

LW-02. CREATION RELATION DATA MODEL WITH ONLINE CASE TOOLS.

1. LAB TARGET.

Learn how to create data dictionary, logical relational data model and study the relevant Online CASE Tools.

2. LAB ASSIGNMENT.

- 2.0. Select Your Individual Variant of the Assignment.
- 2.1. Register on DbDesigner.net Site.
- 2.2. Training work with DbDesigner.net.
- 2.3. Fill in Initial Data Dictionary. Select name for your DB.
- 2.4. Create Initial RDM Scheme.
- 2.5. Create Share Link to Initial RDM Scheme.
- 2.6. Export Initial RDM Scheme to sql-code(create.sql) and make manually corrections (if need)..

3. LAB REPORT.

The report is provided electronic form with Report Blank Form. The report includes:

- 3.0. Individual variant of the assignment formation from student name.
- 3.1. Filled Initial Data Dictionary Table.
- 3.2. Initial RDM Scheme Image include: DB Name, Author Name, Creation Date and Relationship obligation/cardinality description.
- 3.3. Initial RDM Scheme Share Link.
- 3.4. Code of the "Create.sql".

GRADE.

Grade on 10 points: correctly formed individual task variant and correctly made of all assignments.

4. LAB GUIDELINES

4.0. SELECT YOUR INDIVIDUAL VARIANT NR.

a) Write your LastName in English alphabet. Must be at least 4 letters, if not enough, then add the required number of letters from the FirstName (if not enough, then repeat LastName and FirstName).

For example, for student name Yuriy Li there will be LIYU.

b) Replace the first 4 letters with their ordinal numbers in the alphabet, writing the numbers as two-digit decimal numbers.

For example, 12 09 25 21.

c) Consistently add modulo 10 these 4 numbers and add 1

For example, $(12 + 09 + 25 + 21) \bmod 10 + 1 = 67 \bmod 10 + 1 = 7 + 1 = 8.$

d) The resulting will be your variant Nr.

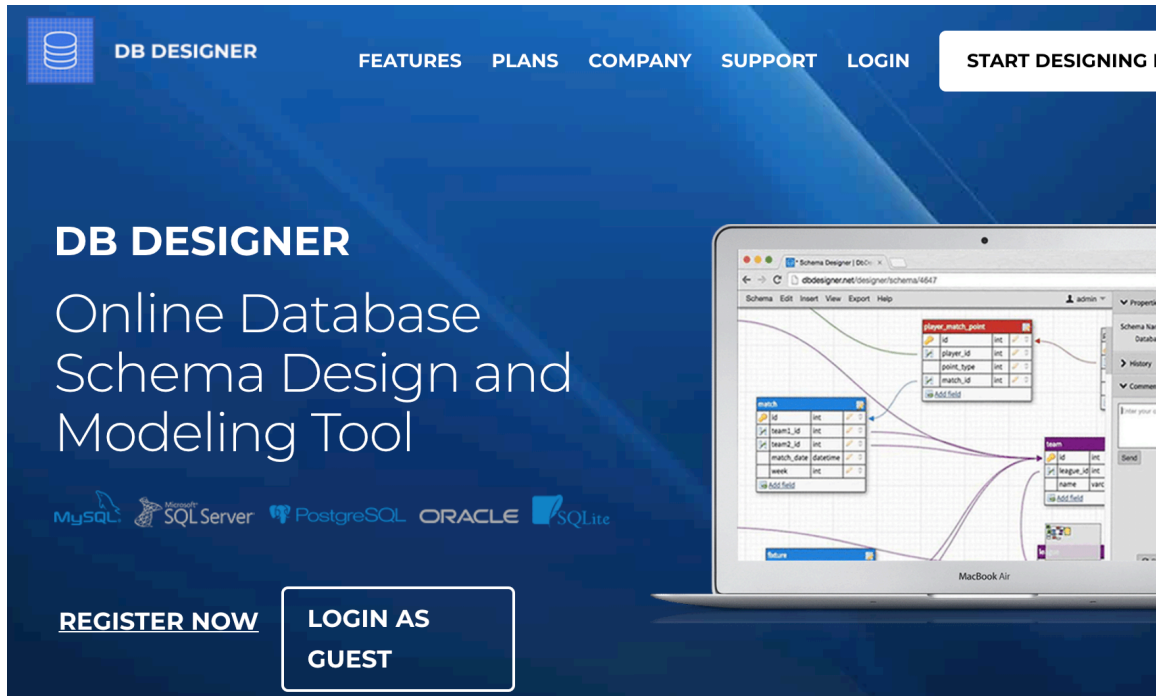
The number 8 in the example has been replaced by 0.

