Curs 9

2025/2026

Programarea aplicațiilor web

PAW

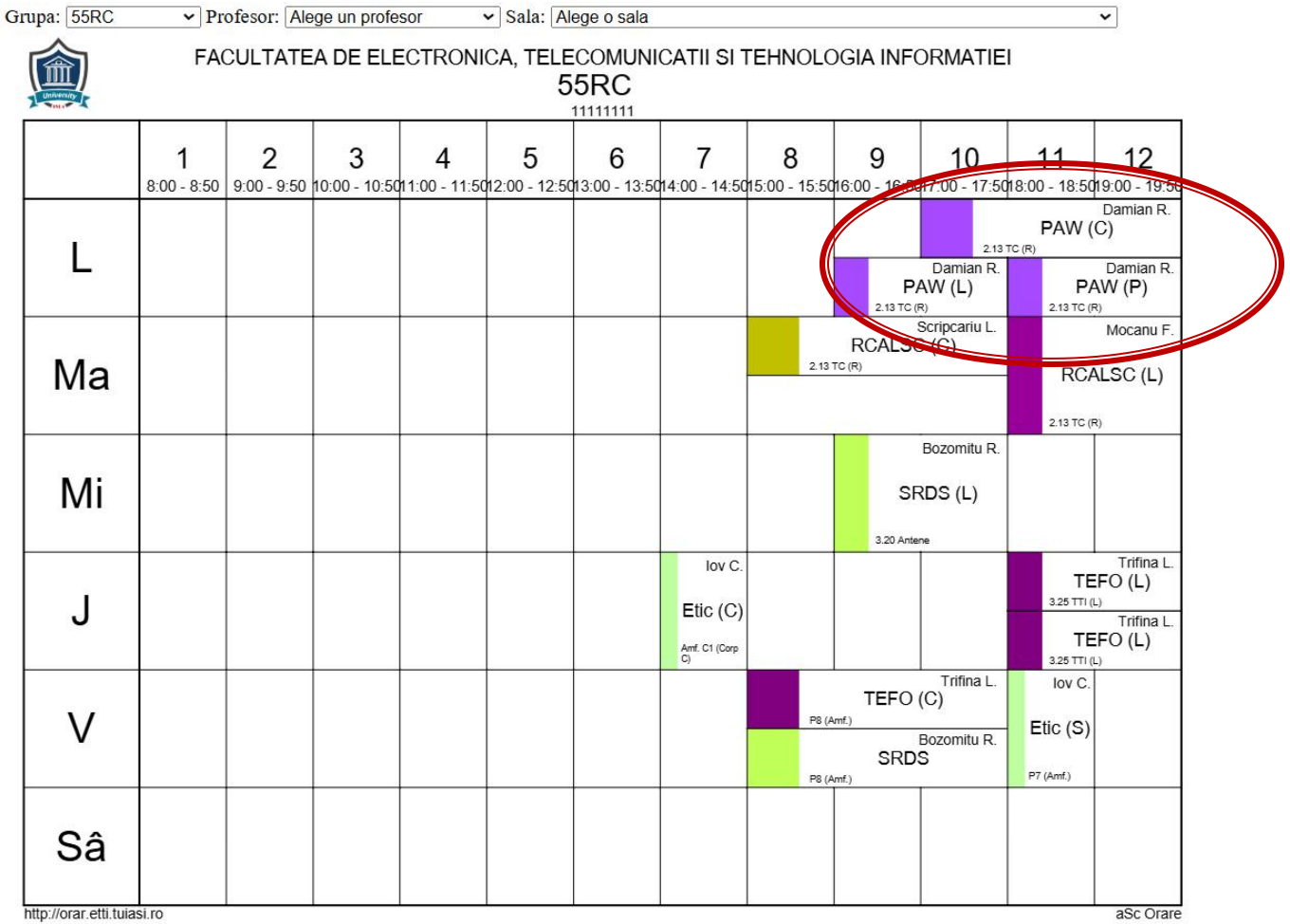
- Programarea aplicațiilor web
  - An V RC
    - 1.5C/1L/1P

Program

- An V
  - Saptamana 1
    - Luni 17-20 Curs (Intro/HTML/CSS)
  - Saptamanile **2-8**
    - Luni 16:30-18 Curs
    - Luni **18-20 Laborator**
  - Saptamanile **9-14**
    - Luni 16:30-18 Curs
    - Luni **18-20 Proiect**

Orar

- https://orar.etti.tuiasi.ro/ : C->16:30-18, L/P -> 18

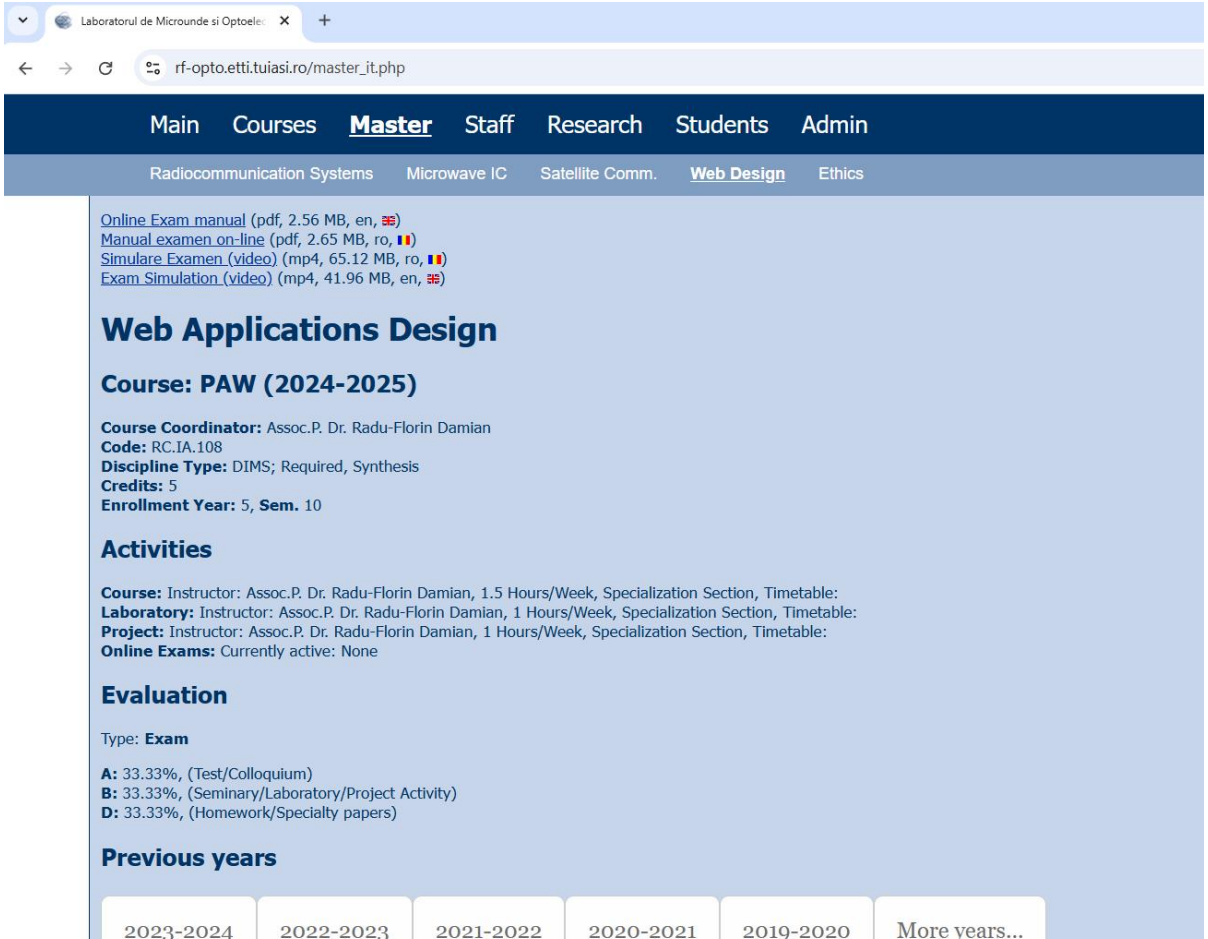


Nota

- An V
  - 33% E
  - 66% Aplicatii
    - 33% L
    - 33% P

Documentatie

- https://rf-opto.etti.tuiasi.ro + www



Acces

- Personalizat (parola), Generic (email)

Date:

Grupa	5304 (2015/2016)
Specializarea	Tehnologii si sisteme de telecomunicatii
Marca	5184

Acceseaza ca acest student

Note obtinute

Disciplina	Tip	Data	Descriere	Nota	Puncte	Obs.
TW	Tehnologii Web					
	N	17/01/2014	Nota finala	10	-	
	A	17/01/2014	Colocviu Tehnologii Web 2013/2014	10	7.55	
	B	17/01/2014	Laborator Tehnologii Web 2013/2014	9	-	
	D	17/01/2014	Tema Tehnologii Web 2013/2014	9	-	

Login

Use the Registration no. and your

Registration no.

