

Lecture 2

Best 2019

Personal Project

Personal application

- Web application to extract data from a (IoT) sensor network
- Use you imagination and knowledge of your field to find a specific application
 - smart house
 - environmental sensor network
 - automated fault detection for electronics
 - etc.

Default database setup

- 2 tables
 - sensor table
 - measurement table

one (sensor) to **many**
(measurement) relationship
between tables



ID_sens	Type	Name	Meas.
1	Temperature	Room 1	C
2	Humidity	Town 1	%
3	Mechanical stress	Eastern Wall 1	N
4	...	...	...

ID_meas	ID_sens	Time	Value
1	1	2019-07-16 ...	4
2	2	2019-07-16 ...	6.1
3	1	2019-07-16 ...	5.2
4	4	2019-07-16 ...	6.3
5	2	2019-07-16 ...	2.4
6	3	2019-07-16 ...	435
...	...	...	...

Difficulty levels

- Different difficulty levels depending on your background in programming and/or web programming
 - beginner
 - intermediate low
 - intermediate high
 - advanced

Beginner Level

- uses the default database setup
- 2 pages (based on previous HTML/CSS project: Save As..)
 - List of sensors (click ->)
 - List of measurements for that particular sensor

Intermediate low Level

- uses the default database setup
- 4 pages (based on previous HTML/CSS project: Save As..)
 - Choose sensor type (click ->)
 - List of sensors of that type (click ->)
 - Choose time interval (click ->)
 - List of measurements for that particular sensor and that time interval

Intermediate high Level

- uses more tables in database setup
 - more parameters for the sensor: location, measurement range (min/max) etc.
 - normalization of the database, type, location, measurement type go to different tables

ID_sens	Type	Name	Location
1	1	Room 1	1
2	1	Town 1	2
3	2	Eastern Wall 1	2
4	...	...	...

ID_type	Meas	Unit
1	Temperature	C
2	Humidity	%
3	Pressure	N/m2
...	...	...

ID_loc	Name
1	Iasi
2	Moscow
3	Athens
4	Istanbul

Intermediate high Level

- 4 pages (based on previous HTML/CSS project: Save As..)
 - Choose sensor type/location/etc. (click ->)
 - List of sensors of that match (click ->)
 - Choose time interval (click ->)
 - List of measurements + basic data processing (min/max/average)

Advanced level

- multiple tables in database setup
- 6 pages (based on previous HTML/CSS project: Save As..)
 - add page to add a sensor in the database
 - add page to generate random measurements in measurement table
 - List of measurements + advanced data processing:
 - min/max/average,
 - comparison with previous time interval (increase/decrease)
 - detection of measurement not in range for that particular sensor
 - etc.

Frameworks

- Absolutely **NO** frameworks allowed!

