

Requirements specification for Enrolling Children business process

1. General description of the business process

a) A general description of the business process and a description of the performance metrics generated by this process, possible current analytical problems.

To enroll a child into a kindergarten, the parent (or a guardian - person responsible for the child) first acquires information about the desired kindergarten, including contact methods and localization. Then, by an in-person visit, phone call or visiting a website, the interested parent/guardian may be provided with additional information such as enrollment conditions, care types & prices, facilities within the kindergarten or activities done by children. If the decision of enrolling a child is made, the kindergarten hands out an application document, including a questionnaire intended to gather all the necessary data about the child and their family (e.g. child's name, age, any medical or special needs, parent/guardian contact information). After filling the document and its submission, the data is introduced into the system by an employee. The school year begins in September each year, children registered before the beginning of the school year are assigned to the year corresponding to the start date of the service. If a child is registered during the school year, his or her starting year begins in the following September.

MEASURABLE GOALS:

- Increase the number of children enrolled in *ABC Adventure* kindergartens by 15% within 5 years.
- Achieve the annual revenue growth of 3.5%.

b) Typical questions

- How many children have been enrolled in the year 2023?
- Which district saw the highest decrease/increase of enrollments in 2020?
- What percentage of enrolled children is in the 'toddler' age group?
- How many kindergartens in Warsaw are full?
- What care type was the most popular in 2022?
- What are the 10 kindergartens that have the least amount of children enrolled for the year 2022?
- Is the average number of pupils per kindergarten higher in Kraków or in Lublin?
- Is there a kindergarten that does not provide all types of care?
- Which type of care noted the decreasing number of applications for 3 years in a row?
- What was the average price of childcare in 2021?