Email/Password

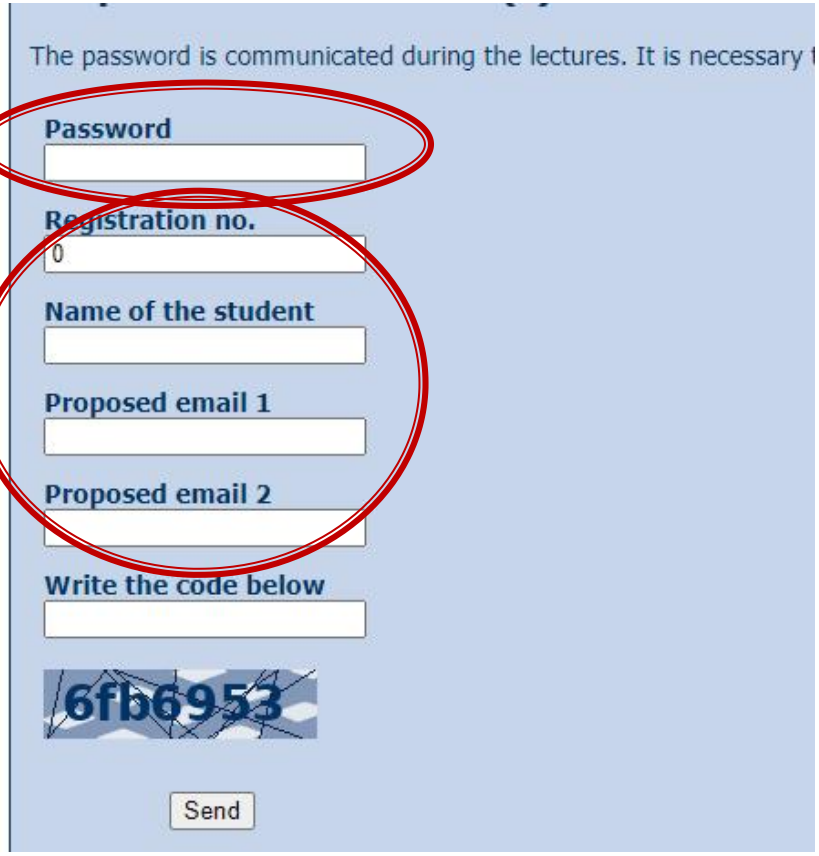
Write the code below

5dd64f9

Send

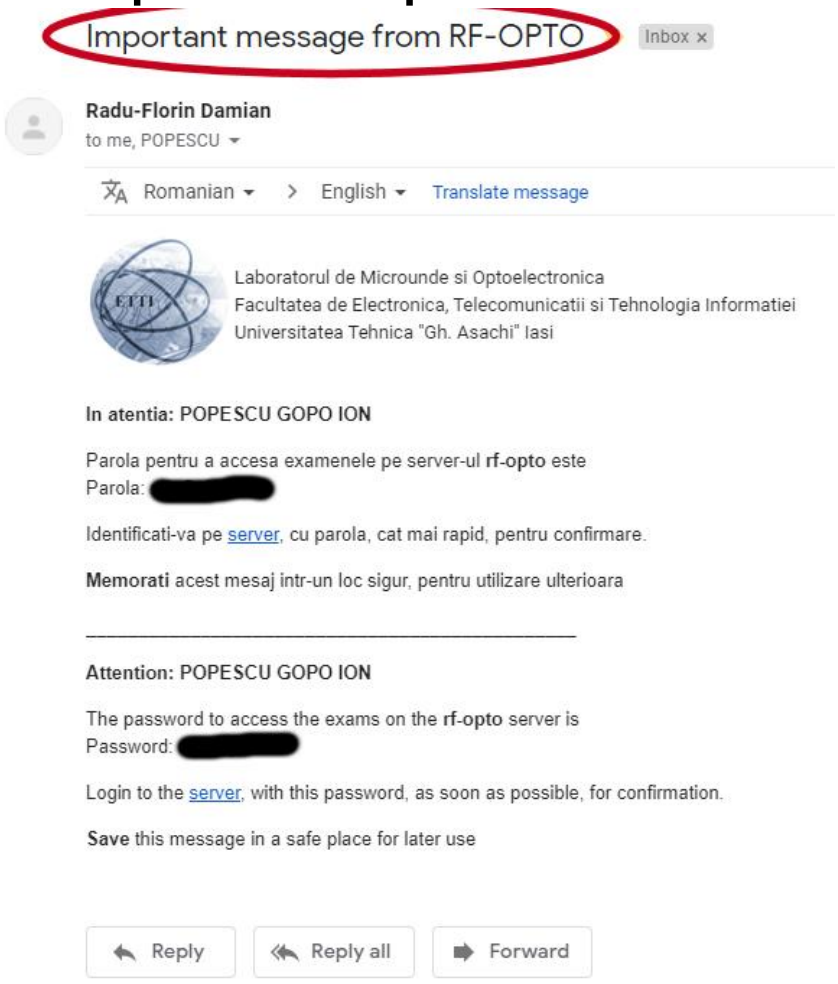
Online – Numar matricol (marca)

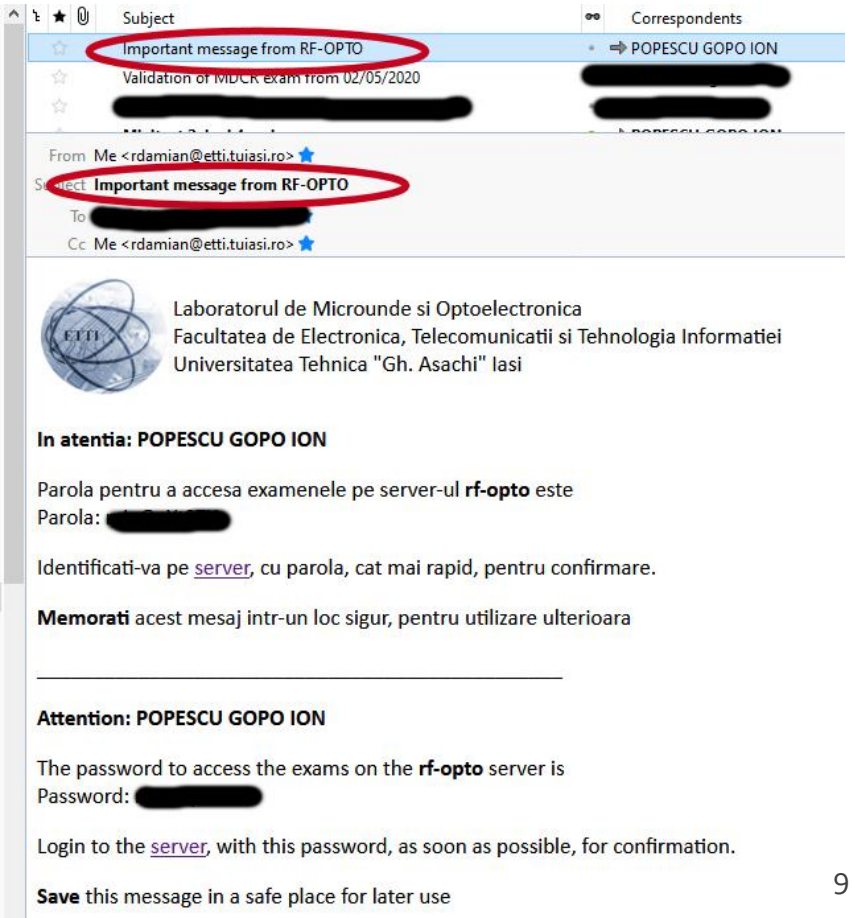
- accesul la **examene** necesita **parola** primita prin email



Parola

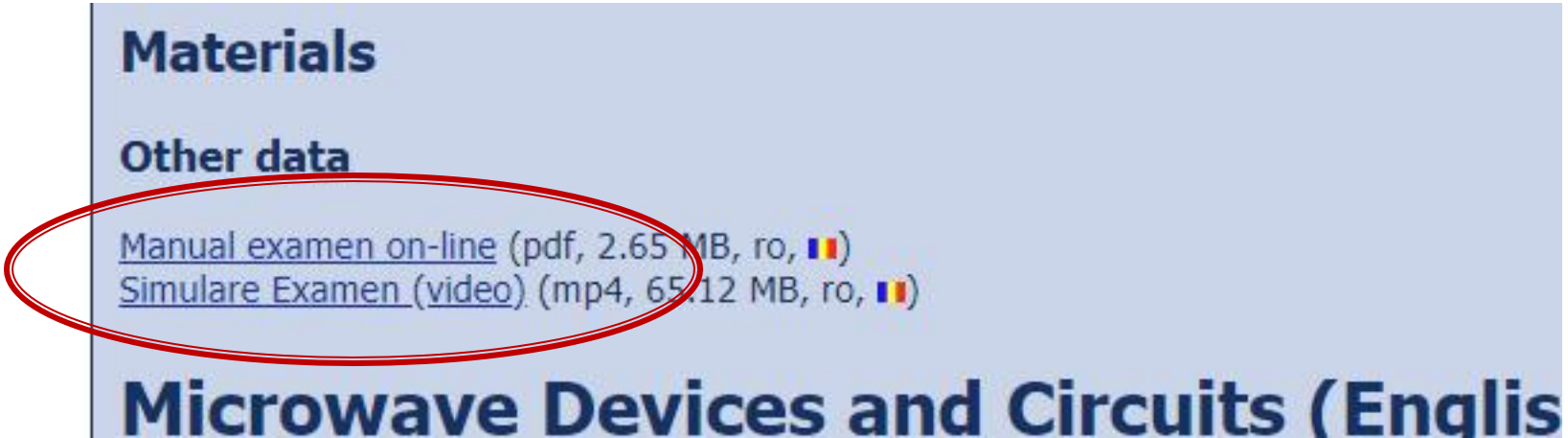
- primita prin **email**





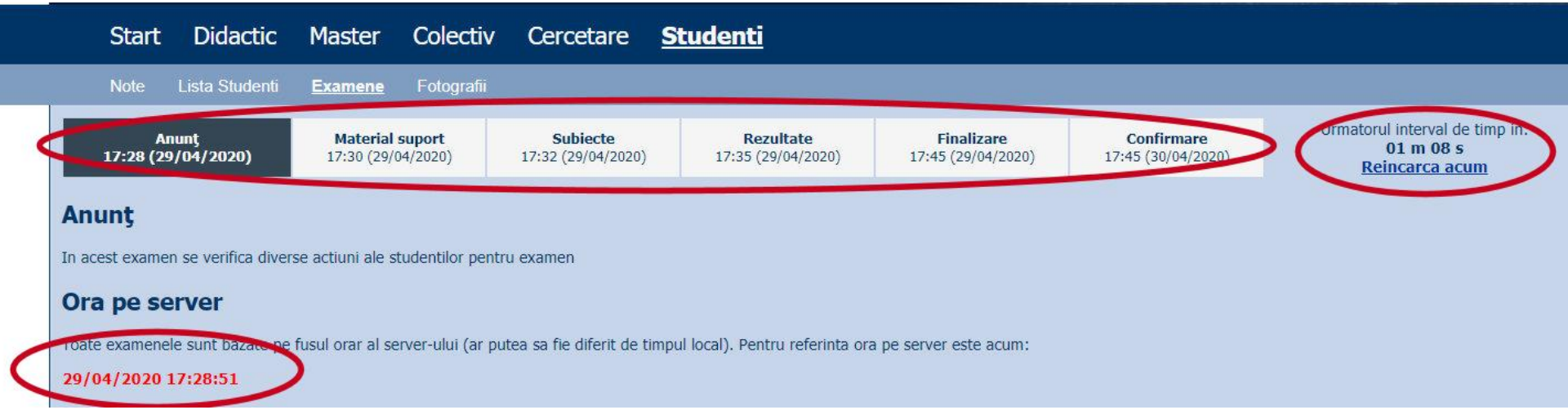
Manual examen online

- Aplicatia de examen online utilizata la:
  - ~~curs (prezenta)~~
  - laborator -> Activitate suplimentara
  - proiect -> Alocare/predare proiect
  - ~~examen~~