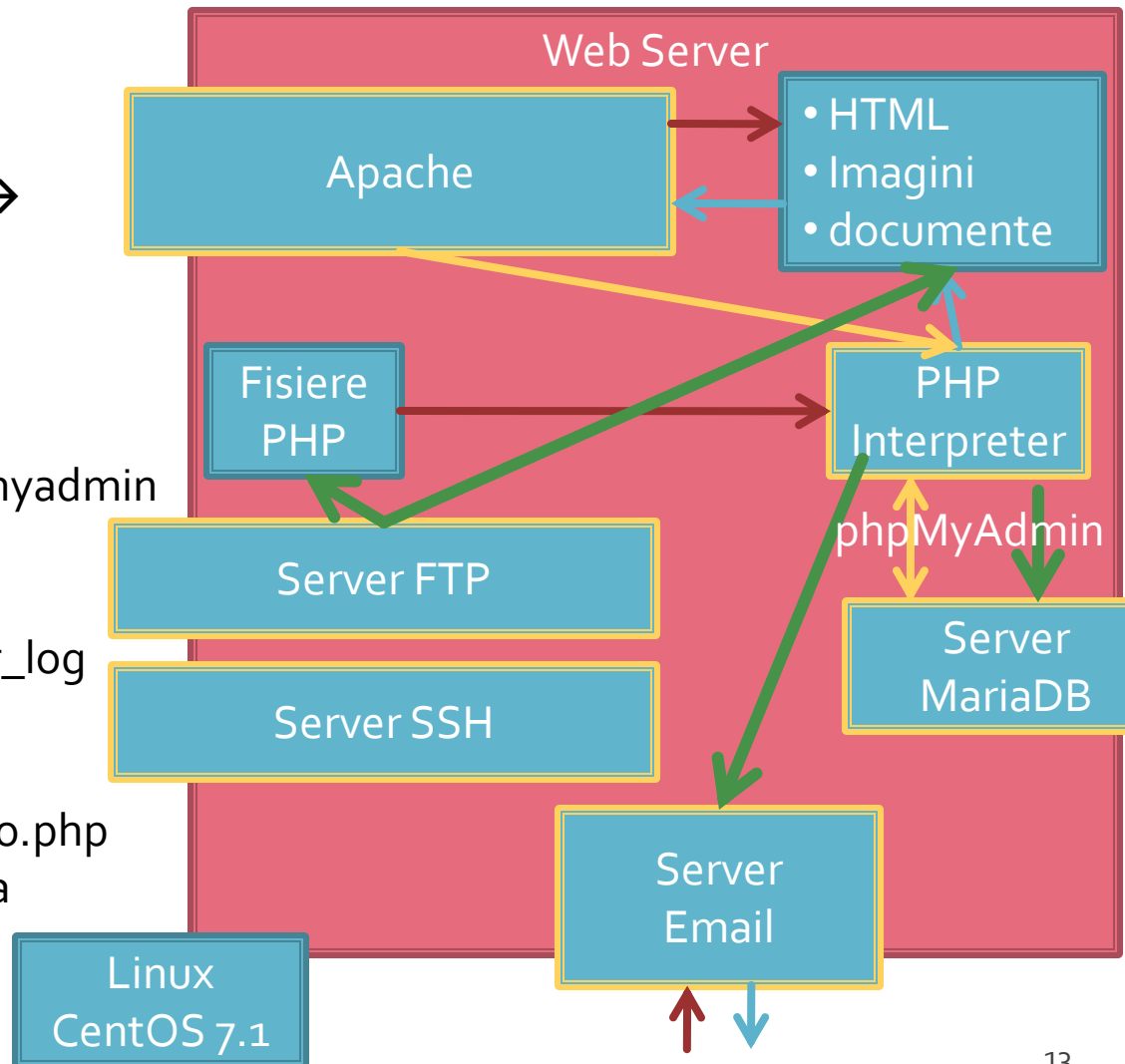
MySQL – Server Centos 7.1

Mini – Indrumar practic

Lucru cu bazele de date

Utilizare LAMP

1. login → root:masterc
2. ifconfig → 192.168.30.5
3. putty.exe → 192.168.30.5 → SSH → root:masterc (remote login)
4. [alte comenzi linux dorite]
5. FTP → Winscp → SFTP → student:masterc@192.168.30.5
6. MySql → http://192.168.30.5/phpmyadmin → root:masterc
7. Apache Error Log →
 - 7a. putty → nano /var/log/httpd/error_log
 - 7b. http://192.168.30.5/logfile.php (nonstandard)
8. PHP info → http://192.168.30.5/info.php
9. daca serviciul DHCP duce la oprirea Apache: service httpd restart



PhpMyAdmin

- <http://192.168.30.5/phpmyadmin>
 - root
 - parola administrator **MySQL/MariaDB** (masterrc)



PhpMyAdmin

The screenshot displays the PhpMyAdmin web interface in a browser window. The address bar shows the URL `http://192.168.0.50/phpmyadmin/#PMAURL-0:index.php` and the page title is `192.168.0.50 / localhost | ph...`. The interface includes a top navigation bar with tabs for **Databases**, **SQL**, **Status**, **Users**, **Export**, **Import**, **Settings**, **Replication**, **Variables**, **Charsets**, and **Engines**. On the left, there is a sidebar with the **phpMyAdmin** logo, **Recent** and **Favorites** buttons, and a tree view showing database schemas: **New**, **information_schema**, **mysql**, **performance_schema**, and **world**. The main content area is divided into several panels. The **General Settings** panel includes a **Change password** link and a **Server connection collation** dropdown set to `utf8mb4_unicode_ci`. The **Appearance Settings** panel shows the **Language** set to `English, the Theme set to pmahomme, and the Font size set to 82%, with a More settings link. The Database server panel lists server details: Server: Localhost via UNIX socket, Server type: MariaDB, Server version: 5.5.44-MariaDB - MariaDB Server, Protocol version: 10, User: root@localhost, and Server charset: UTF-8 Unicode (utf8). The Web server panel lists web server details: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips mod_fcgid/2.3.9 PHP/5.4.16 mod_python/3.5.0- Python/2.7.5, Database client version: libmysql - 5.5.44-MariaDB, PHP extension: mysqli, and PHP version: 5.4.16. The phpMyAdmin panel provides version information and links to Documentation, Wiki, Official Homepage, Contribute, Get support, and List of changes.`

Creare Baza de Date

- Databases → "nume" → Create

The screenshot shows the phpMyAdmin web interface. The 'Databases' tab is selected and circled in red. Below it, the 'Create database' section is visible, with the database name 'tmpaw' entered in the text field, 'utf8_general_ci' selected in the collation dropdown (also circled in red), and the 'Create' button circled in red. A list of existing databases is shown below, including 'information_schema', 'mysql', 'performance_schema', and 'world'. At the bottom, there are checkboxes for 'Check All' and 'Enable Statistics'.

phpMyAdmin

Server: localhost

Databases SQL Status Users Export Import

Databases

Create database

tmpaw utf8_general_ci [v] Create

Note: Enabling the database statistics here might cause heavy traffic between the we