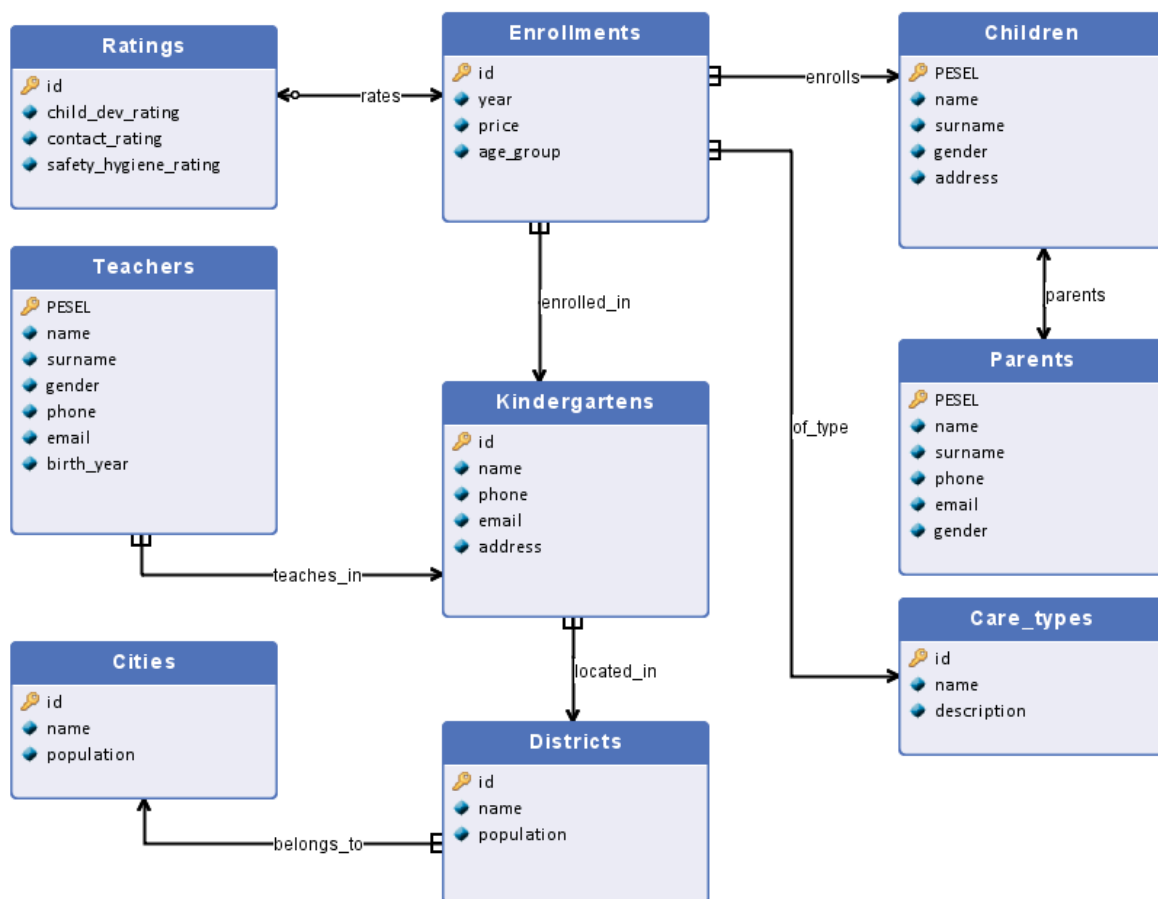
c) Data

At the present time the data of the child and parents/guardians are collected by employees during interviews aimed at enrolling the child in kindergarten. This information is stored in the *ABC Adventure*'s relational database. The same database also stores information about kindergarten facilities, parent ratings and teachers.

2. Data sources structures

2.1 Relational database

ERD:



Entity set descriptions:

Kindergartens
Represents a real-life, physical institution of an <i>ABC Adventure</i> kindergarten.

Attribute name	Type	Description
<u>id</u>	INT	Unique identifier of a kindergarten.
name	STRING	Name of the <i>ABC Adventure</i> kindergarten branch. As a rule, it is a child-friendly name, for example: Colorful Dwarfs. As in the example, the name consists of two parts separated by a space, starting with a capital letter.
address	STRING	Street, building number, apartment number - in that order.
phone	STRING	The 9-digit contact number, does not include area code because each kindergarten is located in Poland.
email	STRING	The contact email address of the facility in the gmail domain, therefore, the format is as follows: abcadventure.opolska@gmail.com

Enrollments		
It represents a record of the recruitment process of one child to <i>ABC Adventure</i> kindergarten on the terms specified in the offer.		
Attribute name	Type	Description
<u>id</u>	INT	Unique identifier of an enrollment.
year	INT	Year of commencement of the service.
age_group	STRING	One of three age groups: toddler (1-3 years), junior (3-4 years), preschooler (5-6 years).
price	INT	Monthly price for the enrollment in polish złoty. Stays constant for the entire school year.

Ratings		
Parent ratings collected through anonymous surveys.		
Attribute name	Type	Description
<u>id</u>	INT	Unique identifier of a rating.
child_dev_rating	INT	Child development rating from 1 (worst) to 10 (best).
contact_rating	INT	Contact with facility rating from 1 (worst) to 10 (best).
safety_hygiene_rating	INT	Safety&Hygiene rating from 1 (worst) to 10 (best).

Care_types		
Stores information about the types of care available on offer of <i>ABC Adventure</i> kindergarten.		
Attribute name	Type	Description
<u>id</u>	INT	Unique identifier of a care type.
name	STRING	Name of the care type. Available care types are: full-day, half-day, extended, drop-in.
description	STRING	Describes what exactly is offered in a given care type.

Districts		
Stores information about branch locations. Only the districts where kindergartens are located, are stored.		
Attribute name	Type	Description
<u>id</u>	INT	Unique identifier of a district.
name	STRING	Name of the district.
population	INT	Information on the number of people

		living in the area.
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Cities		
Stores information about cities in which the facilities are located, including only: Warsaw, Poznań, Gdańsk, Katowice, Wrocław, Kraków, Szczecin, Łódź, Bydgoszcz, Lublin.		
Attribute name	Type	Description
<u>id</u>	INT	Unique identifier of a city.
name	STRING	Name of the city.
population	INT	Information on the number of people living in the city.