Aa	Bb	Cc	Dd	Ee	Ff	Gg
1	2	3	4	5	6	7
Hh	Ii	Jj	Kk	Ll	Mm	Nn
8	9	10	11	12	13	14
Oo	Pp	Qq	Rr	Ss	Tt	Uu
15	16	17	18	19	20	21
Vv	Ww	Xx	Yy	Zz		
22	23	24	25	26		

See assignment variant bellow in this document.

4.1. REGISTER ON DBDESIGNER.NET SITE

4.1.1. Go to in <https://www.dbdesigner.net/> and select Register Now



DBDESIGNER LIMITATIONS FOR FREE ACCOUNT!

MAX 2 DB WITH 10 TABLE EVERY.

4.1.3. Get Tutorial (Help → Show Tutorial)

4.1.2. Fill in fields: Name, Email, Password.

The image shows the registration form on the DB Designer website. It features the DB Designer logo at the top. The form consists of several input fields: 'Name', 'Email Address', 'Confirm Email Address', 'Password', and 'Confirm Password'. Below these fields is a link that says 'Already have an account? Login'. A prominent blue 'REGISTER' button is located below the form. At the bottom of the page, there are two buttons for social login: 'Вход через аккаунт Google' (Login with Google) and 'Sign In With Github'.

4.2. TRAINING WORK WITH DBDESIGNER.NET.

DbDesigner Interface.

The screenshot displays the DbDesigner.NET application interface. At the top, a dark blue menu bar contains options: FILE, VIEW, IMPORT, EXPORT, SHARE, TWEET, HELP, and a user profile icon (YS). A 'File' dropdown menu is open, showing options: New... (Create a new project), Load... (Open existing project or template), Save (Save your current work), Save As... (Save as another project), History (Check history with timestamps), and Properties... (Change different schema properties).

The main workspace is divided into several panels:

- SQL Code Editor (Left):** Contains SQL definitions for Teachers, Courses, Students, and Groups tables with their respective fields and relationships.
- ER Diagram (Center):** A visual representation of the database schema showing tables (Teachers, Courses, Students, Groups) and their relationships (one-to-many).
- Schema Properties (Right):** Shows 'My_School_1_(mysql)' with database type 'MYSQL' and 5 total tables.
- Schema Explorer (Right):** Lists tables: Contracts, Teachers, and Courses, with a search bar and checkboxes for each.
- Comments (Bottom Right):** A chat window with a user profile (YS) and the text 'Example RDM Scheme' dated '05 Feb 2025 20:26'.

```
9 Teachers {
10   teacher_id tinyint pk increments
11     unique
12   teacher_name varchar(20)
13   teacher_phone int(8) null unique
14   course_id smallint null > * Courses
15   .course_id
16 }
17 Courses {
18   course_id smallint pk increments
19   course_name varchar(50) unique
20   course_duration tinyint null
21   course_cost decimal(6,2) null
22   group_id tinyint null > * Groups
23   .group_id
24 }
25 Students {
26   student_id smallint(5) pk increments
27     unique
28   student_name varchar(20)
29   student_birthday date null
30   student_address varchar(40) null
31   student_phone int null unique
32   student_passport char(15) null unique
33   language enum null def(English)
34   group_id tinyint > * Groups.group_id
35 }
36 Groups {
37   group_id tinyint pk increments unique
38   group_name char(8) unique
39   group_start date null
40   group_finish date null
41 }
42
```

4.2.1. Select File → New Schema → Title → MySQL → Create New Schema

New Schema

Create from scratch

Title: MySchool MySQL

Selecting the "generic" database type will allow you to generate SQL for all the databases; but you will only have access to the generic data types.