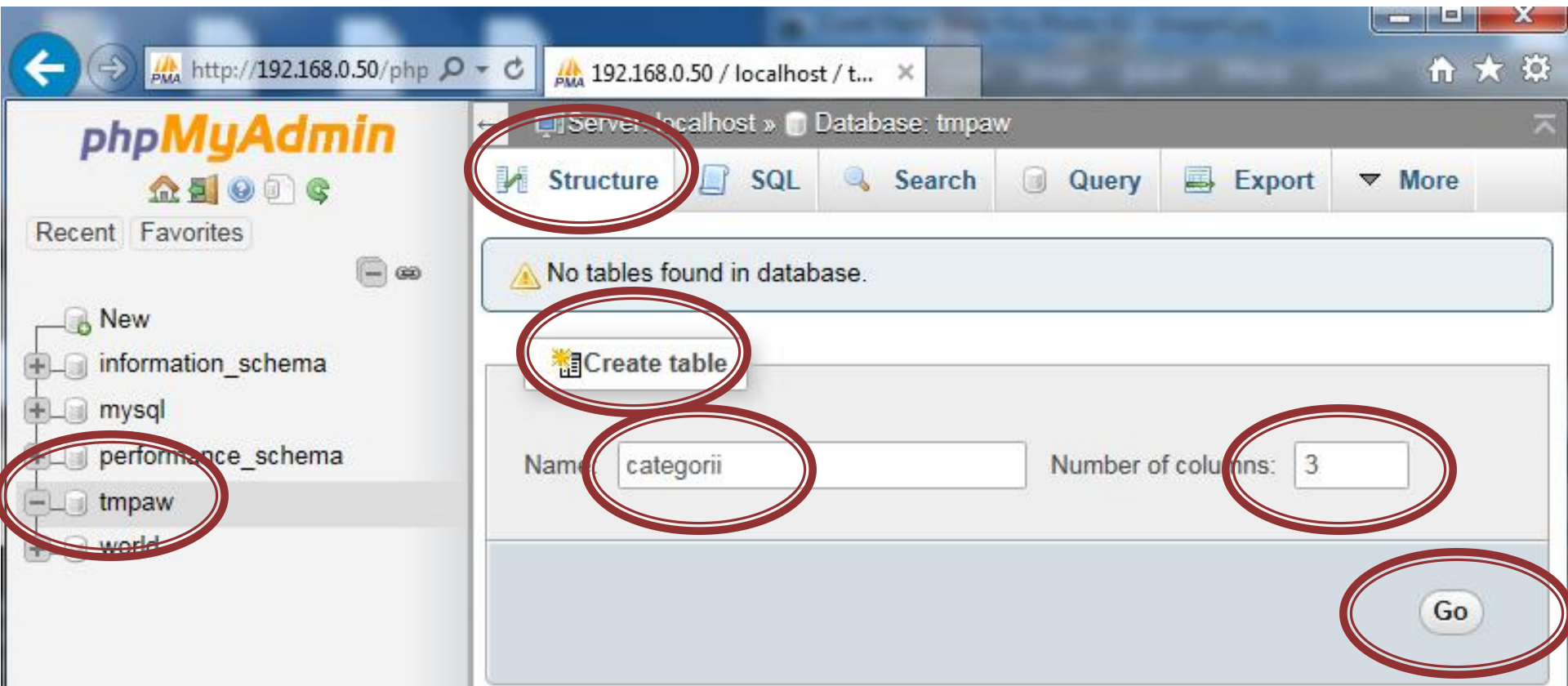
Database	Collation	
☐ information_schema	utf8_general_ci	Check Privileges
☐ mysql	latin1_swedish_ci	Check Privileges
☐ performance_schema	utf8_general_ci	Check Privileges
☐ world	latin1_swedish_ci	Check Privileges
Total: 4	latin1_swedish_ci	

↑ ☐ Check All With selected: [Drop](#)

• Enable Statistics

Creare tabelle in baza de date

- Baza de date (in lista) → Structure → div Create Table → nume/coloane → Go



Introducere coloane, tabel categorii

- (eventual) Adaugare coloane / Stabilire nume
- Name / Type / Length / Default

The screenshot shows the phpMyAdmin interface for a table named 'categorii' in the 'tmpaw' database. The table structure is displayed with the following columns:

Name	Type	Length/Values	Default	Collation
id_categ	INT		None	
nume	VARCHAR	45	None	
detalii	VARCHAR	150	None	

The interface also includes a 'Table comments:' field and a 'Collation:' dropdown menu. The 'Storage Engine' is set to 'InnoDB'.

Introducere coloane

- (eventual) NOT NULL / Index / Auto Increment
 - in functie de “necesitatile” coloanei respective

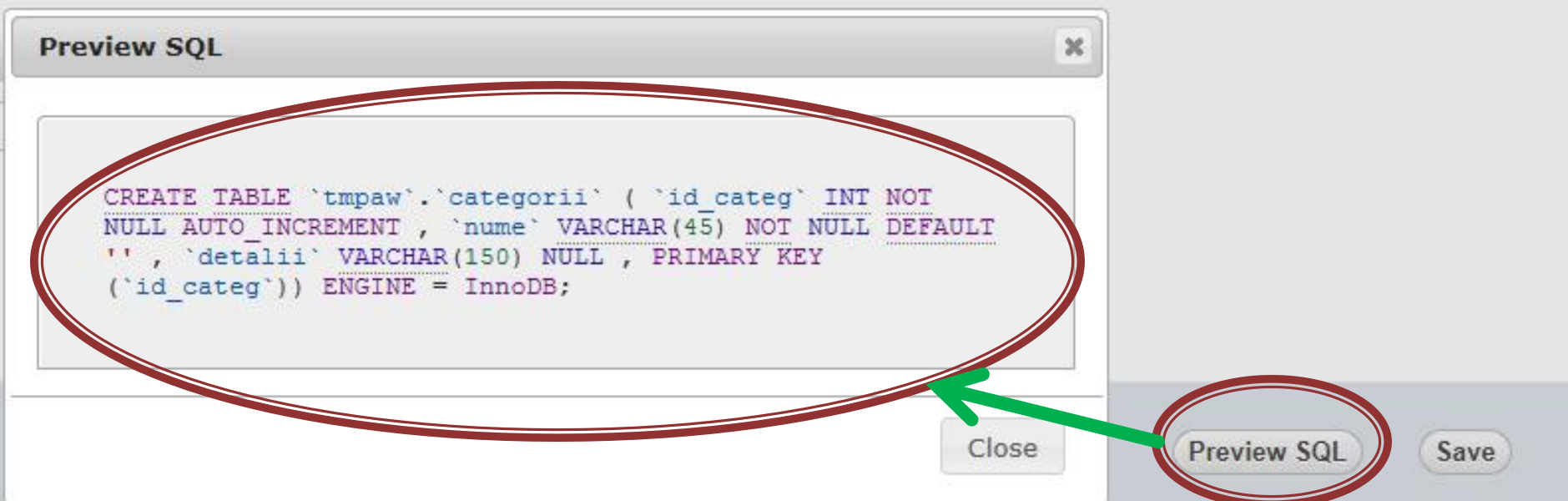
Table name: Add column(s)