Children		
Personal data of children that have been enrolled in the <i>ABC Adventure</i> kindergartens.		
Attribute name	Type	Description
<u>PESEL</u>	STRING	The national identification number used in Poland (unique, 11-digit).
parent_pesel	STRING	Foreign key containing pesel of a parent who enrolled a child to a facility.
name	STRING	First name of the child.
surname	STRING	Surname of the child.
gender	STRING	Gender of the child.
address	STRING	Street, building number, apartment number - in that order.

Parents		
Parents and guardians enrolling children into the <i>ABC Adventure</i>		

kindergartens.		
Attribute name	Type	Description
<u>PESEL</u>	STRING	The national identification number used in Poland (unique, 11-digit).
name	STRING	First name of the legal guardian.
surname	STRING	Surname of the legal guardian.
gender	STRING	Gender of the parent.
phone	STRING	The 9-digit contact number, does not include area code because each kindergarten is located in Poland.
email	STRING	The contact email address of the legal guardian.

Teachers		
Teachers or staff taking care of children, employed by <i>ABC Adventure</i> kindergartens.		
Attribute name	Type	Description
<u>PESEL</u>	STRING	The national identification number used in Poland (unique, 11-digit).
name	STRING	First name of the teacher.
surname	STRING	Surname of the teacher.
gender	STRING	Gender of the teacher.
birth_year	INT	Year of birth of the teacher.
phone	STRING	The 9-digit contact number, does not include area code because each kindergarten is located in Poland.
email	STRING	The contact email address of the teacher.

Relationships descriptions:

rates	
Describes the relationship of assigning a rating to an enrollment of a child.	
Entities	Enrollments - Ratings
Cardinality	one-to-one(optionality)
Cardinality justification	Each enrollment can only be rated once or not rated.

enrolls	
Describes the relationship of a reference of a child in an enrollment.	
Entities	Children - Enrollments
Cardinality	many-to-one
Cardinality justification	Each child can be enrolled multiple times in the system (e.g. in the year 2021 and 2022).

parents	
Describes the relationship of a legal responsibility of a parent/guardian over a child.	
Entities	Parents - Children
Cardinality	one-to-one
Cardinality justification	Each child can be enrolled by one guardian and a guardian can enroll one child at once.

enrolled_in	
Describes the relationship of an enrollment of a child to a specific kindergarten.	
Entities	Enrollments - Kindergartens
Cardinality	many-to-one

Cardinality justification	Multiple children can be enrolled to one kindergarten, but each enrollment is assigned to one kindergarten at a time.
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of_type	
Describes the relationship of enrollments having assigned a specific care type to them.	
Entities	Enrollments - Care_types
Cardinality	many-to-one
Cardinality justification	There's only several care types, and each one of them is assigned to multiple enrollments. However, an enrollment can't have more than 1 care type assigned to it.

teaches_in	
Describes the relationship of a teacher being employed by a kindergarten.	
Entities	Teachers - Kindergartens
Cardinality	many-to-one
Cardinality justification	More than one teacher can be employed by a kindergarten, but each teacher can only be employed by one facility at a time.

located_in	
Describes the relationship of a kindergarten being located in a specific district.	
Entities	Kindergartens - Districts
Cardinality	many-to-one
Cardinality justification	Each kindergarten has one and only one location, each district can have multiple kindergartens located in it.

belongs_to	
Describes the relationship of a district that belongs to one of the cities.	

Entities	Districts - Cities
Cardinality	many-to-one
Cardinality justification	One city can have multiple districts, but the same district is associated only with one city.