CREATE A NEW SCHEMA

Templates

Your Schemas

Schemas shared with you:

Generate with Ai

4.2.2. Select Settings → Set Recommended Settings ... (look on right)

4.2.3.a. Select File → Save As... → Name

4.2.3.b. Select File → Save, if repeat saving

4.2.4. Select Profile → Dashboard → for View/Clone/Delete Project

DB DESIGNER

Dashboard + NEW PROJECT

+ NEW PROJECT

Dashboard

Team

My Exports

Logout

Project Name	DB Type	Last Updated
MySchool	Mysql	11 minutes ago

Showing 1 - 1 of 1

Per page 10

Settings

Dark Mode

Language: English

Enable keyboard shortcuts

Select Markup Theme: Chaos

Allow Table Color Hex Code in DBML Markup

Allow Field Color Hex Code in DBML Markup

Show Minimap

Show Sidebar

Show Markup

Show Grid

Show Feedback FAB

Choose your preferred line type: Bezier, Straight, Flowchart

Line Colors

4.3. FILL IN INITIAL DATA DICTIONARY.

4.3.1. After analyses your Subject Area select **Name** for your RDM

4.3.2. And fill in **yellow** table cells: Attribute Name, PK/FK, Type, Size, Auto Incr., Null, Unique, Default, Range.

4.3.3. If need, then insert **additional** Attributes to your Entitys. For example, “Course Nr” to “Teachers” for relationship creation between Teachers and Courses; or “Course Name” to “Courses” for course name defining.

Add Initial Data Dictionary Table to Report. Only **part of the table** is shown! (see full example in Report Blank Form)

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
0	Teachers	Teacher Nr	teacher_id	PK	tinyint		Yes		Yes		<120	
		Teacher Name Surname	teacher_name		varchar	20						
		Teacher Phone	teacher_phone		int			Yes				8 dig
		Course Nr	course_id	FK	smallint							
	Students	Student Nr	student_id	PK	smallint		Yes			Yes		<10000
		Name Surname	student_name		varchar	20						
		Birthday	student_birthday		date			Yes			Null	
		Address	student_address		varchar	40		Yes			Null	
		Phone	student_phone		int			Yes			Null	8 dig
		Passport	student_passport		char	15		Yes	Yes		Null	
		Language	language		enum						English	Eng,Rus,Lat
		Group Nr	group_id	FK	tinyint							
	Contracts	Contract Id	contract_id	PK	smallint		Yes			Yes		<10000
		Number	contract_number		char	20				Yes		
		Date	contract_date		date							
		Student Nr	student_id	FK	smallint					Yes		
	Courses	Course Nr	course_id	PK	smallint		Yes			Yes		<1000
		Course Name	course_name		varchar	50				Yes		
Duration		course_duration		tinyint								

4.4. CREATE INITIAL RDM SCHEME.

(see example in Report Blank Form).

4.4.1. Build an initial set of **Relations** from database scheme. Example for MySchool: Teachers, Students, Contracts, Courses, Groups tables.

4.4.2. Identify the **Relationship** between the relations and add new fields if need.

4.4.3. Determine the **Obligation** (optional, mandatory) and **Cardinality** (min, max) of the relationship, add Notes to RDM in engineering notation (0,1:1,m).

c) Identify the PK and FK and add missing binding relations, keys attributes and restrictions to Initial Data Dictionary (p.4.3).

4.5. EXPORT/SHARE INITIAL RDM SCHEME.

4.5.1. Export RDM to image.

Copy picture from your browser or Select menu Export → Export Image...