Examen online

- intotdeauna **contratimp**
  - perioada lunga (proiect, activitate suplimentara)
  - ~~perioada scurta (teste: 15min, examen: 2h)~~



Nota

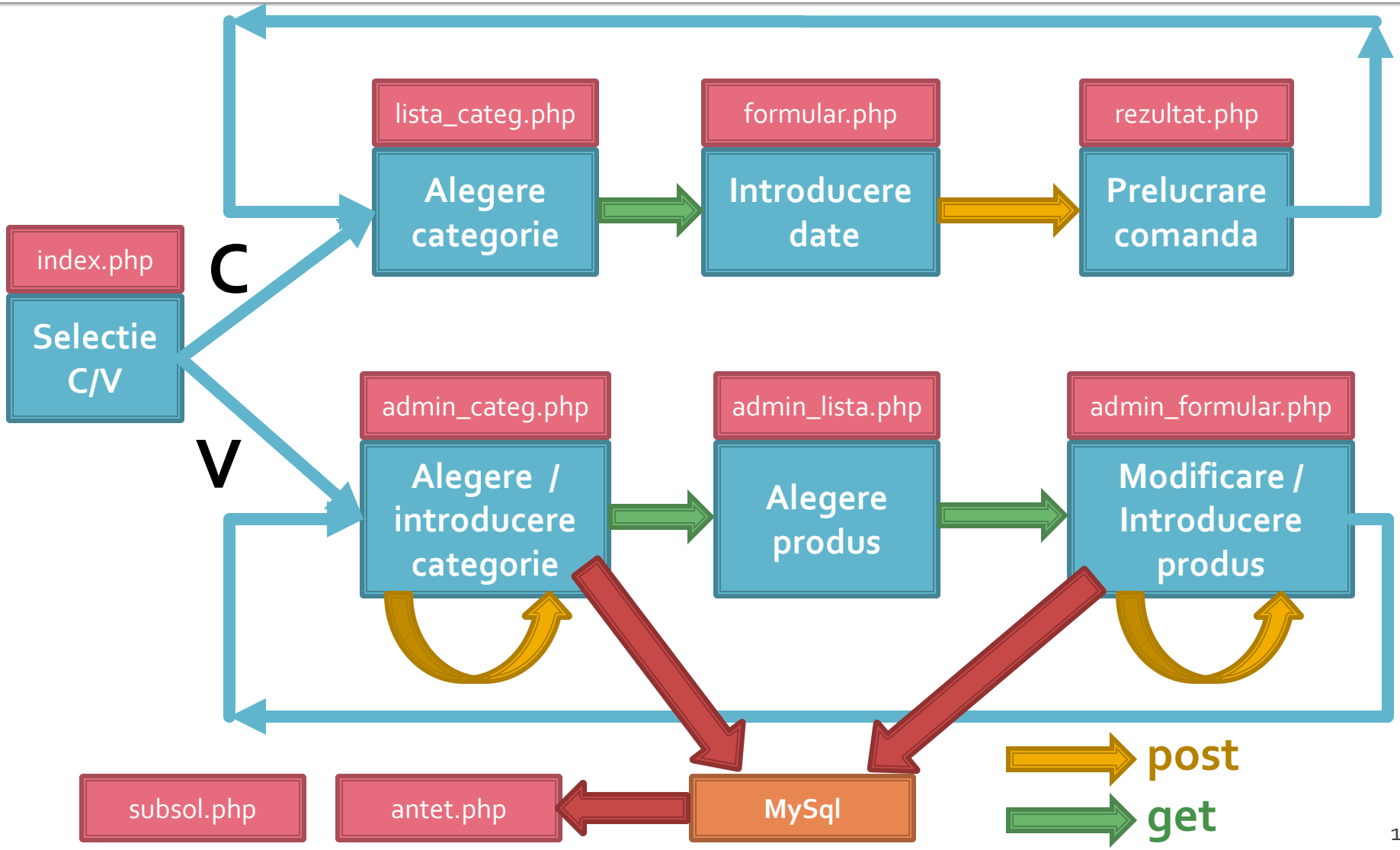
- An V
  - 33% E
  - 33% L
  - 33% P
- Laborator - Prezenta
  - 1pz = 1p (p>5 ←→ Curs)
- Examen
  - Prezenta la curs: 3pz = 0.5p
  - Asemanator cu materia de **proiect**
- Activitate suplimentara
  - Dupa terminarea activitatii la laborator
  - +2p la E/L

Laborator

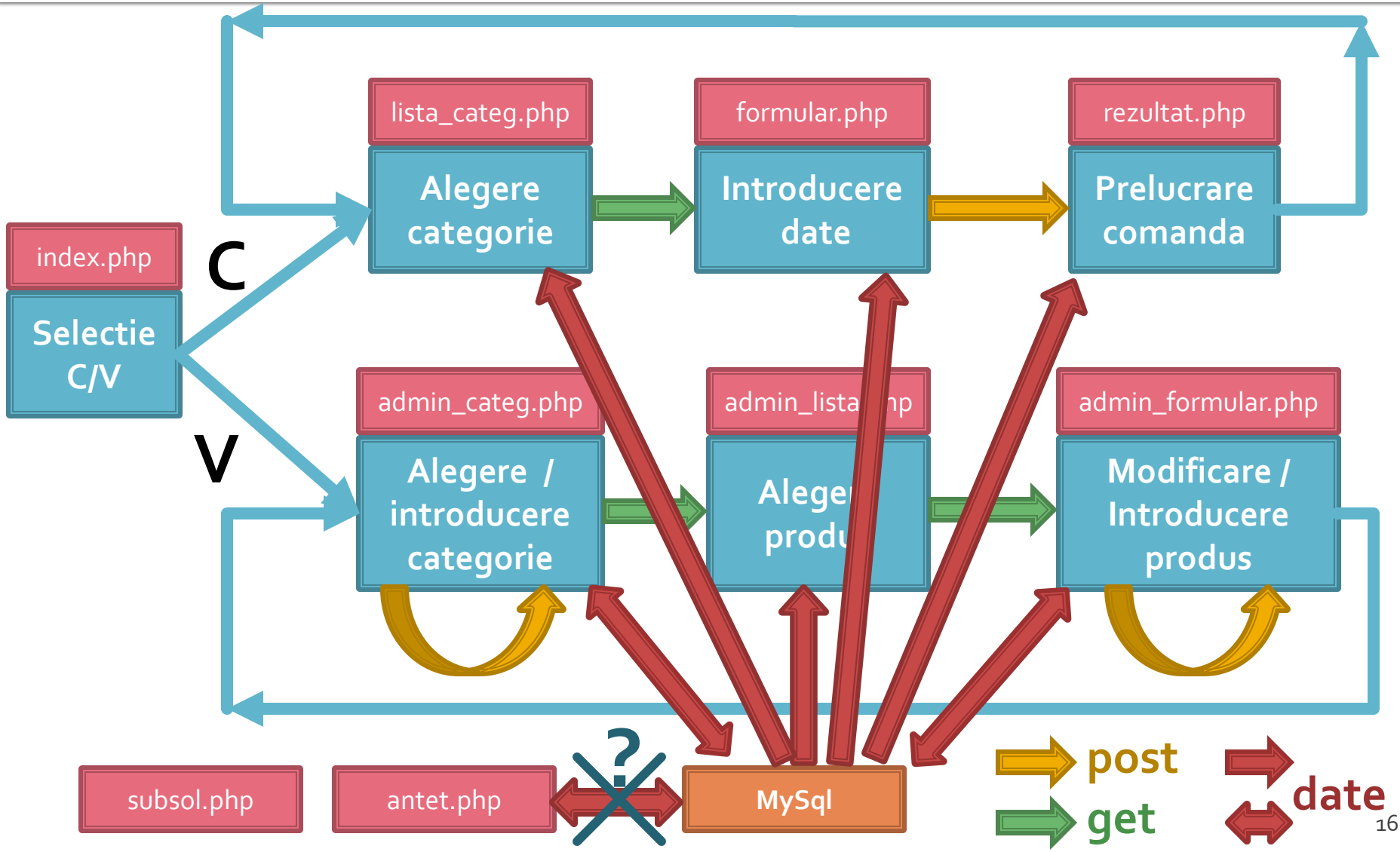
MySql – eficienta

- eficienta unei aplicatii web
  - 100% - **toate prelucrarile "mutate" in RDBMS**
  - PHP **doar** afisarea datelor
- eficienta unei aplicatii MySql
  - 25% **alegerea corecta a tipurilor de date**
  - 25% **crearea indecsilor necesari in aplicatii**
  - 25% **normalizarea corecta a bazei de date**
  - 20% **cresterea complexitatii interogarilor pentru a "muta" prelucrarile pe server-ul de baze de date**
  - 5% **scrierea corecta a interogarilor**

Plan aplicatie - laborator



Plan aplicatie - optim



Proiect

Proiect

- Teme in **echipa**: 2/3 membri
- Evaluare **individuala**
- Variabile ca dificultate (cu note diferite)

"Examen" Alocare teme proiect

- **Alocare teme**
  - tema aleasa (optiune principala) - **necesar**
  - nume coechipier - **necesar**
  - tema alternativa (rezerva 1)
  - tema alternativa (rezerva 2)
  - punctul ales (a/b) – **necesar (?)**
- Primul venit, primul servit
  - **ambii** parteneri finalizeaza "examenul"