Relational database schema:

Ratings(id, enrollment_id REF enrollments, child_dev_rating, contact_rating, safety_hygiene_rating)

Enrollments(id, kindergarten_id REF kindergartens, child_id REF children, care_type_id REF care_types, year, age_group, price)

Children(PESEL, parent_pesel REF parents, name, surname, gender, address, birth_year)

Parents(PESEL, name, surname, phone, email, gender)

Teachers(PESEL, kindergarten_id REF kindergartens, name, surname, birth_year, phone, email, gender)

Kindergartens(id, district_id REF district, name, address, phone, email)

Care_types(id, name, description)

Districts(id, city_id REF cities, name, population)

Cities(id, name, population)

2.2 CEO Excel

Contains data that is easy to modify and determined by the CEO of *ABC Adventure*.

Column A: Kindergarten id (INTEGER).

Column B: Kindergarten name (STRING).

Column C: District of kindergarten (STRING).

Column D: City of kindergarten (STRING).

Column E: Location price (INTEGER).

Column F: Toddler age group price (INTEGER).

Column G: Junior age group price (INTEGER).

Column H: Preschooler age group price (INTEGER).

Column I: Full-day care type price (INTEGER).
Column J: Half-day care type price (INTEGER).
Column K: Extended care type price (INTEGER).
Column L: Drop-in care type price (INTEGER).

3. Scenarios of analytical problems

Analysis of the offer pricing system and its factors

- Which district has the highest average price of the offers?
- Does the contact rating affect the average price of the offers?
- What are the average prices for each care type?
- What are the most popular care types in selected districts?
- Does the average age of the teachers affect the average price of the offer?
- e.) How does the prices compare to other kindergartens (competition) located in the district?

Children enrollment

- How many children are enrolled each year?
- Which age group is least commonly enrolled in kindergartens where contact with employees is below average and what is the average age group price in those facilities?
- How many pupils in 2023 on average do kindergartens with below-average safety & hygiene grades have? How does it compare to institutions with an above-average rating?
- Are there more children enrolled in kindergartens with higher child development ratings each year?
- What is the proportion of children enrolled in each age group and what is the average price of the specific age group?
- Compare the number of enrollments in 2022 of the best 10 and the worst 10 kindergartens, in terms of overall grade.
- f.) How would the enrollment number change compared to the average in years 2020-2023 if online enrolling was introduced?

4. Data needed for analytical problems

Analysis of the offer pricing system and its factors

1. Which district has the highest average price of the offers?
 - **final price of the offer** - Relational Database, table *Enrollments*, column *price*, resulting from:
 - **location price** - CEO Excel, column E
 - **age group price** - CEO Excel, one column from columns F-H
 - **care type price** - CEO Excel, one column from columns I-L

- **name of a district** - Relational Database, table *Districts*, column *name*
 - **district ID** - Relational Database, table *Districts*, column *id*
2. Does the contact rating affect the average price of the offers?
- **contact with employees rating** - Relational Database, table *Ratings*, column *contact_rating*
 - **final price of the offer** - Relational Database, table *Enrollments*, column *price*, resulting from:
 - **location price** - CEO Excel, column E
 - **age group price** - CEO Excel, one column from columns F-H
 - **care type price** - CEO Excel, one column from columns I-L
3. What are the average prices for each care type?
- **Full-day care type price** - CEO Excel, column I
 - **Half-day care type price** - CEO Excel, column J
 - **Extended care type price** - CEO Excel, column K
 - **Drop-in care type price** - CEO Excel, column L
 - **Name of a care type** - CEO Excel, first row of the columns I-L
4. What are the most popular care types in selected districts?
- **name of a district** - Relational Database, table *Districts*, column *name*
 - **district ID** - Relational Database, table *Districts*, column *id*
 - **care type name** - Relational Database, table *Care_types*, column *name*
 - **care type ID** - Relational Database, table *Care_types*, column *id*
 - **highest number of occurrences of specific care type in successful enrollments** - Relational Database, table *Enrollments*, column *care_type_id*
5. Does the average age of the teachers affect the average price of the offer?
- **teachers' age** - Relational Database, table *Teachers*, column *birth_year* (which is later subtracted from current year)
 - **kindergarten ID** - Relational Database, table *Kindergartens*, column *id*
 - **final price of the offer** - Relational Database, table *Enrollments*, column *price*, resulting from:
 - **location price** - CEO Excel, column E
 - **age group price** - CEO Excel, one column from columns F-H
 - **care type price** - CEO Excel, one column from columns I-L
6. How does the prices compare to other kindergartens (competition) located in the district?
- **name of a district** - Relational Database, table *Districts*, column *name*
 - **district ID** - Relational Database, table *Districts*, column *id*
 - **final price of the offer** - Relational Database, table *Enrollments*, column *price*, resulting from:
 - **location price** - CEO Excel, column E
 - **age group price** - CEO Excel, one column from columns F-H
 - **care type price** - CEO Excel, one column from columns I-L
 - **competitor's price** - demands additional data sources, but does not demand changing the business process