Add RDM Scheme Image to Report. (see example in Report Blank Form)

4.5.2. Share RDM by link.

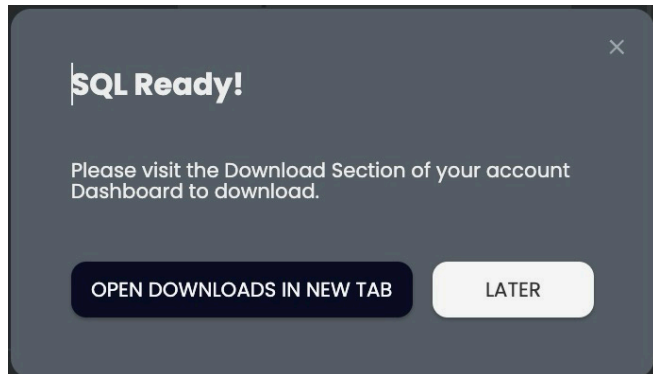
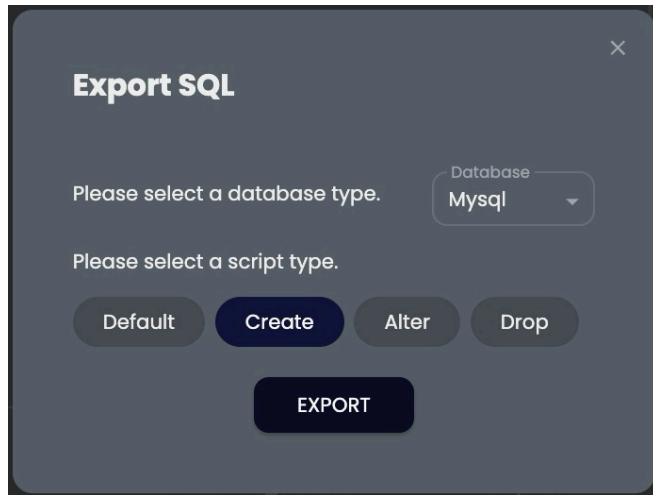
Copy link from your browser header string or Select menu Share → Get Short Link...

Add RDM Scheme Share Link to Report. (see example in Report Blank Form)

4.5.3. Export RDM to sql-file.

Select menu Export → Export SQL... → Create to MySQL → Export → Open Downloads in New Tab.

Add RDM Scheme Create.sql code to Report. (see example in Report Blank Form)



```
My_School_1_(mysql)-1738878627.sql
CREATE TABLE IF NOT EXISTS `Teachers` (
  `teacher_id` tinyint AUTO_INCREMENT NOT NULL UNIQUE,
  `teacher_name` varchar(20) NOT NULL,
  `teacher_phone` int,
  `course_id` smallint NOT NULL,
  PRIMARY KEY (`teacher_id`)
);
CREATE TABLE IF NOT EXISTS `Courses` (
  `course_id` smallint AUTO_INCREMENT NOT NULL,
  `course_name` varchar(50) NOT NULL UNIQUE,
  `course_duration` tinyint NOT NULL,
  `course_cost` decimal(6,2),
  PRIMARY KEY (`course_id`)
);
CREATE TABLE IF NOT EXISTS `Groups` (
  `group_id` tinyint AUTO_INCREMENT NOT NULL UNIQUE,
  `group_name` varchar(8) NOT NULL UNIQUE,
  `group_start` date,
  `group_finish` date,
  `course_id` smallint NOT NULL,
  PRIMARY KEY (`group_id`)
);
CREATE TABLE IF NOT EXISTS `Students` (
  `student_id` smallint AUTO_INCREMENT NOT NULL UNIQUE,
  `student_name` varchar(20) NOT NULL,
  `student_birthday` date,
  `student_address` varchar(40),
  `student_phone` int,
  `student_passport` char(15) UNIQUE,
  `language` enum NOT NULL DEFAULT 'Latvian',
  `group_id` tinyint NOT NULL,
  PRIMARY KEY (`student_id`)
);
CREATE TABLE IF NOT EXISTS `Contracts` (
  `contract_id` smallint AUTO_INCREMENT NOT NULL UNIQUE,
  `contract_number` char(20) NOT NULL UNIQUE,
  `contract_date` date NOT NULL,
  `student_id` smallint NOT NULL UNIQUE,
  PRIMARY KEY (`contract_id`)
);
ALTER TABLE `Teachers` ADD CONSTRAINT `Teachers_fk3` FOREIGN KEY (`course_id`) REFERENCES `Courses` (`course_id`);
ALTER TABLE `Groups` ADD CONSTRAINT `Groups_fk4` FOREIGN KEY (`course_id`) REFERENCES `Courses` (`course_id`);
ALTER TABLE `Students` ADD CONSTRAINT `Students_fk7` FOREIGN KEY (`group_id`) REFERENCES `Groups` (`group_id`);
ALTER TABLE `Contracts` ADD CONSTRAINT `Contracts_fk3` FOREIGN KEY (`student_id`) REFERENCES `Students` (`student_id`);
```