"Examen" Predare proiect

- Predare proiect
- Chiar daca unele fisiere sunt comune, **ambii** coechipieri trebuie sa finalizeze depunerea
- Predare 3 fisiere
  - un fişier ***.pdf/*.jpg** cu **planul aplicației**
  - un fişier ***.sql** cu backup-ul bazei de date de care are nevoie aplicația pentru a funcționa (**nr. linii!!**)
  - un fişier cu arhiva directorului conținând aplicația (fişiere *.php, *.jpg, structură de directoare etc., arhivate: ***.zip, *.7z** etc.) (**nr. pagini!!**)

Predare + Sustinere proiect

- Sustinere – sala II.13
  - 25.05.2026 ora 18
  - XX.06.2026 ora YY (ziua examenului, 17,19)
- Predare – examen online
  - limita pentru fisiere 10MB. Pentru date mai multe este prevazuta posibilitatea introducerii unui link spre un fisier in cloud
    - neprotejat
    - valid cel putin 5 zile

PROIECT (final)

- Tema de nota 8
  - Tema unica pentru fiecare student
  - Baza de date cu care se lucreaza contine minim 20 de inregistrari in tabelul cel mai "voluminos"

- Tema de nota 9
  - Conditiile de la tema de nota 8 **si in plus**
  - Necesitatea conlucrarii intre 2 studenti cu doua teme "pereche"
  - Se accepta ca un student sa realizeze ambele puncte
  - Numar **minim** de pagini dinamice (php+mysql) in aplicatie 4 = 2 X 2
  - Baza de date cu care se lucreaza contine minim 50 de inregistrari in tabelul cel mai "voluminos"

PROIECT (final)

- Tema de nota **10**
  - Conditiile de la tema de nota 9 **si in plus**
  - Necesitatea conlucrarii intre 2 **studenti** cu teme "pereche"
  - Numar **minim** de pagini dinamice (php+mysql) in aplicatie **6 = 3 X 2**
  - Baza de date cu care se lucreaza sa contina minim **100** de inregistrari in tabelul cel mai "voluminos".

PROIECT (final)

- In caz de necesitate, pentru completarea echipei **cadrul didactic** poate fi membru al echipelor (9/10). Conditii:
  - metoda de comunicare in echipa sa fie prin email sau direct
  - latenta de raspuns: ~ 1 zi
  - reactiv
  - nu lucreaza noaptea, si in special nu in noaptea dinaintea predarii (☺)
- dezavantaj asumat: "spion" in echipa

PROIECT (final)

- Tema bonus (>5, in general **offline**)
  - Conditiile de la tema de nota 10 **si in plus:**
  - **3 studenti/CD**
  - Baza de date cu care se lucreaza contine minim **300** de inregistrari in tabelul cel mai "voluminos"
  - Numar **minim** de pagini dinamice (php+mysql) in aplicatie **12 = 4 X 3**
  - Tema care face apel la controlul **sesiunii** client/server
  - Necesitatea utilizarii **Javascript** in **aplicatie** (aplicatie libera dar cu efect tehnic nu estetic)
  - Forma paginii controlata **dual** prin CSS, **desktop/phone**
  - Facilitati in ceea ce priveste nota (**DACA** toate celelalte conditii sunt indeplinite), la alegere:
    - prezenta la laborator: N –> P = **67%**, L = **0%**, E = 33%

PROIECT (final)

- proiectul se **sustine individual** (oral si practic)
- fiecare membru al unei echipe (la temele de nota 9 si 10) trebuie sa sustina in aceeasi zi proiectul
- Pentru toate temele se prevede un bonus de **1p** pentru implementări care **nu** folosesc framework-uri.
  - poate fi utilizat pentru a compensa anumite cerințe neîndeplinite (instalare/plan de ex.)
  - nu poate fi folosit pentru a transforma o temă de nota 9 în o temă de nota 10 de ex.)

Notare proiect 2025/2026

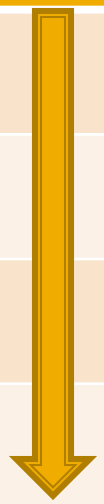
- 1p – functionalitate √
- 1p –aplicatia ruleaza pe server-ul CentOS/Ubuntu/Debian √
- numar de pagini dinamice √
- numar de inregistrari in baza de date √
- 1p – planul aplicatiei √
- 1p – instalarea aplicatiei pe server √

Notare 2026 (final)

- 1p – **functionalitate**
- 1p – mutarea **personala** a site-ului (restaurare backup + setare server) pe un server de referinta CentOS/Ubuntu**/Debian**
- 1p – cunoasterea **cod**ului
  - raspunsul la intrebari de genul: “unde ai facut aceasta”, "ce face acest cod"
- 1p – **planul aplicatiei**
- Teme “de nota 10”
  - Initiativa. Investigarea posibilitatilor de imbunatatire
  - Explicatii relativ la functionarea unei anumite secvente de cod
  - Utilizare sesiune, Javascript, **CSS media**

Notare 2026

- numar de pagini dinamice √
- numar de inregistrari in baza de date √
  - se verifica indeplinirea conditiilor corespunzatoare si se realizeaza **de-clasificarea** temei pana cand **ambele** conditii sunt indeplinite



Tema de nota …	Pagini	Inregistrari
bonus	12 = 4 X 3	300
10	6 = 3 X 2	100
9	4 = 2 X 2	50
8	1 = 1 X 1	20

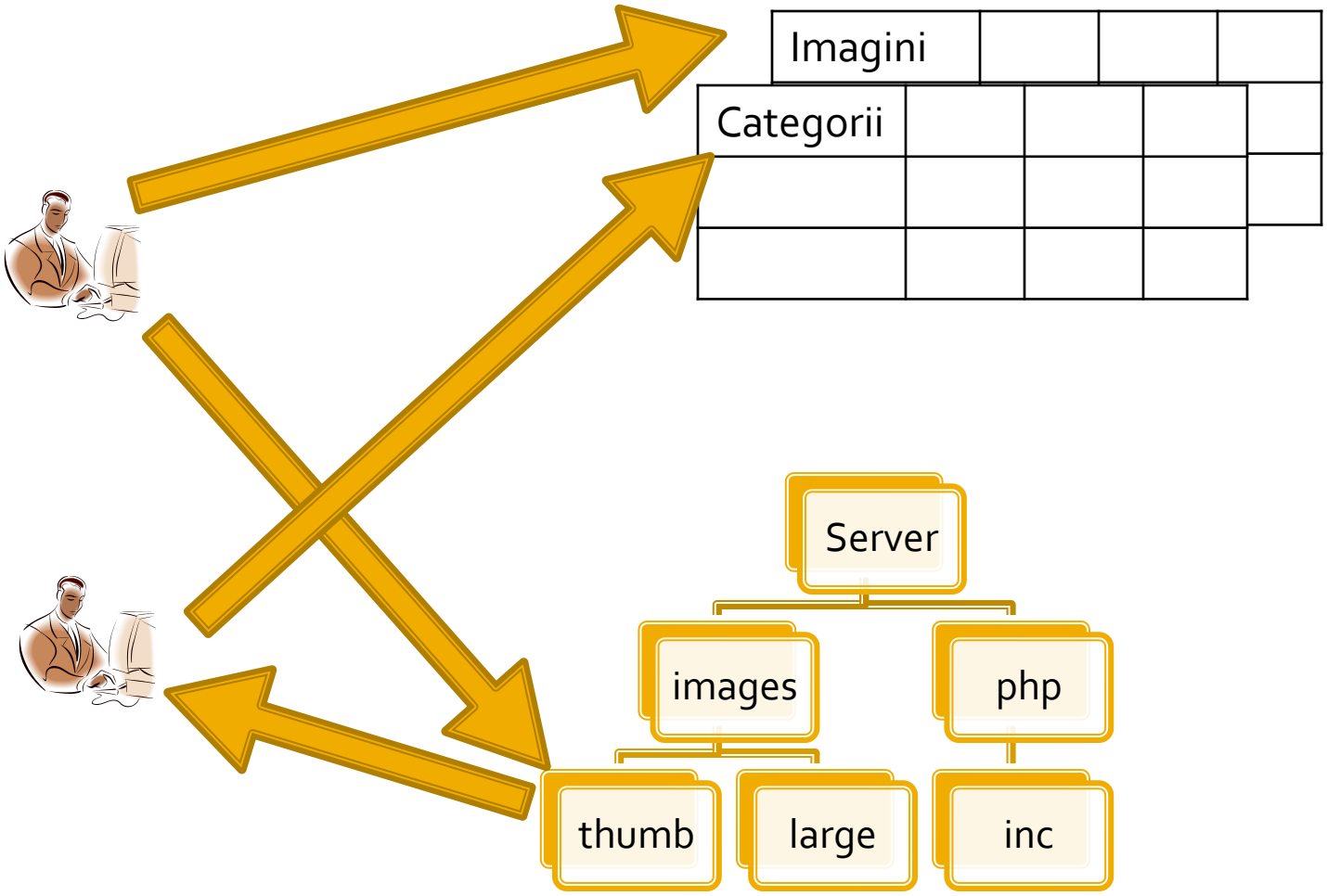
Exemplu

- 1. Galerie de imagini in care imaginile sunt ordonate dupa categorii.

