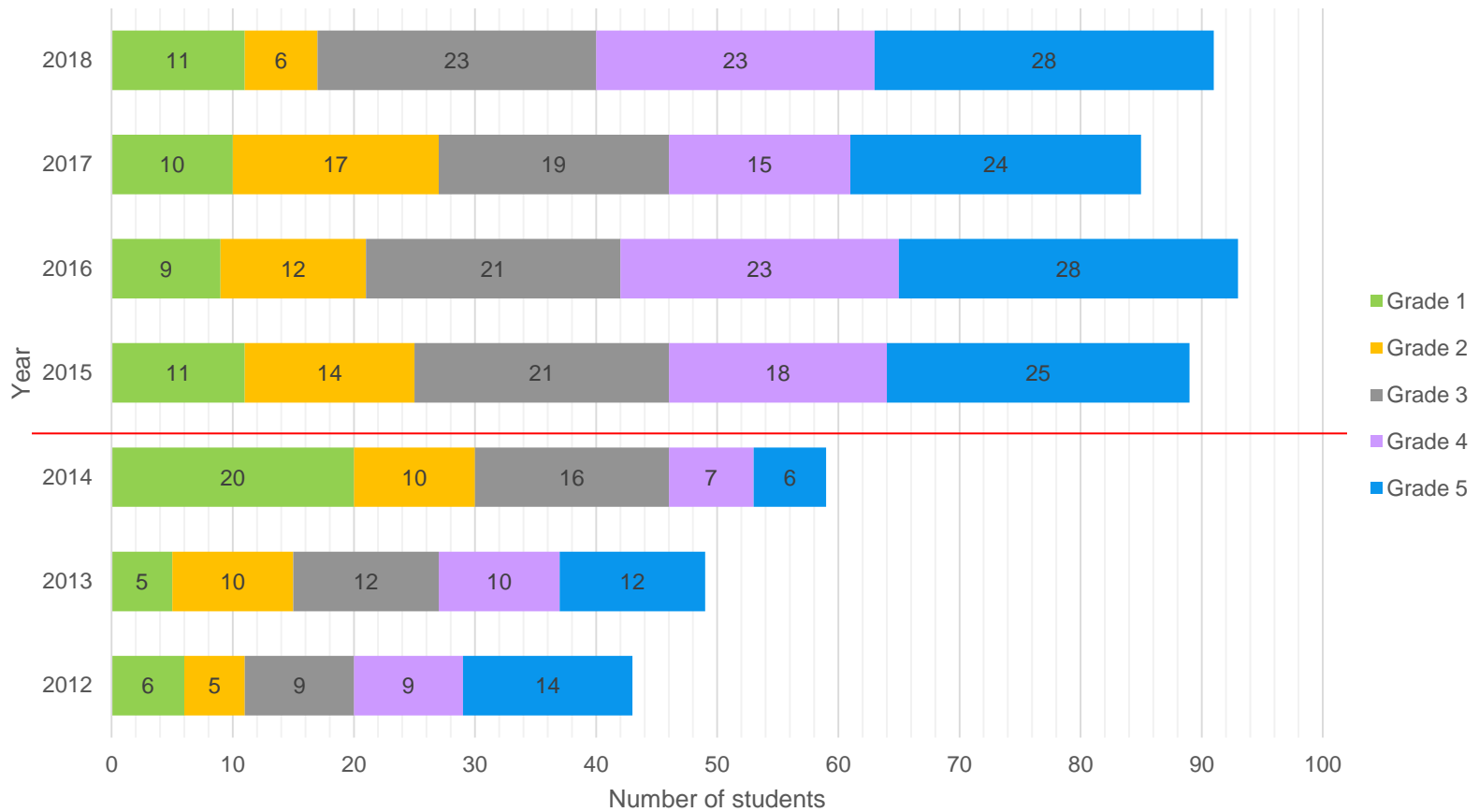
Kahoot desktop admin interface – one of the quizzes