ВАРИАНТЫ ЗАДАНИЙ

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
0	Teachers	Teacher Nr										
		Teacher Name Surname										
		Teacher Phone										
	Students	Student Nr										
		Name Surname										
		Birthday										
		Address										
		Phone										
		Passport										
		Language										
		Group Nr										
	Contracts	Contract Id										
		Number										
		Date										
		Student Nr										
	Courses	Course Nr										
		Duration										
		Cost Sum										
	Groups	Group Nr										
		Start Date										
Finish Date												
Course Nr												

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
1	Teachers	Tabell Number										
		Surname of the teacher										
		Name of teacher										
		Teacher position										
		Work experience (years)										
		Department ID										
	Departments	Department ID										
		Department Name										
		Abbreviation										
		Number of work pozitions										
	Lessons	Day of spending										
		Time spending										
		Type										
		Course Id										
	Auditory	Corpus										
		Floor										
		Room Number										
		Auditory type										
		Capacity										
	Groups	Group number										
		Faculty										
Number of students												
Training Courses	Course Id											
	Course Name											
	Number of hours											

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
2	Faculties	Faculty identifier										
		Full name										
		Dean										
	Groups	Group number										
		Leader ID										
		Number of students										
		Graduating department										
	Students	Student ID Number										
		Surname										
		First name										
		Date of birth										
		Group										
		Gender										
		Region										
		Dormitory accommodation										
	Academic Performances	Course identifier										
		Student ID Number										
		Semester number										
		Date										
		Rating										
	Semesters	Semester number										
		Start										
		Ending										
		Number of weeks										
	Courses	Course ID										
		Course Name										
		Number of hours										

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
3	Competitions	Competition identifier										
		Sport identifier										
		Start date										
		End date										
		Stadium identifier										
	Stadiums	Stadium identifier										
		Title										
		Address										
		Capacity										
	Teams	Team identifier										
		Team name										
		City										
		Number of players										
		Trainer										
	Athletes	Athlete Number										
		Surname										
		Name										
		Middle name										
		Team identifier										
	Results	Athlete Number										
		Date of execution										
		Attempt Number										
		Attempt Result										
Sports	Sport identifier											
	Sport Name											

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
4	Students	Student Identifier Number										
		Surname										
		Name										
		Group Number										
		Date of Birth										
		Gender										
		Address										
	Relative Types	Type of Relative identifier										
		Name of Relative										
	Student Relatives	Relative identifier										
		Type of Relative identifier										
		Surname										
		Name										
		Address										
	Discounts	Student Identifier Number										
		Type of Discount										
		Base (document)										
		Date of Issue										
	Groups	Group Number										
		Faculty Identifier										
		Number of students										
	Faculties	Faculty Identifier										
		Faculty Name										
		Dean										
		Dean Phone										