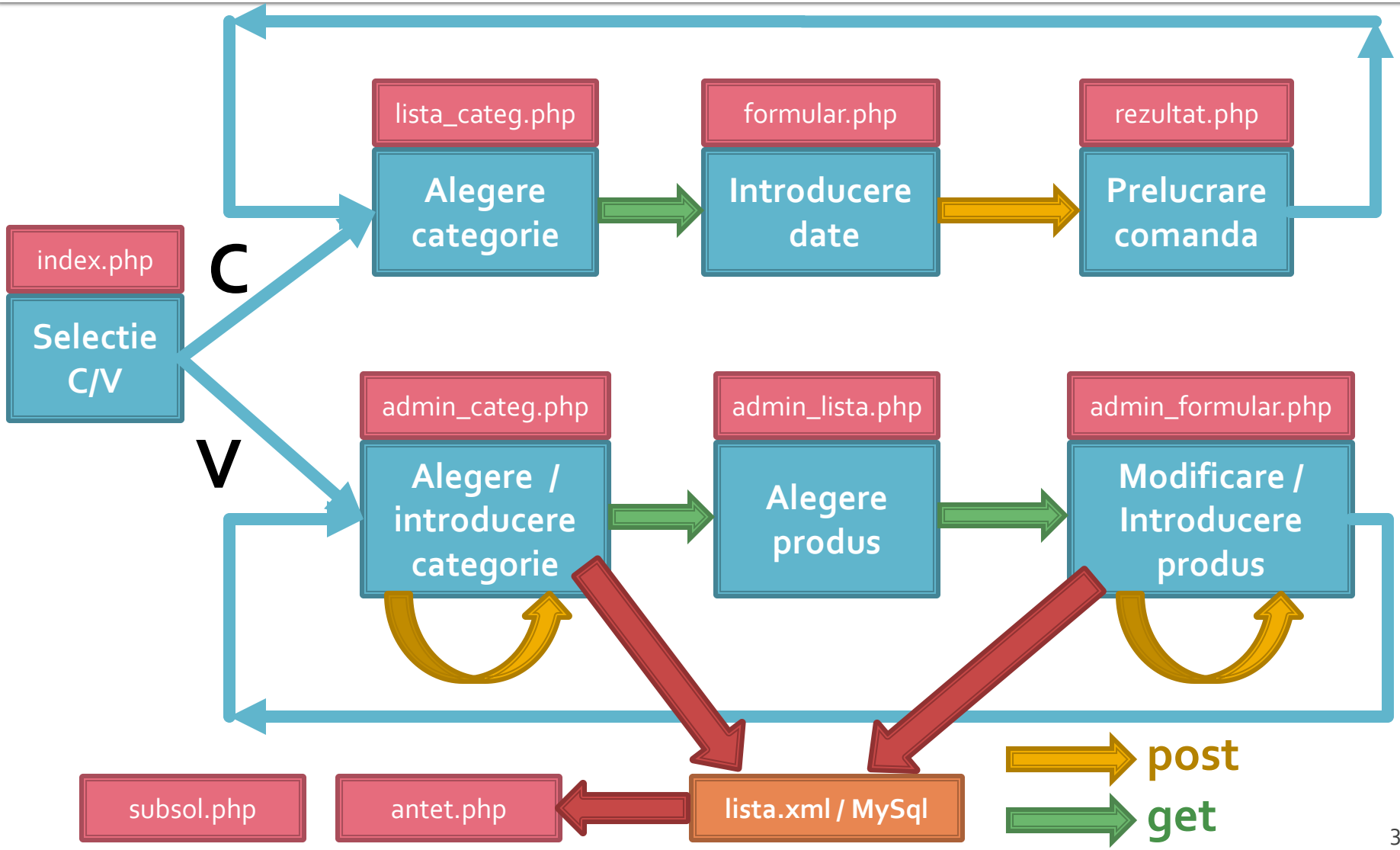
a. aplicatia pentru adaugarea de categorii si afisare a imaginilor (cu alegerea prealabila a categoriei si afisarea listei de imagini format mic)

b. aplicatia pentru adaugare de imaginilor (cu alegerea prealabila a categoriei si generarea prealabila a imaginii format mic)

Exemplu



Plan aplicatie



Examen

- **fizic 2h (1.5h)**
- **XX.06.2026 17:00/18:00/18:30 (+proiect)**
- probleme
- fiecare student are subiect propriu
- toate materialele permise
- tehnica de calcul **nu** este necesara dar este permisa

Examen

- Oricare din temele de proiect (sau asemanatoare) poate constitui una din problemele de examen
  - se va cere realizarea planului / structurii logice a aplicatiei
- Se poate cere scrierea unui cod pentru realizarea anumitor operatii, fara necesitatea corectitudinii tehnice absolute (“;”, nume corect al functiilor, parametri functie etc.)
- Se poate cere interpretarea unui cod php/MySql cu identificarea efectului

Aspecte practice recomandate in realizarea aplicatiilor web

Metode de lucru recomandate 1

- Daca nu aveti acces simplu la “log-urile” server-ului **MySql** puteti vedea cum ajung efectiv interogarile la el afisand temporar textul interogarii
  - $query = "SELECT * FROM `produse` AS p WHERE `id_categ` = ".$row_result_c['id_categ'];
    echo $query; //util in perioada de testare
    - Textul prelucrat de PHP al interogarii va fi afisat in clar pe pagina facand mai usoara depanarea programului
    - Aceste linii **trebuie** eliminate in forma finala a programului ca masura de securitate

Metode de lucru recomandate 2

- Verificarea "log-ului" de erori al server-ului este principala metoda de depanare a codului PHP.
  - Centos/Ubuntu/Debian
    - putty → nano /var/log/httpd/error_log
    - http://192.168.30.5/logfile.php (nonstandard)
    - error log PHP (Lab1: php.ini + activare log PHP **recomandat**)

Metode de lucru recomandate 3

- In perioada de definitivare a formei interogarilor MySql este de multe ori benefic sa se utilizeze mai intai **MySql Workbench/PhpMyAdmin** pentru incercarea interogarilor, urmand ca apoi, cand sunteti multumiti de rezultat, sa transferati interogarea SQL in codul PHP

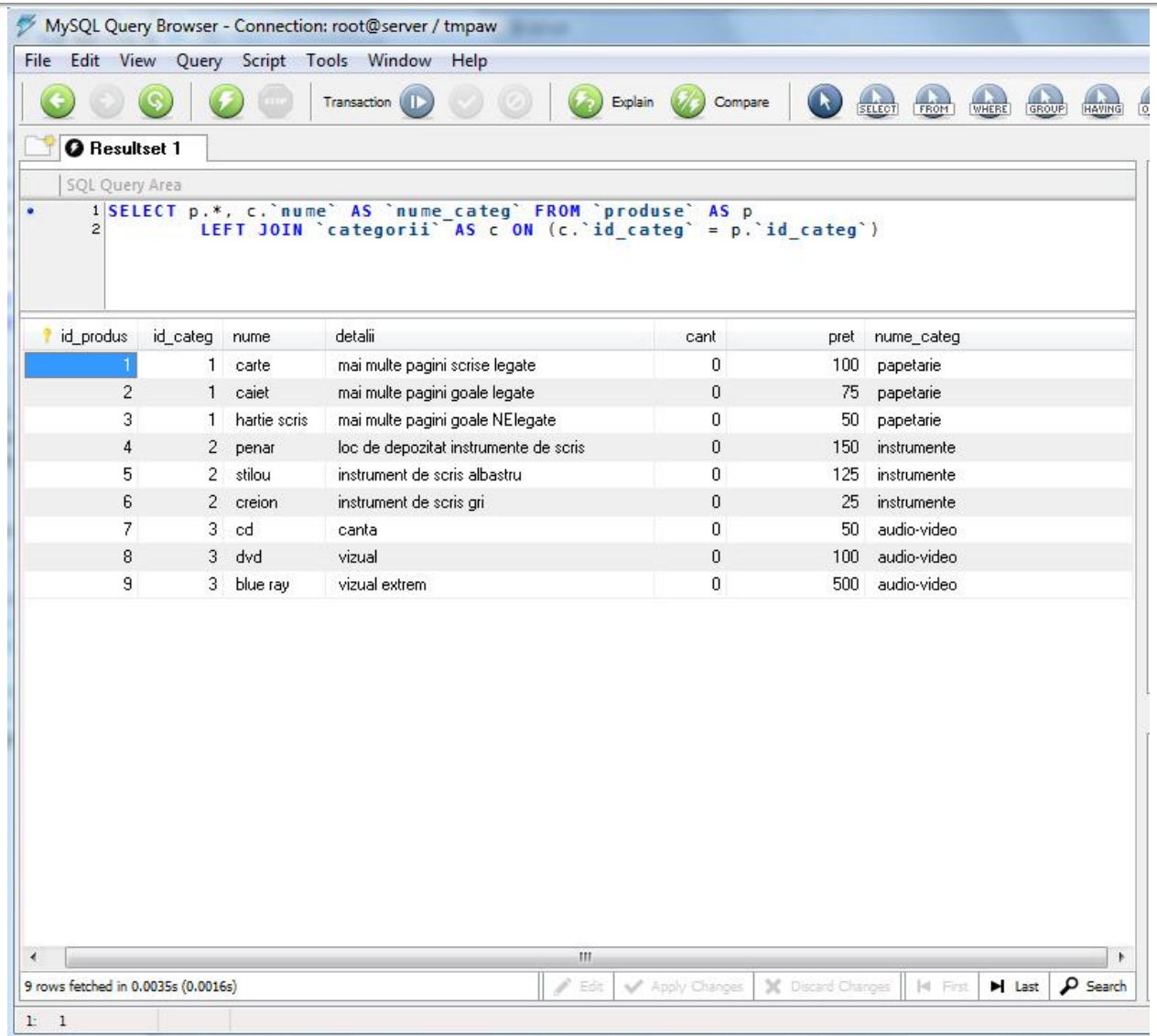
Resultset 1

SQL Query Area

```
1 SELECT p.*, c.`nume` AS `nume_categ` FROM `produse` AS p
2         LEFT JOIN `categorii` AS c ON (c.`id_categ` = p.`id_categ`)
```

id_produs	id_categ	nume	detalii	cant	pret	nume_categ
1	1	carte	mai multe pagini scrise legate	0	100	papetarie
2	1	caiet	mai multe pagini goale legate	0	75	papetarie
3	1	hartie scris	mai multe pagini goale NElegate	0	50	papetarie
4	2	penar	loc de depozitat instrumente de scris	0	150	instrumente
5	2	stilou	instrument de scris albastru	0	125	instrumente