Structure

Name	Type	Length/Values	Default	Collation	Attributes	Null	Index	A_I	Comments
id_categ	INT		None			☐	PRIMARY	☒	
nume	VARCHAR	45	As defined:			☐	---	☐	
detalii	VARCHAR	150	None			☒	---	☐	

Preview SQL

- in aproape toate etapele in PhpMyAdmin
 - exemplu de cod SQL/schelet utilizabil (copy/paste) in aplicatia PHP
 - modificari de finete absente din interfata
 - copy → Sectiune "SQL" in interfata → paste → modificare



Introducere coloane, tabel produse

- New → Nume → Add Columns → ...

The screenshot shows the phpMyAdmin interface. On the left, the 'Database: tmpaw' is selected in the sidebar. The main area displays the 'Add Columns' form for the table 'produse'. The 'Table name' field is 'produse', and the 'Add' button is next to '1 column(s)'. The 'Go' button is also visible. Below the form, the table structure is shown with columns: id_produs, id_categ, nume, detalii, cant, and pret. The 'Type' column for 'pret' is set to 'FLOAT'.

Name	Type	Length/Values	Default	Collation	Attributes	Null	Index	A_I	C
id_produs	INT		None			☐	PRIMARY	☒	
id_categ	INT		None			☐	---	☐	
nume	VARCHAR	45	As defined:			☐	---	☐	
detalii	VARCHAR	150	None			☒	---	☐	
cant	INT		None			☒	---	☐	
pret	FLOAT		None			☒	---	☐	

Introducere date initiale (interfata)

- Tabel → Insert → Completare → Go

The screenshot shows the phpMyAdmin interface for a database named 'tmpaw'. The left sidebar shows the database structure, with 'categorii' selected under 'tmpaw'. The main area displays the 'Insert' form for the 'categorii' table. The table has three columns: 'id_categ' (int(11)), 'nume' (varchar(45)), and 'detalii' (varchar(150)). The 'nume' field is filled with 'papetarie'. The 'Go' button is at the bottom right. Below the table, there are options to 'insert as new row' and 'Go back to previous page'. At the bottom, it says 'Continue insertion with 1 row'.

Column	Type	Function	Null	Value
id_categ	int(11)			
nume	varchar(45)			papetarie
detalii	varchar(150)		☒	

Insert as new row and then Go back to previous page

Continue insertion with 1 row

Vizualizare date existente

- Tabel → Browse → salt la pagina (numar de linii pe pagina)

The screenshot shows the phpMyAdmin interface. The left sidebar displays the database structure, with 'tmpaw' selected and 'categorii' highlighted. The main panel shows the 'Browse' tab for the 'categorii' table. The table structure is displayed, showing three rows of data. The 'id_categ' column is highlighted with a red circle. The table data is as follows:

id_categ	nume	detalii
1	papetarie	NULL
2	instrumente	NULL
3	audio-video	NULL

Introducere date initiale (SQL)