# Lectures (in 2018)

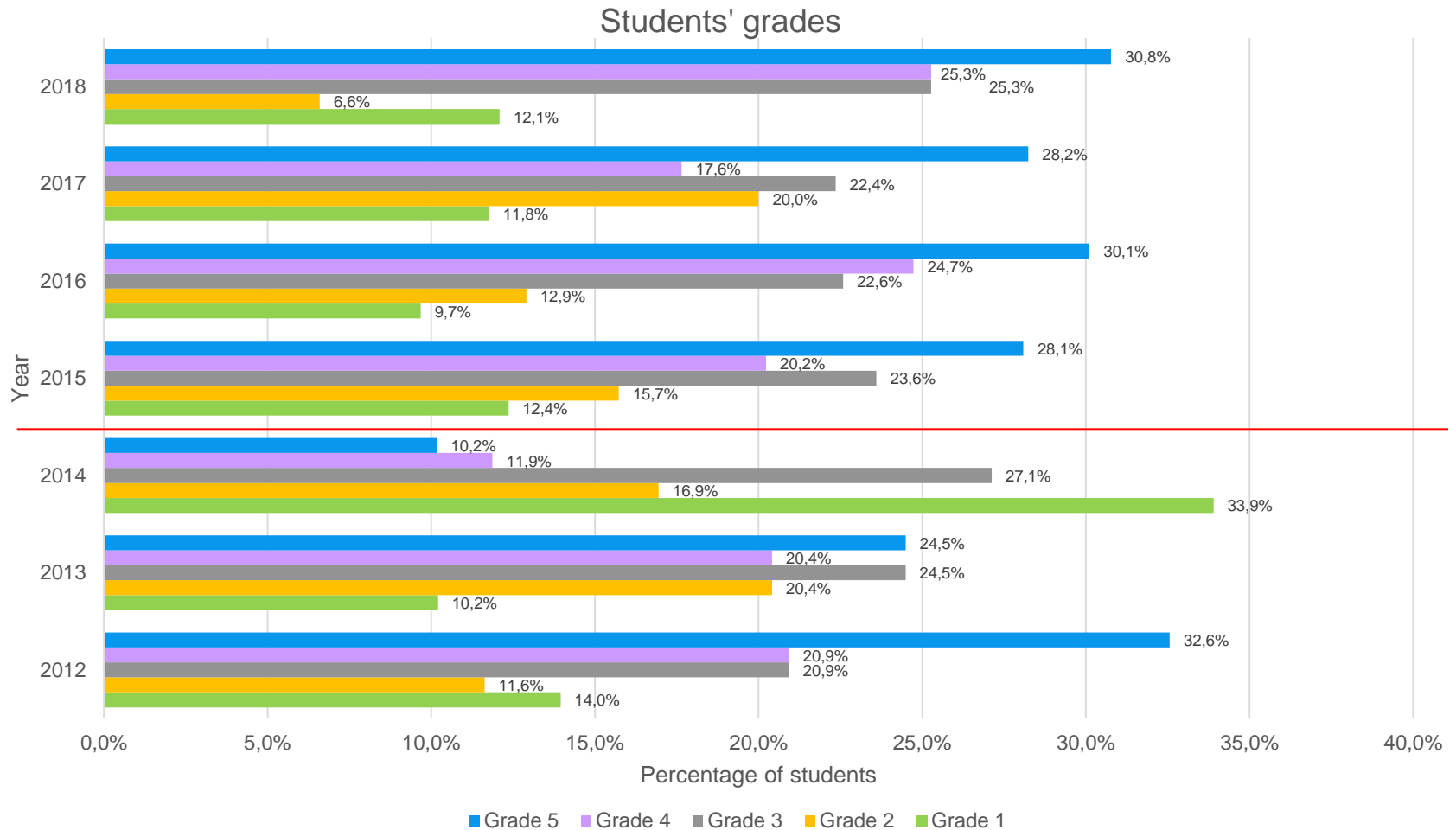


Kahoot - joining the quiz

# Grade results



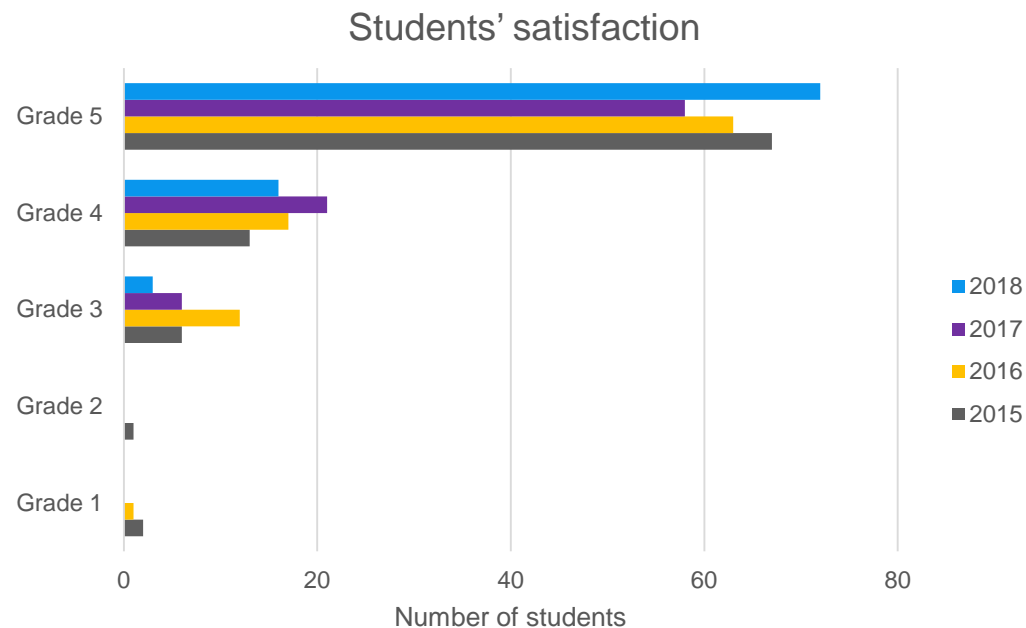
# Grade results (in %)