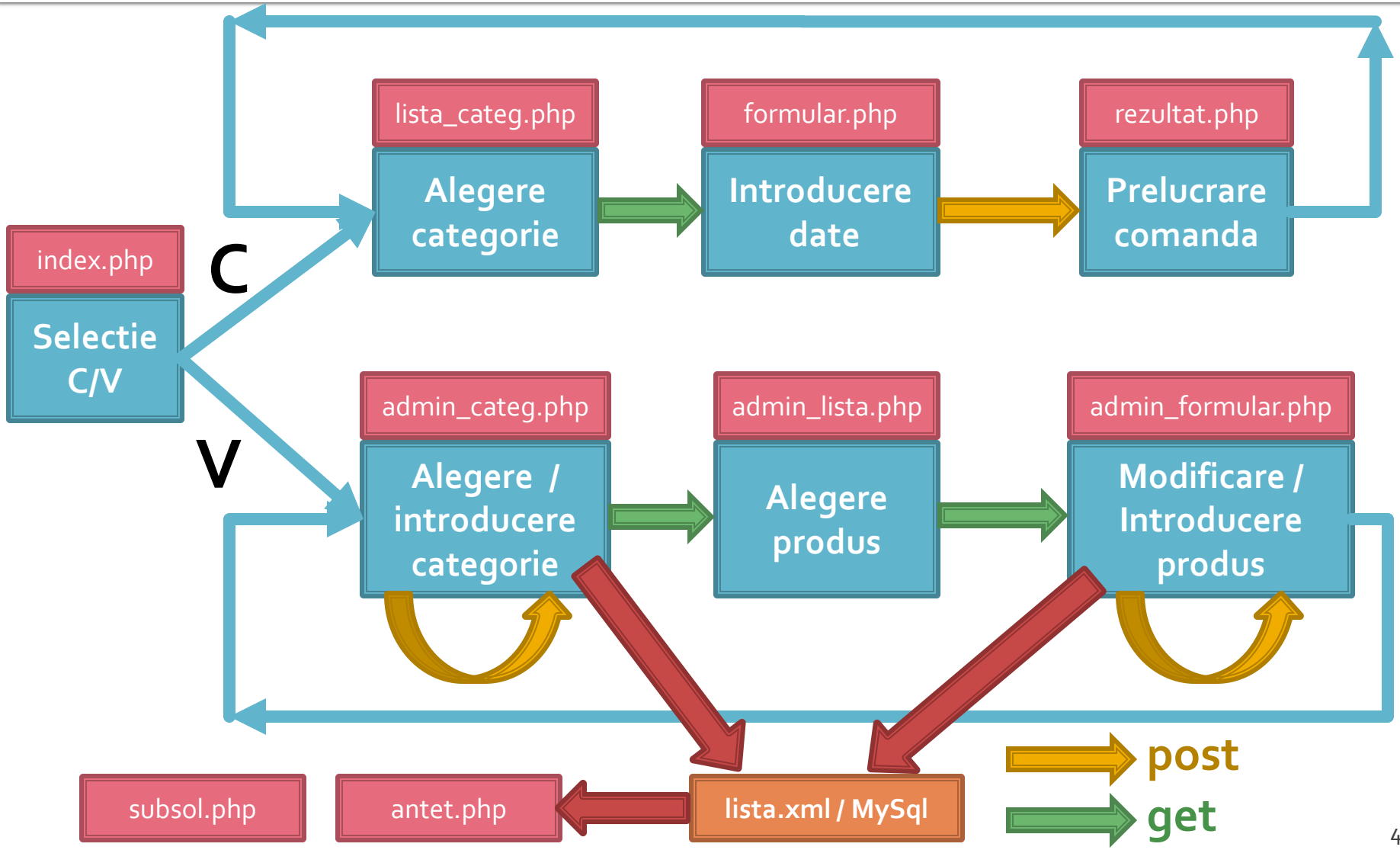
Metode de lucru recomandate 3



Metode de lucru recomandate 4

- eficienta unei aplicatii web
  - 100% - **toate prelucrarile "mutate" in RDBMS**
  - PHP **doar** afisarea datelor
- eficienta unei aplicatii MySql
  - 25% **alegerea corecta a tipurilor de date**
  - 25% **crearea indecsilor necesari in aplicatii**
  - 25% **normalizarea corecta a bazei de date**
  - 20% **cresterea complexitatii interogarilor pentru a "muta" prelucrarile pe server-ul de baze de date**
  - 5% **scrierea corecta a interogarilor**

Plan aplicatie



Metode de lucru recomandate 5a

- La implementarea unei aplicatii noi (proiect)
  1. Imaginarea planului aplicatiei (ex: S15-16,32,41)
     - "cum as vrea eu sa lucrez cu o astfel de aplicatie"
     - hartie/creion/timp – esentiale
  2. Identificarea datelor/transmisia de date intre pagini
     - get/post/fisier unic colectare-prelucrare
     - baza de date read/write
  3. Identificarea structurii logice a datelor utilizate
     - "clase" de obiecte/fenomene tratate identic
     - se are in vedere scalabilitatea (posibilitatea de crestere a numarului de elemente dintr-o clasa)

Metode de lucru recomandate 5b

- La implementarea unei aplicatii noi (proiect)
  4. Realizarea structurii bazei de date
     - In general un tabel pentru fiecare clasa logica distincta **DAR...**
     - se are in vedere scalabilitatea (daca aplicatia creste sa **NU** apara cresterea numarului de clase/tabele) **SI...**
     - normalizare
  5. Identificarea tipului de date necesar pentru coloane
     - de preferat numerele intregi in orice situatie care presupune ordonare
     - dimensiunea campurilor nu mai mare decat e necesar (poate fi fortata prin atributul "size" in eticheta HTML "input")
  6. Imaginarea formei fizice a paginilor
     - "am mai vazut asa si mi-a placut" (Don't make me think!)
     - investigarea posibilitatii de a introduce functionalitate template

Metode de lucru recomandate 5c

- La implementarea unei aplicatii noi (proiect)
  7. Populareа manuala a bazei de date cu date initiale
     - MySql Workbench (sau PhpMyAdmin) / automat / imprumut
     - programarea individuala a paginilor **are nevoie** de prezenta unor date
  8. Programare individuala a paginilor
     - In general in ordinea din planul aplicatiei (de multe ori o pagina asigura datele necesare pentru urmatoarea din plan)
     - modul "verbose" activ pentru PHP (adica: **echo** $a; **print_r**($matr))
  9. Pregatirea pentru distributie/mutare
     - testare detaliata (eventual un "cobai")
     - eliminarea adaosurilor "verbose"
     - backup
     - generarea unui eventual install/setup

Faza de verificare/depanare

- Se recomanda utilizarea posibilitatii vizualizarii tablourilor
  - In fisierul care receptioneaza datele
  - temporar pina la definitivarea codului
- utilizarea de cod "verbose" (manual) in etapele initiale de scriere a surselor PHP poate fi extinsa si la alte tipuri de date
  - singura (aproape) metoda de depanare(debug) in PHP
  - temp <?php echo "a=";echo $a; ?>

```
echo "<pre>";
print_r ($_POST);
echo "</pre>";
```

MySql

Accesul la metode externe de stocare eficienta a datelor

MySql

- Baza de date – instrument pentru stocarea si manipularea informatiei eficient si efectiv
  - datele sunt protejate de corupere sau pierderi accidentale
  - nu se utilizeaza mai multe resurse decat minimul necesar
  - datele pot fi accesate cu performanta acceptabila
- Baze de date relationale
  - model relational (matematic eficient) – Codd ~1970

DBMS, RDBMS

- DBMS – database management system aplicatii incluse in baza de date pentru accesul la informatii
- RDBMS – Relational DBMS. Majoritatea sistemelor de baze de date tind la aceasta titulatura
  - ~300 de reguli trebuie respectate
  - nici un sistem actual nu implementeaza total aceste reguli

Relatii

- Toate sistemele de baze de date sunt caracterizate de:
  - toate informatiile sunt reprezentate intr-o aranjare ordonata **bidimensionala** numita **relatie**
  - toate valorile (atribute) stocate sunt scalare (in orice celula din tabel se stocheaza **o singura** valoare)
  - toate operatiile se aplica asupra unei intregi relatii si rezulta o intreaga relatie
- Terminologii (MySql)
  - tabel – table / recordset / result set
  - linie – record / row
  - coloana – field / column

Relatii, chei

- toate informatiile sunt reprezentate intr-o aranjare bidimensionala numita relatie
  - aranjarile bidimensionale nu sunt ordonate implicit
  - datele trebuie stocate pentru a implementa o relatie in asa fel incat fiecare linie sa fie unica
- cheie candidata
  - exista cel putin o combinatie de atribute (coloane) care pot identifica in mod unic o linie
  - aceste combinatii de atribute se numesc chei candidate

Chei

- Din toate combinatiile de coloane care pot fi utilizate pentru identificarea unica a unei linii se alege **macar** una utilizata intern de RDBMS pentru ordonarea datelor – **cheie primara**
  - Celelelte chei candidate devin **chei alternative** si pot fi folosite pentru eficientizarea prelucrarilor (crearea de "index" dupa aceste chei)
- In cazul in care nu exista o combinatie de coloane utilizabila ca si cheie cu utilitate practica se introduce artificial o cheie, cu numere intregi incrementate automat de DBMS (autoincrement)
  - de multe ori este recomandata o astfel de actiune, numerele intregi fiind mult mai usor de controlat, ordonat, cautat decat alte tipuri de date
  - cheile de tip autoincrement nu e **nevoie** sa contina informatie

Normalizare

- Normalizarea asigura:
  - stocarea eficienta a datelor
  - prelucrarea eficienta a datelor
  - integritatea datelor
- Trei nivele de normalizare
- Eliminarea datelor redundante

OrderID	CustomerID	OrderDate	Items	OrderTotal
1	CACTU	1/1/1999	3 Zaanse koeken, 1 Tarte au sucre	$89.70
2	BSBEV	1/5/1999	4 Mozzarella di Giovanni	$139.20
3	SUPRD	5/2/1999	3 Ravioli Angelo, 6 Tofu	$198.06