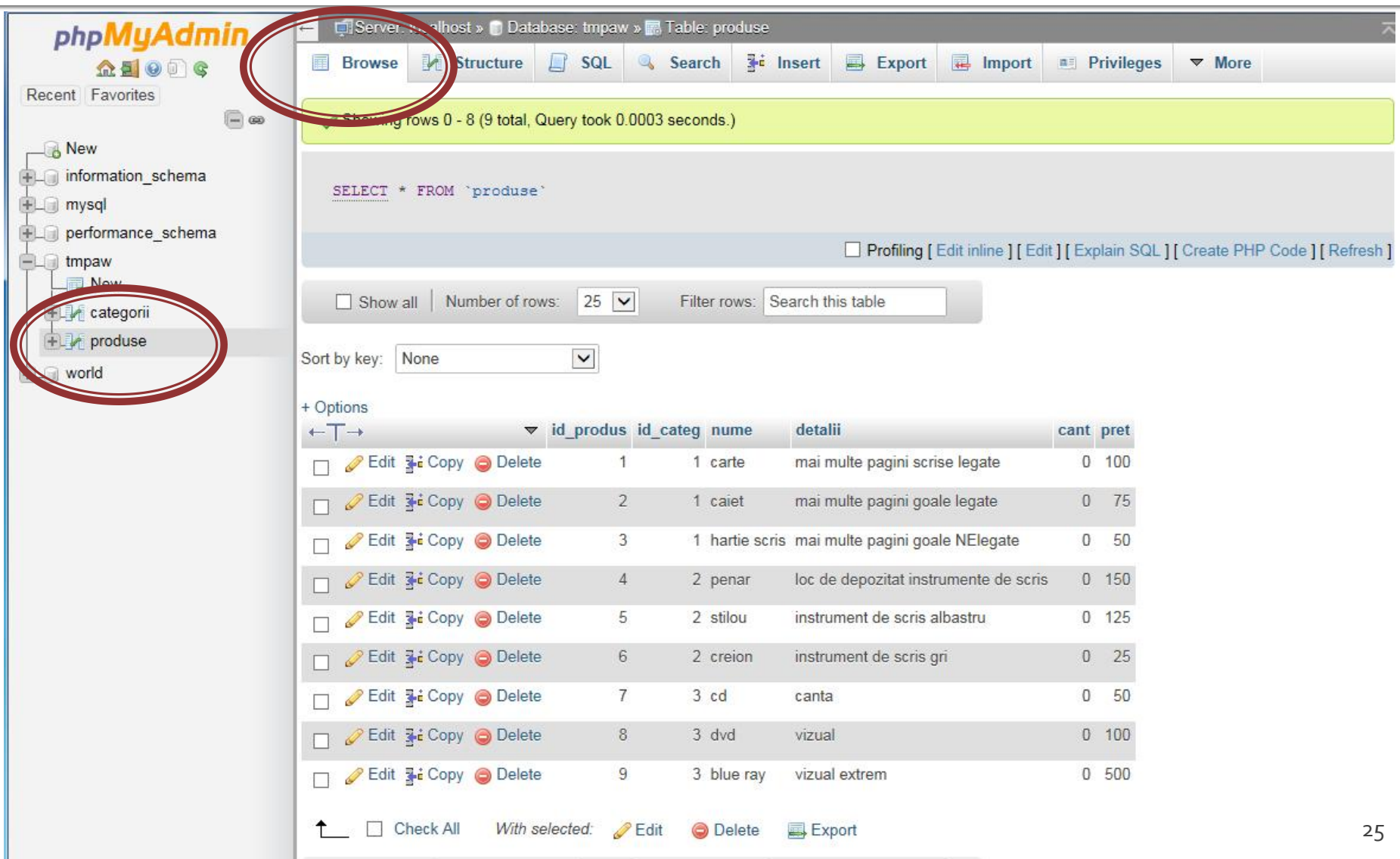
- Tabel → SQL → completare → Go

The screenshot shows the phpMyAdmin web interface. In the left sidebar, the 'produse' table under the 'tmpaw' database is selected. The top navigation bar includes buttons for 'Browse', 'Structure', 'SQL', 'Search', 'Insert', 'Export', 'Import', 'Privileges', 'Operations', and 'Triggers'. The 'SQL' button is circled in red. The main content area is titled 'Run SQL query/queries on database "tmpaw" (Schema: "produse")'. It contains a text editor with the following SQL query:

```
1 INSERT INTO `produse` (`id_produ` , `id_categ` , `nume` , `detalii` , `cant` , `pret` )  
VALUES  
2 (1,1,'carte','mai multe pagini scrise legate',0,100),  
3 (2,1,'caiet','mai multe pagini goale legate',0,75),  
4 (3,1,'hartie scris','mai multe pagini goale NElegate',0,50),  
5 (4,2,'penar','loc de depozitat instrumente de scris',0,150),  
6 (5,2,'stilou','instrument de scris albastru',0,125),  
7 (6,2,'creion','instrument de scris gri',0,25),  
8 (7,3,'cd','canta',0,50),  
9 (8,3,'dvd','vizual',0,100),  
10 (9,3,'blue ray','vizual extrem',0,500);
```

Below the query editor are buttons for 'SELECT *', 'SELECT', 'INSERT', 'UPDATE', 'DELETE', 'Clear', and 'Format'. At the bottom right, the 'Go' button is circled in red. The bottom status bar shows options for 'Delimiter', 'Show this query here again', 'Retain query box', and 'Rollback when finished'.

Tabel produse



phpMyAdmin

Server: localhost » Database: tmpaw » Table: produse

Structure SQL Search Insert Export Import Privileges More

Showing rows 0 - 8 (9 total, Query took 0.0003 seconds.)

```
SELECT * FROM `produse`
```

☐ Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP Code] [Refresh]

☐ Show all | Number of rows: 25 | Filter rows: Search this table

Sort by key: None

+ Options

				id_produc	id_categ	nume	detalii	cant	pret
☐	Edit	Copy	Delete	1	1	carte	mai multe pagini scrise legate	0	100
☐	Edit	Copy	Delete	2	1	caiet	mai multe pagini goale legate	0	75
☐	Edit	Copy	Delete	3	1	hartie scris	mai multe pagini goale NElegate	0	50
☐	Edit	Copy	Delete	4	2	penar	loc de depozitat instrumente de scris	0	150
☐	Edit	Copy	Delete	5	2	stilou	instrument de scris albastru	0	125
☐	Edit	Copy	Delete	6	2	creion	instrument de scris gri	0	25
☐	Edit	Copy	Delete	7	3	cd	canta	0	50
☐	Edit	Copy	Delete	8	3	dvd	vizual	0	100
☐	Edit	Copy	Delete	9	3	blue ray	vizual extrem	0	500