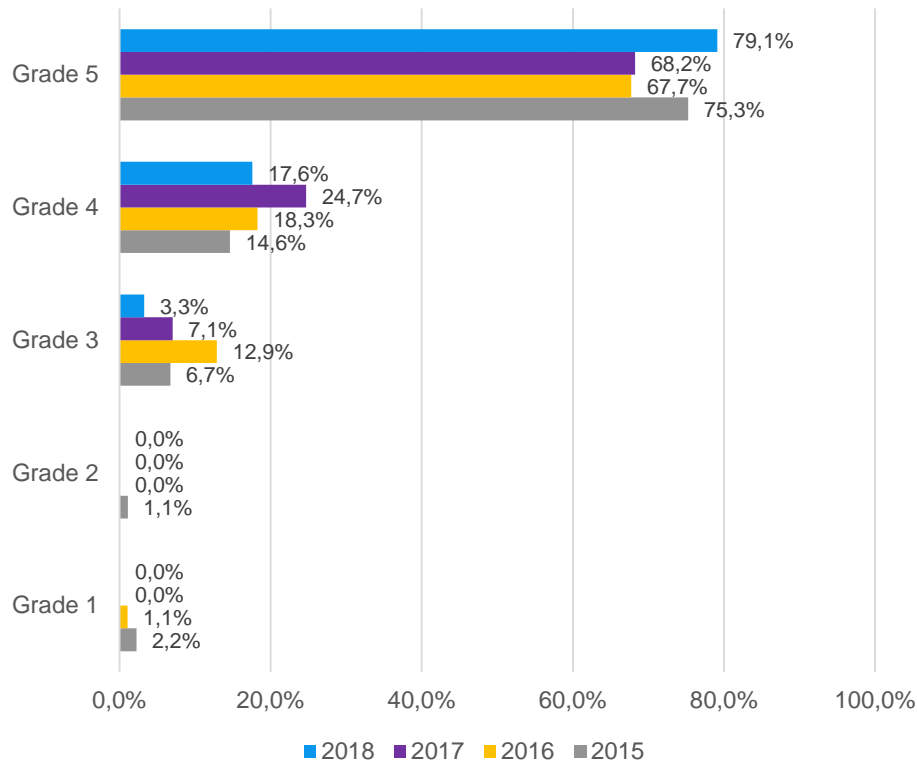
# Satisfaction results

- At the end of semester students filled in a short questionnaire about their satisfaction with the course
- We are satisfied with results 😊