Eliminarea datelor redundante

Order ID	SalesPerson	Hire Date	Phone	Company Name	Product Name	Quantity
10871	Dodsworth, Anne	15-Nov-1994	452	Bon app'	Alice Mutton	16
10747	Suyama, Michael	17-Oct-1993	428	Piccolo und mehr	Gorgonzola Telino	8
10258	Davolio, Nancy	01-May-1992	5467	Ernst Handel	Chef Anton's Gumbo Mix	65
11007	Callahan, Laura	05-Mar-1994	2344	Princesa Isabel Vinhos	Thüringer Rostbratwurst	10
10421	Callahan, Laura	05-Mar-1994	2344	Que Delicia	Perth Pasties	15
10558	Davolio, Nancy	01-May-1992	5467	Around the Horn	Perth Pasties	18
10431	Peacock, Margaret	03-May-1993	5176	Bottom-Dollar Markets	Alice Mutton	50
10659	King, Robert	02-Jan-1994	465	Queen Cozinha	Gorgonzola Telino	20
10273	Leverling, Janet	01-Apr-1992	3355	QUICK-Stop	Gorgonzola Telino	15
10382	Peacock, Margaret	03-May-1993	5176	Ernst Handel	Chef Anton's Gumbo Mix	32
10949	Fuller, Andrew	14-Aug-1992	3457	Bottom-Dollar Markets	Alice Mutton	6
10285	Davolio, Nancy	01-May-1992	5467	QUICK-Stop	Perth Pasties	36
10867	Suyama, Michael	17-Oct-1993	428	Lonesome Pine Restaur	Perth Pasties	3
10691	Fuller, Andrew	14-Aug-1992	3457	QUICK-Stop	Thüringer Rostbratwurst	40
10354	Callahan, Laura	05-Mar-1994	2344	Pericles Comidas clásic	Thüringer Rostbratwurst	4
10698	Peacock, Margaret	03-May-1993	5176	Ernst Handel	Thüringer Rostbratwurst	12
10962	Callahan, Laura	05-Mar-1994	2344	QUICK-Stop	Perth Pasties	20
10465	Davolio, Nancy	01-May-1992	5467	Vaffeljernet	Thüringer Rostbratwurst	18
10549	Buchanan, Steven	17-Oct-1993	3453	QUICK-Stop	Gorgonzola Telino	55

Eliminarea datelor redundante

Customers Relation

Customer ID	Company Name	Phone
ALFKI	Alfreds Futterkiste	030-0074321
ANATR	Ana Trujillo Emparedados y helados	(5) 555-4729
ANTON	Antonio Moreno Taquería	(5) 555-3932
AROUT	Around the Horn	(171) 555-7788
BERGS	Berglunds snabbköp	0921-12 34 65
BLAUS	Blauer See Delikatessen	0621-08460
BLONP	Blondel père et fils	88.60.15.31
BOLID	Bólido Comidas preparadas	(91) 555 22 82
BONAP	Bon app'	91.24.45.40
BOTTM	Bottom-Dollar Markets	(604) 555-4729
BSBEV	B's Beverages	(171) 555-1212
CACTU	Cactus Comidas para llevar	(1) 135-5555
CENTC	Centro comercial Moctezuma	(5) 555-3392

Invoices Relation

Order ID	Company Name	Phone
10643	Alfreds Futterkiste	030-0074321
10692	Alfreds Futterkiste	030-0074321
10702	Alfreds Futterkiste	030-0074321
10835	Alfreds Futterkiste	030-0074321
10952	Alfreds Futterkiste	030-0074321
11011	Alfreds Futterkiste	030-0074321
10308	Ana Trujillo Emparedados y helados	(5) 555-4729
10625	Ana Trujillo Emparedados y helados	(5) 555-4729
10759	Ana Trujillo Emparedados y helados	(5) 555-4729
10926	Ana Trujillo Emparedados y helados	(5) 555-4729
10365	Antonio Moreno Taquería	(5) 555-3932
10507	Antonio Moreno Taquería	(5) 555-3932
10535	Antonio Moreno Taquería	(5) 555-3932
10573	Antonio Moreno Taquería	(5) 555-3932
10677	Antonio Moreno Taquería	(5) 555-3932

When was she hired?

Order ID	SalesPerson	Hire Date	Phone	Company Name	Product Name
10871	Dodsworth, Anne	15-Nov-1994	452	Bon app'	Alice Mutton
10747	Suyama, Michael	17-Oct-1993	428	Piccolo und mehr	Gorgonzola Telino
10258	Davolio, Nancy	01-May-1992	5467	Ernst Handel	Chef Anton's Gumbo Mix
11007	Callahan, Laura	05-Mar-1994	2344	Princesa Isabel Vinhos	Thüringer Rostbratwurst
10421	Callahan, Laura	05-Mar-1994	2344	Que Delícia	Perth Pasties
10558	Davolio, Nancy	01-May-1992	5467	Around the Horn	Perth Pasties
10431	Peacock, Margaret	03-May-1993	5176	Bottom-Dollar Markets	Alice Mutton

Product ID	Product Name	Unit Price
1	Chai	$18.00
2	Chang	$19.00
3	Aniseed Syrup	$10.00
4	Chef Anton's Cajun Seasoning	$22.00
5	Chef Anton's Gumbo Mix	$21.35
6	Grandma's Boysenberry Spread	$25.00
7	Uncle Bob's Organic Dried Pears	$30.00
8	Northwoods Cranberry Sauce	$40.00
9	Mishi Kobe Niku	$97.00
10	Ikura	$31.00
11	Queso Cabrales	$21.00
12	Queso Manchego La Pastora	$38.00
13	Konbu	$6.00
14	Tofu	$23.25

These are not the same value

Order ID	Product Name	Unit Price	Quantity	Unit Price
10248	Mozzarella di Giovanni	$34.80	5	$174.00
10248	Queso Cabrales	$21.00	12	$168.00
10248	Singaporean Hokkien Fried Mee	$14.00	10	$98.00
10249	Manjimup Dried Apples	$53.00	40	$1,696.00
10249	Tofu	$23.25	9	$167.40

Prima forma normala

- toate valorile sunt scalare

OrderID	CustomerID	OrderDate	Items	OrderTotal
1	CACTU	1/1/1999	3 Zaanse koeken, 1 Tarte au sucre	$89.70
2	BSBEV	1/5/1999	4 Mozzarella di Giovanni	$139.20
3	SUPRD	5/2/1999	3 Ravioli Angelo, 6 Tofu	$198.06

- nu toate rezolvarile sunt eficiente

OrderID	CustomerID	Item1	Qty1	Item2	Qty2	Item3	Qty3
1	ANTON	Queso Cabrales	4	Tofu	3	Ravioli Angelo	1
2	BLAUS	Chai	2		0		

Product	Year	TargetJan	ActualJan	TargetFeb	ActualFeb
Aniseed Syrup	2004	$1,000.00	$1,300.00	$0.00	$0.00
Chai	2004	$4,000.00	$2,000.00	$0.00	$0.00
Chang	2004	$3,000.00	$8,022.00	$0.00	$0.00

A doua forma normala

- O relatie este in a **doua** forma normala cand este in **prima** forma normala si suplimentar atributele (valorile de pe coloana) depind de **intreaga cheie** candidata aleasa

Product Name	SupplierName	Category Name	SupplierPhoneNumber
Chai	Exotic Liquids	Beverages	(171) 555-2222
Chang	Exotic Liquids	Beverages	(171) 555-2222
Guaraná Fantástica	Refrescos Americanas LTDA	Beverages	(11) 555 4640
Sasquatch Ale	Bigfoot Breweries	Beverages	(503) 555-9931
Steeleye Stout	Bigfoot Breweries	Beverages	(503) 555-9931
Côte de Blaye	Aux joyeux ecclésiastiques	Beverages	(1) 03.83.00.68
Chartreuse verte	Aux joyeux ecclésiastiques	Beverages	(1) 03.83.00.68
Ipoh Coffee	Leka Trading	Beverages	555-8787
Laughing Lumberjack Lager	Bigfoot Breweries	Beverages	(503) 555-9931
Outback Lager	Pavlova, Ltd.	Beverages	(03) 444-2343

A doua forma normala

Product ID	Product Name	Category
1	Chai	Beverages
2	Chang	Beverages
3	Aniseed Syrup	Condiments
4	Chef Anton's Cajun Seasoning	Condiments
5	Chef Anton's Gumbo Mix	Condiments
6	Grandma's Boysenberry Spread	Condiments
7	Uncle Bob's Organic Dried Pears	Produce

Supplier ID	SupplierName	SupplierPhoneNumber
1	Exotic Liquids	(171) 555-2222
2	New Orleans Cajun Delights	(100) 555-4822
3	Grandma Kelly's Homestead	(313) 555-5735
4	Tokyo Traders	(03) 3555-5011
5	Cooperativa de Quesos 'Las Cabras'	(98) 598 76 54
6	Mayumi's	(06) 431-7877
7	Pavlova, Ltd.	(03) 444-2343
8	Specialty Biscuits, Ltd.	(161) 555-4448
9	PB Knäckebröd AB	031-987 65 43

A treia forma normala

- O relatie este in a **treia** forma normala cand este in a **doua** forma normala si suplimentar atributele (valorile de pe coloana) care nu fac parte din cheie sunt **mutual independente**

	Company Name	Address	City	Region	Postal Code
	Exotic Liquids	49 Gilbert St.	London		EC1 4SD
	New Orleans Cajun Delights	P.O. Box 78934	New Orleans	LA	70117
	Grandma Kelly's Homestead	707 Oxford Rd.	Ann Arbor	MI	48104
	Tokyo Traders	9-8 Sekimai	Tokyo		100
	Cooperativa de Quesos 'Las Cabras'	Calle del Rosal 4	Oviedo	Asturias	33007
	Mayumi's	92 Setsuko	Osaka		545
	Pavlova, Ltd.	74 Rose St.	Melbourne	Victoria	3058

A treia forma normala

Company Name	Address	City
Exotic Liquids	49 Gilbert St.	London
New Orleans Cajun Delights	P.O. Box 78934	New Orleans
Grandma Kelly's Homestead	707 Oxford Rd.	Ann Arbor
Tokyo Traders	9-8 Sekimai	Tokyo
Cooperativa de Quesos 'Las Cabras'	Calle del Rosal 4	Oviedo
Mayumi's	92 Setsuko	Osaka
Pavlova, Ltd.	74 Rose St.	Melbourne