☐ Check All With selected: Edit Delete Export

Adaugare utilizator

- Server → Users → Add user

The screenshot shows the phpMyAdmin interface. The top navigation bar includes 'Server: localhost', 'Database: tmpaw', and 'Table: produse'. The 'Server: localhost' link is circled in red. Below this, the 'Users' tab in the main navigation bar is also circled in red. The 'Users overview' table lists existing users. At the bottom, the 'New' button is circled in red, and the 'Add user' link is highlighted.

Server: localhost » Database: tmpaw » Table: produse

phpMyAdmin

Recent Favorites

information_schema
mysql
performance_schema
tmpaw
New
categorii
produse
world

Server: localhost

Databases SQL Status Users Export Import Settings

Users overview

	User name	Host	Password	Global privileges	Grant	Action
☐	root	127.0.0.1	Yes	ALL PRIVILEGES	Yes	Edit Privileges Export
☐	root	::1	Yes	ALL PRIVILEGES	Yes	Edit Privileges Export
☐	root	localhost	Yes	ALL PRIVILEGES	Yes	Edit Privileges Export
☐	root	tmpaw.etti	Yes	ALL PRIVILEGES	Yes	Edit Privileges Export
☐	web	%	Yes	USAGE	No	Edit Privileges Export

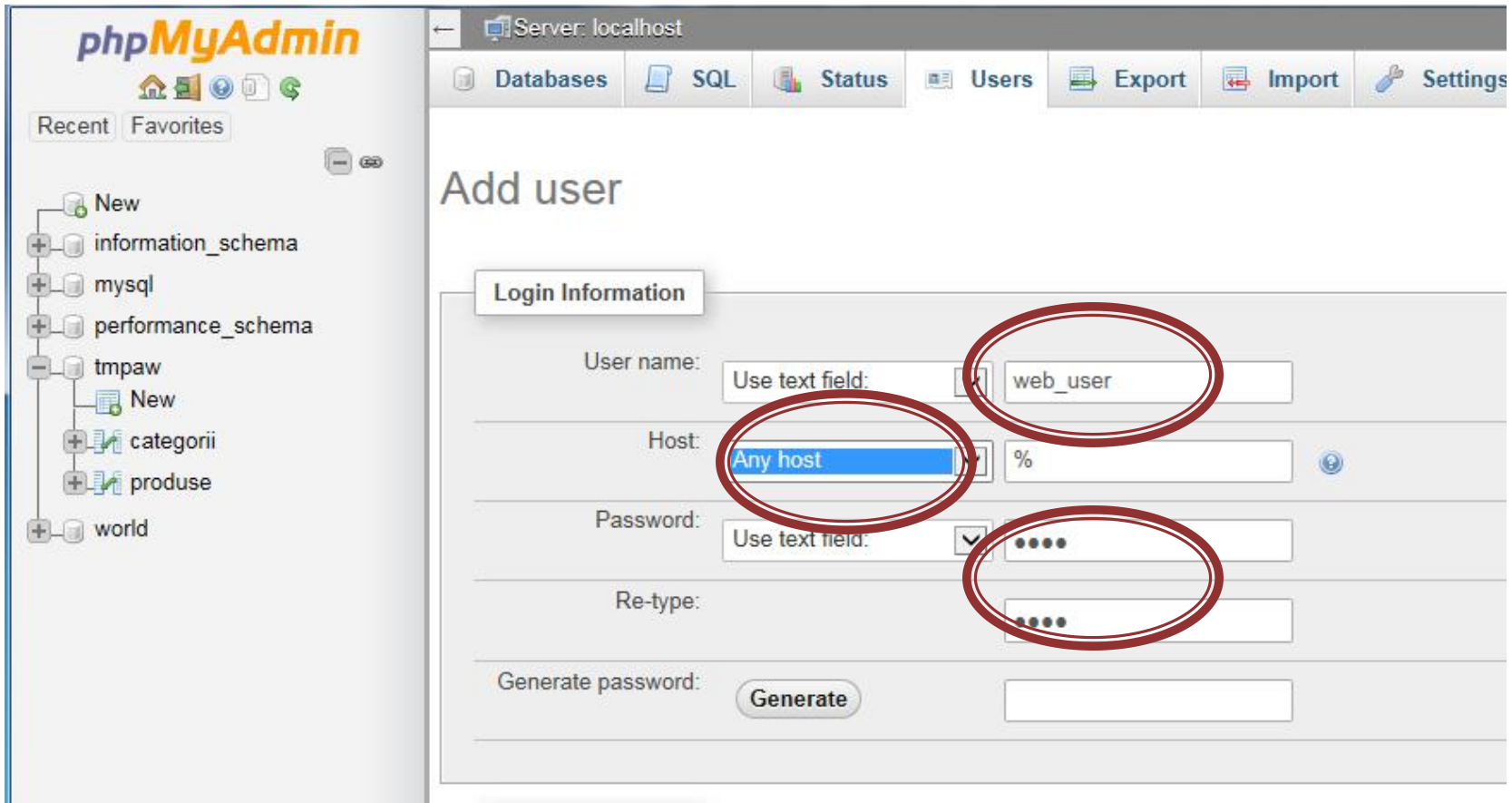
↑ ☐ Check All With selected: Export

New

Add user

Adaugare utilizator

- Nu e recomandabil/**posibil** sa se utilizeze user-ul MySql "root" pentru aplicatii