Children enrollment

1. How many children are enrolled each year?
 - **child's year of enrollment** - Relational Database, table *Enrollments*, column *year*
2. Which age group is least commonly enrolled in kindergartens where contact with employees is below average and what is the average age group price in those facilities?
 - **number of enrollments** - Relational Database, table *Enrollments*, column *id*
 - **contact with employees rating** - Relational Database, table *Ratings*, column *contact_rating*
 - **Toddler age group price** - CEO Excel, column F
 - **Junior age group price** - CEO Excel, column G
 - **Preschooler age group price** - CEO Excel, column H
 - **name of the age group** - CEO Excel, first row of the columns F-H
3. How many pupils in 2023 on average do kindergartens with below-average safety & hygiene grades have? How does it compare to institutions with an above-average rating?
 - **safety & hygiene ratings** - Relational Database, table *Ratings*, column *safety_hygiene_rating*
 - **kindergarten ID** - Relational Database, table *Enrollment*, column *kindergarten_id*
 - **number of enrollments** - Relational Database, table *Enrollments*, column *id*
 - **2023 year of enrollment** - Relational Database, table *Enrollments*, column *year*
4. Are there more children enrolled in kindergartens with higher child development ratings each year?
 - **child development ratings** - Relational Database, table *Ratings*, column *child_dev_rating*
 - **kindergarten ID** - Relational Database, table *Enrollment*, column *kindergarten_id*
 - **number of enrollments** - Relational Database, table *Enrollments*, column *id*
 - **child's year of enrollment** - Relational Database, table *Enrollments*, column *year*
5. What is the proportion of children enrolled in each age group and what is the average price of the specific age group?
 - **Toddler age group price** - CEO Excel, column F
 - **Junior age group price** - CEO Excel, column G
 - **Preschooler age group price** - CEO Excel, column H
 - **name of the age group** - CEO Excel, first row of the columns F-H

- **number of enrollments of specific type** - Relational Database, table *Enrollment*, column *id*; Relational Database, table *Enrollment* column *age_group*.
6. Compare the number of enrollments in 2022 of the best 10 and the worst 10 kindergartens, in terms of overall grade.
- **overall grade** - overall grade for the enrollment computed as an average of three grades given for each category:
 - **child development rating** - Relational Database, table *Ratings*, column *child_dev_rating*
 - **contact with employees rating** - Relational Database, table *Ratings*, column *contact_rating*
 - **safety & hygiene ratings** - Relational Database, table *Ratings*, column *safety_hygiene_rating*
 - **kindergarten ID** - Relational Database, table *Enrollment*, column *kindergarten_id*
 - **name of the kindergarten** - Relational Database, table *Enrollment*, column *name*
 - **number of enrollments** - Relational Database, table *Enrollments*, column *id*
 - **2022 year of enrollment** - Relational Database, table *Enrollments*, column *year*
7. How would the enrollment number change compared to the average in years 2020-2023 if online enrolling was introduced?
- **years 2020-2023 of enrolling a child** - Relational Database, table *Enrollments*, column *year*
 - **number of enrollments in 2020-2023** - Relational Database, table *Enrollments*, column *id*
 - **number of enrollments in 2024 including online enrollments** - requires changes in the business process