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
5	Medical Institutions	Medical Institution Number										
		Type of Medical Institution										
		Specialization of a Medical Institution										
		Address										
	Doctors	Doctor's personnel number										
		Medical Institution Number										
		Surname										
		Name										
		Specialty										
	Patients	Insurance Policy Number										
		Surname										
		Name										
		Date of Birth										
		Address										
	Visits	Date of visit										
		Visit time										
		Cabinet number										
		Doctor's personnel number										
		Insurance Policy Number										
		Diagnosis id										
		Procedure Number										
	Procedures	Procedure Number										
		Procedure Name										
Duration												
Price												
Diagnoses	Diagnosis id											
	Diagnosis Description											

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
6	Stores	Store Number										
		Store Name										
		Specialization										
		Address										
		Personnel Number of Director										
	Sectors	Sector Number										
		Sector Name										
		Store Number										
		Personnel Number of Manager										
	Employees	Personnel number of Employee										
		Surname, First Name										
		Address										
		Gender										
		Date of Birth										
	Products	Product ID										
		Sector Number										
		Price										
		Quantity										
		Expiration Date										
		Date of Delivery										
		Supplier Number										
	Contracts	Contract Number										
		Date										
		Supplier Number										
	Suppliers	Supplier Number										
		Supplier Name										
		Supplier Address										

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
7	Libraries	Library Number										
		Library Name										
		Address										
	Depositories	Depository Number										
		Floor										
		Capacity										
	Employees	Personnel number of Employee										
		Surname, First Name										
		Date of Birth										
		Position										
	Books	Book Number										
		Book Code										
		Author										
		Title										
		Publishing House										
		Publishing Year										
		Price										
		Coming Date										
	Subscribers	Depository Number										
		Number of Ticket										
		Surname, First Name										
		Address										
	Issues	Phone										
		Number of Ticket										
		Book Number										
		Issue Date										
			Return Date									

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
8	Factorys	Factory Number										
		Name										
		Address										
		Director Surname Name										
	Divisions	Division Number										
		Factory Number										
		Chief Surname Name										
	Products	Product Code										
		Factory Number										
		Division Number										
		Product Name										
		Product Weight										
		Manufacturing Technology Code										
	Manufacturing Technologys	Manufacturing Technology Code										
		Description										
		Developer										
		Duration										
	Details	Detail Code										
		Detail Name										
		Product Code										
		Weight										
		Dimensions										
		Supplier Code										
	Suppliers	Supplier Code										
		Supplier Name										
		Address										
		Director Surname Name										

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
9	Bus Stations	Bus Station Number										
		City										
		Phone										
	Bus Stops	Bus Stop name										
		Coordinates										
		Trip Number										
		Serial Number										
	Buses	Bus Number										
		Bus Station Number										
		Seats quantity										
		Exploitation Start Date										
	Drivers	Driver Personnel Number										
		Surname, First Name										
		Date of Birth										
		Passport data										
		License										
	Trips	Experience Start Date										
		Trip Number										
		Bus Station Number										
		Destination										
		Departure time										
		Arrival time										
		Driver Personnel Number										
	Bus Number											
	Tickets	Ticket Number										
		Trip Number										
		Date										

Var. Nr	Entity	Attribute Description	Attribute Name	PK, FK	Type	Size	Auto Incr.	Null	Unique	Default	Range	
10	Sellers	Seller Code										
		Seller Name										
		Address										
		Phone										
	Buyers	Buyer Code										
		Buyer Name										
		Address										
		Phone										
	Products	Product Code										
		Product Name										
		Weight										
		Dimensions										
		Warehouse Number										
	Sales	Invoice Number										
		Product Code										
		Seller Code										
		Buyer Code										
		Delivery Code										
		Price										
		Quantity										
		Sale Date										
	Deliveries	Delivery Code										
Delivery Destination												
Delivery Date												
Progress mark												
Warehouses	Warehouse Number											
	Address											