The screenshot shows the phpMyAdmin interface for adding a new user. The left sidebar displays a tree view of databases and tables, including 'information_schema', 'mysql', 'performance_schema', 'tmpaw', 'categorii', 'produse', and 'world'. The main panel is titled 'Add user' and contains a 'Login Information' section. This section has four rows of input fields: 'User name:' with a text field containing 'web_user'; 'Host:' with a dropdown menu showing 'Any host'; 'Password:' with a text field containing masked characters; and 'Re-type:' with another masked text field. A 'Generate password:' button and an empty text field are at the bottom. Four red circles are drawn around the 'web_user' text, the 'Any host' dropdown, and both password input fields to highlight the user details being added.

Drepturi de acces

- Server → Users → Edit Privileges

The screenshot shows the phpMyAdmin interface. The left sidebar contains a tree view of databases: New, information_schema, mysql, performance_schema, tmpaw, and world. The main content area displays the 'Users overview' page. The top navigation bar includes links for Databases, SQL, Status, Users, Export, Import, and Settings. The 'Users overview' table lists users with their privileges and actions.

	User name	Host	Password	Global privileges	Grant	Action
☐	root	127.0.0.1	Yes	ALL PRIVILEGES	Yes	Edit Privileges Export
☐	root	:::1	Yes	ALL PRIVILEGES	Yes	Edit Privileges Export
☐	root	localhost	Yes	ALL PRIVILEGES	Yes	Edit Privileges Export
☐	root	tmpaw.etti	Yes	ALL PRIVILEGES	Yes	Edit Privileges Export
☐	web	%	Yes	USAGE	No	Edit Privileges Export
☐	web_user	%	Yes	USAGE	No	Edit Privileges Export

Drepturi de acces

- Database → nume → Go

The screenshot shows the phpMyAdmin interface for a local MySQL server. The left sidebar displays a tree of databases, including 'information_schema', 'mysql', 'performance_schema', 'tmpaw', and 'world'. The main panel is titled 'Edit Privileges: User 'web_user'@'%''. The 'Database' tab is selected and circled in red. Below the title, there is a section for 'Database-specific privileges' with a table that has columns 'Database', 'Privileges', 'Grant', 'Table-specific privileges', and 'Action'. The table currently shows 'None'. At the bottom, there is a text input field labeled 'Add privileges on the following database(s):' with a dropdown menu showing 'mysql', 'tmpaw', and 'world', which is also circled in red.

Server: localhost

Databases SQL Status Users Export Import Settings

Global Database Change password Login Information

Edit Privileges: User 'web_user'@'%'

Database-specific privileges

Database	Privileges	Grant	Table-specific privileges	Action
None				

Add privileges on the following database(s):

mysql
tmpaw
world

Drepturi de acces

- Se alocă drepturile SELECT + INSERT + UPDATE + DELETE asupra bazei de date create

The screenshot shows the phpMyAdmin interface for a MySQL server on localhost. The left sidebar displays a tree of databases, including 'tmpaw' which is expanded to show tables 'categorii' and 'produse'. The main panel is titled 'Edit Privileges: User **'web_user'@'%'** - Database **tmpaw**'. Below the title, there is a section for 'Database-specific privileges' with a 'Check All' button. A note states: 'Note: MySQL privilege names are expressed in English.' There are three columns of checkboxes: 'Data', 'Structure', and 'Administration'. The 'Data' column has four checked items: SELECT, INSERT, UPDATE, and DELETE. The 'Structure' column has several unchecked items: CREATE, ALTER, INDEX, DROP, CREATE TEMPORARY TABLES, and SHOW VIEW. The 'Administration' column has three unchecked items: GRANT, LOCK TABLES, and REFERENCES. Red ovals are drawn around the user name, the database name, and the 'Data' column checkboxes.

phpMyAdmin

Server: localhost

Databases SQL Status Users Export Import Settings Replication

Database Table

Edit Privileges: User **'web_user'@'%'** - Database **tmpaw**

Database-specific privileges ☒ Check All

Note: MySQL privilege names are expressed in English.

Data	Structure	Administration
☒ SELECT	☐ CREATE	☐ GRANT
☒ INSERT	☐ ALTER	☐ LOCK TABLES
☒ UPDATE	☐ INDEX	☐ REFERENCES
☒ DELETE	☐ DROP	
	☐ CREATE TEMPORARY TABLES	
	☐ SHOW VIEW	

Drepturi de acces, verificare

- Nume → Privileges
- Marea majoritate a aplicatiilor **nu** au nevoie de drepturi de acces la structura/administrare

The screenshot shows the phpMyAdmin interface. On the left, the database 'tmpaw' is selected in the sidebar. The main panel displays the 'Privileges' tab for the 'tmpaw' database. The table lists users and their privileges. The 'tmpaw.etti' user is highlighted with a red circle, showing 'ALL PRIVILEGES'. The 'web_user' user is also highlighted with a red circle, showing 'SELECT, INSERT, UPDATE, DELETE' privileges. The 'Privileges' tab in the top navigation bar is also circled in red.