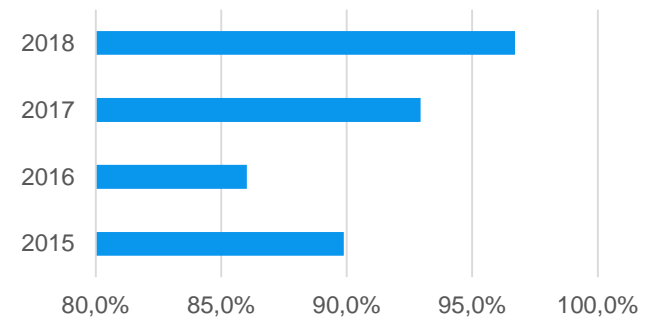


# Satisfaction results (in %)

Students' satisfaction



Grade 4 or 5



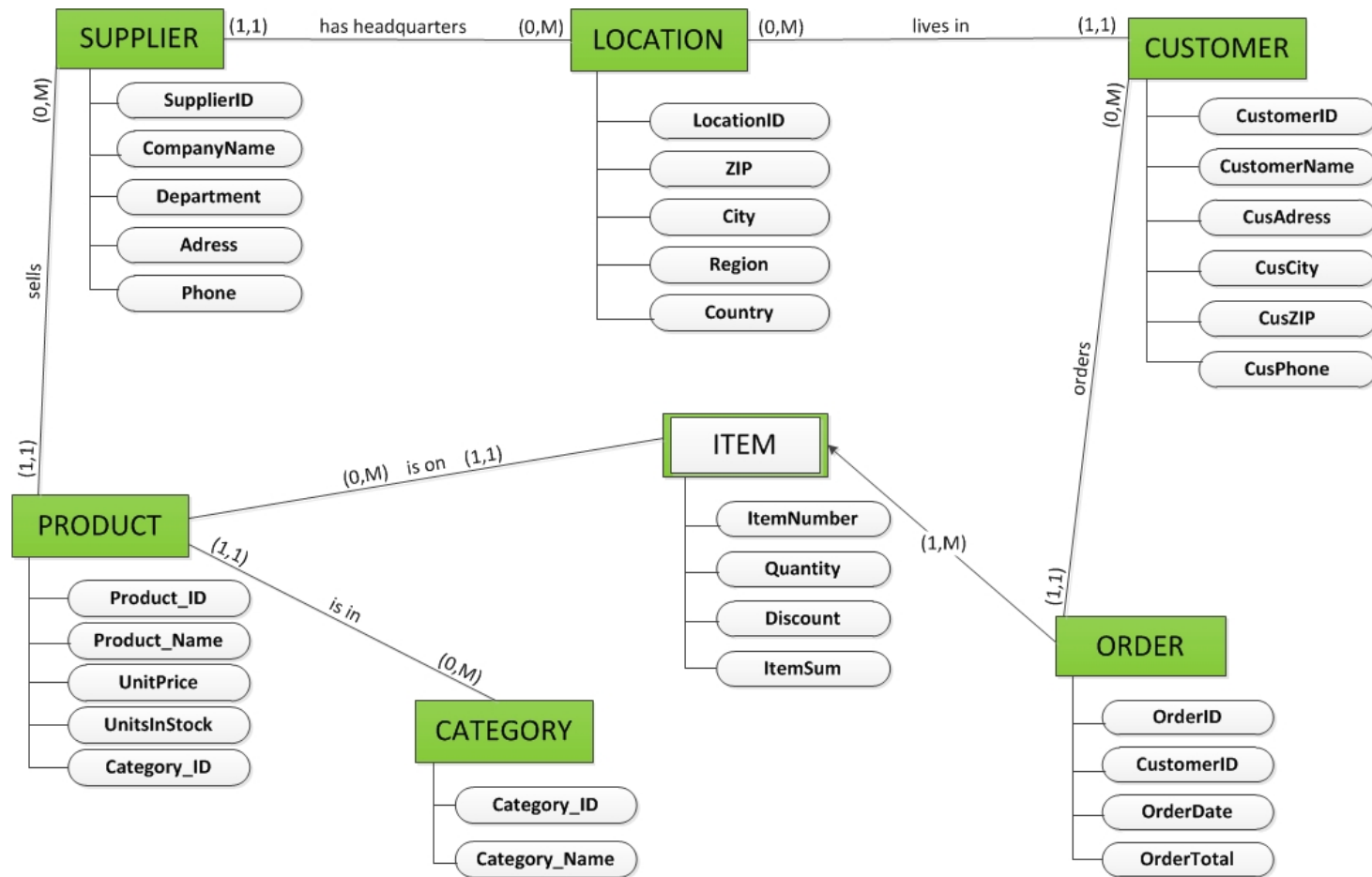
# Exercises

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- In the exercises students can learn:
  - how to build standalone database and business application based on the relational and entity-relationship data model in rapid application development tool
  - at the end of the semester, students are required to develop their own application based on a relational database – final exam



# Exercises



Example of  
entity-  
relationship  
model



# Exercises

Example of business application created during practical exercises

The screenshot displays a business application interface with a menu bar (Datoteka, Pregled, Uredi, Prozor, Pomoć) and a toolbar. The main window, titled "Pregled narudžbi", contains a table with the following data:

Br narudžbe	Datum izdavanja	Br kupca	Ime	Prezime
1	23/03/2010	3345	Petar	Petrić

Below the table are buttons for "Unos", "Izmjena", and "Brisanje". An "Ažuriranje narudžbi..." dialog box is open, showing input fields for "Br narudžbe" (value: 2) and "Datum izdavanja" (value: 0/00/0000), and "Br kupca" (value: 0). It also has a "Napomena:" text area. Below the dialog is a "Stavke:" table:

Br narudžbe	Rbr stavke	Sifra proizvoda	Naziv proizvoda	Kolicina	Iznos sta

At the bottom of the dialog are buttons for "Unos", "Izmjena", and "Brisanje", along with a "UKUPNO:" field showing "0.00". The main application window also has buttons for "Spremi", "Odustani", and "Dodavanje zapisa".

# Conclusion

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- The students' reaction was positive to the changes we introduced in lectures
- Their satisfaction ratings are very high
- They are motivated for coming to lectures
- There are some technical issues to be solved
- We will try to find out some better quiz tool
- We will continue to work on improvement





**Thank You for your attention!**

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