User	Host	Type	Privileges	Grant	Action
☐ root	127.0.0.1	global	ALL PRIVILEGES	Yes	Edit Privileges
☐ root	:::1	global	ALL PRIVILEGES	Yes	Edit Privileges
☐ root	localhost	global	ALL PRIVILEGES	Yes	Edit Privileges
☐ root	tmpaw.etti	global	ALL PRIVILEGES	Yes	Edit Privileges
☐ web_user	%	database-specific	SELECT, INSERT, UPDATE, DELETE	No	Edit Privileges

↑ ☐ Check All With selected: Export

Index

- Adaugare index e esentiala pentru viteza
 - exemplu, produse grupate pe categorii, selectia produselor dintr-o categorie se face cu :
 - `SELECT * FROM `produse` WHERE `id_categ` = 1`
- Tabel → Structure → Index / Selectare + Index

The screenshot shows the phpMyAdmin interface. On the left, the database structure tree is visible, with 'produse' selected under the 'categorii' database. The main panel displays the 'Table structure' for 'produse'. The table has 6 columns: id_produs (int(11), PRIMARY, AUTO_INCREMENT), id_categ (int(11), PRIMARY), nume (varchar(45), PRIMARY), detalii (varchar(150), PRIMARY), cant (int(11), PRIMARY), and pret (float, PRIMARY). The 'Index' tab is selected, showing the 'Index' button circled in green. The 'Unique' button is also circled in green. The 'Index' button is circled in red. The 'Unique' button is circled in red. The 'Index' button is circled in red. The 'Unique' button is circled in red.

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
1	id_produs	int(11)			No	None	AUTO_INCREMENT	Change Drop Primary Unique Index Spatial Fulltext Distinct values
2	id_categ	int(11)			No	None		Change Drop Primary Unique Index Spatial Fulltext Distinct values
3	nume	varchar(45)	utf8_general_ci		No			Change Drop Primary Unique Index Spatial Fulltext Distinct values
4	detalii	varchar(150)	utf8_general_ci		Yes	NULL		Change Drop Primary Unique Index Spatial Fulltext Distinct values
5	cant	int(11)			Yes	NULL		Change Drop Primary Unique Index Spatial Fulltext Distinct values
6	pret	float			Yes	NULL		Change Drop Primary Unique Index Spatial Fulltext Distinct values

Verificare/Stergere index

- Apasare +Indexes, se deschide lista de indecsi
- Apasare -Indexes, se inchide lista de indecsi

- Indexes

Indexes ?

Action	Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
Edit Drop	PRIMARY	BTREE	Yes	No	id_produ	9	A	No	
Edit Drop	id_categ	BTREE	No	No	id_categ	9	A	No	

Create an index on columns

Backup, Restore

- Ca si in cazul Windows 2000 facilitatea de Backup realizeaza un script SQL care contine structura si datele exprimate sub forma de interogari SQL
- O deosebire intre PhpMyAdmin si aplicatiile specifice MySql (aceleasi de pe Windows 2000 sau MySql Workbench) este absenta liniilor de creare a bazei de date
 - CREATE DATABASE IF NOT EXISTS tmpaw;
 - USE tmpaw;
- La utilizarea PhpMyAdmin trebuie sa se creeze manual inaintea restaurarii baza de date

Backup

- Nume (tabel sau baza de date) → Export

The screenshot displays the phpMyAdmin web interface. On the left sidebar, the database 'tmpaw' is selected and circled in red. The main panel shows the 'Export' tab, also circled in red. The title of the export page is 'Exporting tables from "tmpaw" database'. Under the 'Export Method:' section, the 'Quick' option is selected. Under the 'Output:' section, the 'Save on server' checkbox is checked. Under the 'Format:' section, 'SQL' is selected in the dropdown menu. A 'Go' button is at the bottom.

Server: localhost » Database: tmpaw

Structure SQL Search Query **Export** Import Operations

Exporting tables from "tmpaw" database

Export Method:

- ☒ Quick - display only the minimal options
- ☐ Custom - display all possible options

Output:

- ☒ Save on server in the directory `/var/lib/phpMyAdmin/save/`
- ☐ Overwrite existing file(s)

Format:

SQL

Go

Restore

- Se creaza in avans baza de date
- Nume → Import → Browse (alegere fisier backup)
- fisierele SQL pot fi compresate gzip, bzip2, zip

The screenshot displays the phpMyAdmin web interface. On the left sidebar, the database 'tmpaw' is selected and highlighted with a red circle. The main panel shows the 'Import' tab, which is also circled in red. The title of the page is 'Importing into the database "tmpaw"'. Under the 'File to Import:' section, there is a text input field and a 'Browse...' button, both circled in red. Below this, there are radio buttons for 'Browse your computer' and 'Select from the web server upload directory'. The 'Character set of the file:' is set to 'utf-8'. At the bottom, there is a 'Partial Import:' section with a checked checkbox for 'Allow the interruption of an import in case the script detects it is close to the PHP timeout limit.' and a text input field for 'Skip this number of queries (for SQL) or lines (for other formats), starting from the first one:' with the value '0'.

Contact

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