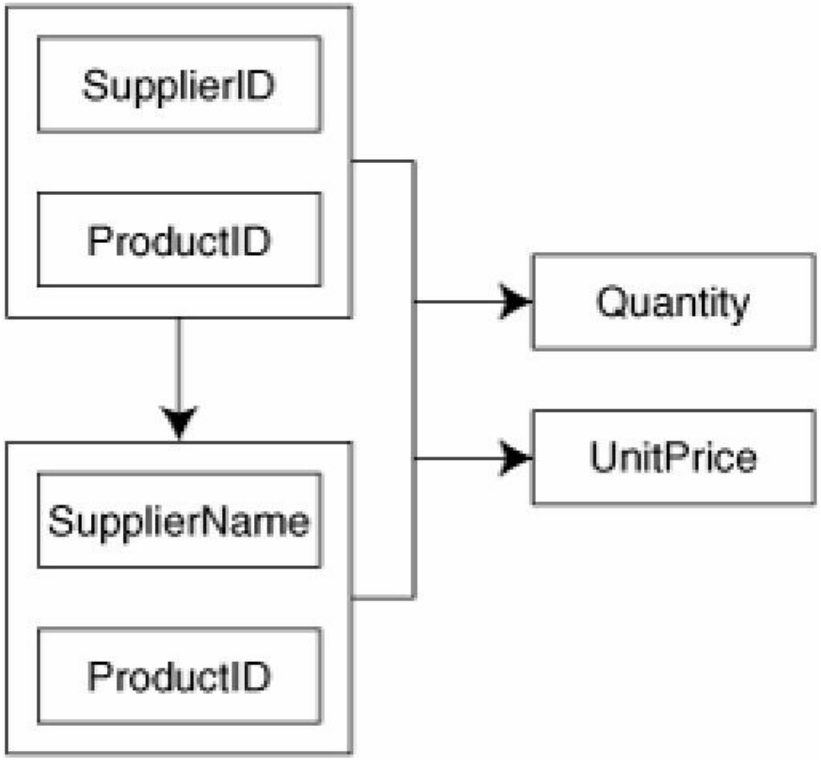
City	Region	Postal Code
Melbourne	Victoria	3058
Ste-Hyacinthe	Québec	J2S 7S8
Montréal	Québec	H1J 1C3
Bend	OR	97101
Sydney	NSW	2042
Ann Arbor	MI	48104
Boston	MA	02134
New Orleans	LA	70117
Oviedo	Asturias	33007

Normalizare suplimentara

- Se tine cont si de eliminarea datelor redundante. Anumite redundante pot fi eliminate prin introducerea de relatii suplimentare
- Forma normala Boyce/Codd cere sa nu existe dependenta functionala intre cheile candidate

Supplier ID	SupplierName	Product	Quantity	Unit Price
5	Cooperativa de Quesos 'Las Cabras'	Queso Cabrales	12	$14.00
20	Leka Trading	Singaporean Hokkien Fried Mee	10	$9.80
14	Formaggi Fortini s.r.l.	Mozzarella di Giovanni	5	$34.80
24	G'day, Mate	Manjimup Dried Apples	40	$42.40
6	Mayumi's	Tofu	9	$18.60
24	G'day, Mate	Manjimup Dried Apples	35	$42.40
19	New England Seafood Cannery	Jack's New England Clam Chowder	10	$7.70
2	New Orleans Cajun Delights	Louisiana Fiery Hot Pepper Sauce	15	$16.80

Normalizare suplimentara



	Supplier ID	SupplierName
	1	Exotic Liquids
	2	New Orleans Cajun Delights
	3	Grandma Kelly's Homestead
	4	Tokyo Traders
	5	Cooperativa de Quesos 'Las Cabras'
	6	Mayumi's

	SupplierID	ProductID	Quantity	UnitPrice
	2	65	15	$21.05
	24	53	15	$32.80
	8	20	40	$81.00
	22	47	16	$9.50
	6	14	9	$23.25
	28	59	30	$55.00
	28	60	40	$34.00
	21	46	15	$12.00

MySql

Relatii in Bazele de date

Relatii in Bazele de date

- Legaturile intre tabele pot fi
  - One to One
  - One to Many
  - Many to Many
    - Unare (auto referinta)

One to One

- Fiecare tabel poate avea corespondenta **o singura linie (row) sau nici una** de cealalta parte a relatiei
- echivalent cu o relatie "bijectiva"
- analogie cu casatorie:
  - o persoana poate fi casatorita sau nu
  - daca este casatorita va fi casatorita cu o singura persoana din tabelul cu persoane de sex opus
  - persoana respectiva va fi caracterizata de aceeasi relatie "one to one" – primeste simultan un singur corespondent in tabelul initial

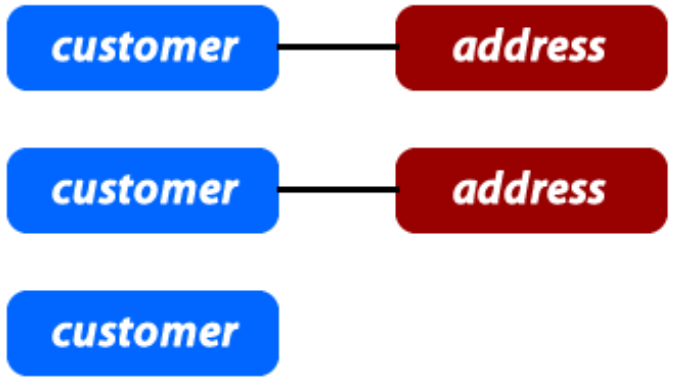
One to One

- de multe ori legaturile "one to one" se bazeaza pe reguli externe
- de obicei se poate realiza usor si eficient gruparea ambelor tabele in unul singur

CUSTOMERS		
customer_id	customer_name	address_id
101	John Doe	301
102	Bruce Wayne	302

ADDRESSES	
address_id	address
301	12 Main St., Houston TX 77001
302	1007 Mountain Dr., Gotham NY 10286

CUSTOMERS		
customer_id	customer_name	customer_address
101	John Doe	12 Main St., Houston TX 77001
102	Bruce Wayne	1007 Mountain Dr., Gotham NY 10286



One to Many

- O linie dintr-un tabel (row), identificata prin cheia primara, poate avea: **nici una, una sau mai multe linii corespondente** in celalalt tabel. In acesta o linie poate fi legata cu o **singura** linie din tabelul primar.
- Analogie cu relatii parinte/copil:
  - fiecare om are o singura mama
  - fiecare femeie poate avea nici unul, unul sau mai multi copii

One to Many, Many to One

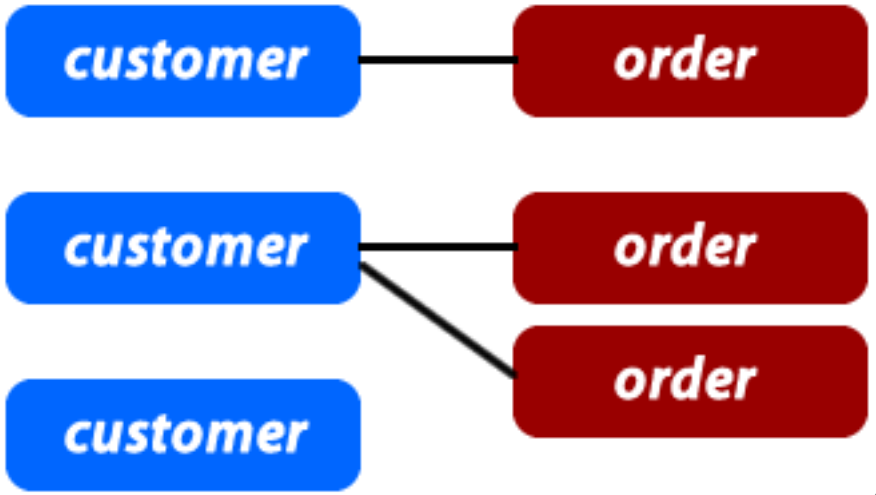
- de obicei aceste legaturi se implementeaza prin introducerea cheii primare din tabelul **One** in calitate de coloana in tabelul **Many** (cheie externa – foreign key)

CUSTOMERS

customer_id	customer_name
101	John Doe
102	Bruce Wayne

ORDERS

order_id	customer_id	order_date	amount
555	101	12/24/09	$156.78
556	102	12/25/09	$99.99
557	101	12/26/09	$75.00



Many to Many

- Fiecare linie (row) din **ambele tabele** implicate in legatura poate fi legat cu **oricate (niciuna, una sau mai multe) linii** din tabelul corespondent.
- Analogie cu relatii de rudenie (veri de exemplu), tabel 1 – barbati, tabel 2 – femei :
  - fiecare barbat poate fi ruda cu una sau mai multe femei
  - la randul ei fiecare femeie poate fi ruda cu unul sau mai multi barbati

Many to Many

- de obicei aceste legaturi se implementeaza prin introducerea unui tabel **suplimentar** (numit tabel **asociat** sau de **legatura**) care sa memoreze legaturile

ORDERS

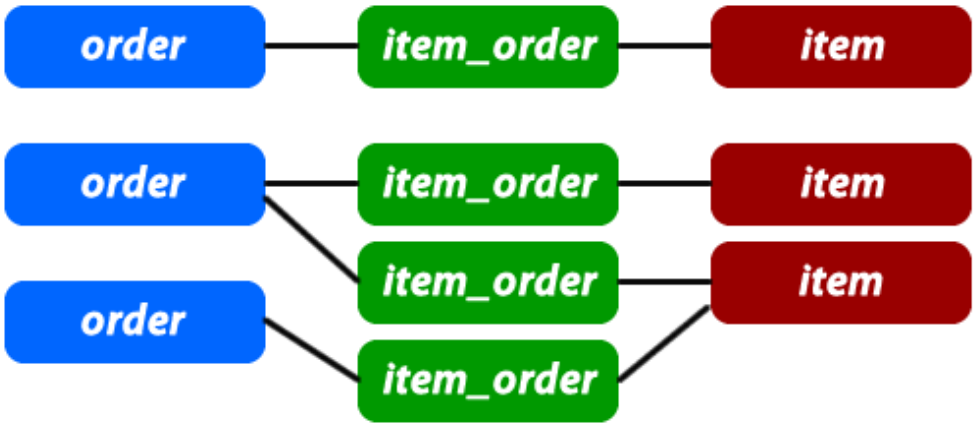
order_id	customer_id	order_date	amount
555	101	12/24/09	$156.78
556	102	12/25/09	$99.99

ITEMS

item_id	item_name	item_description
201	Tickle Me Elmo	It wants to be tickled
202	District 9 DVD	Awesome sci-fi movie
203	Batarang	It is very sharp

ITEMS_ORDERS

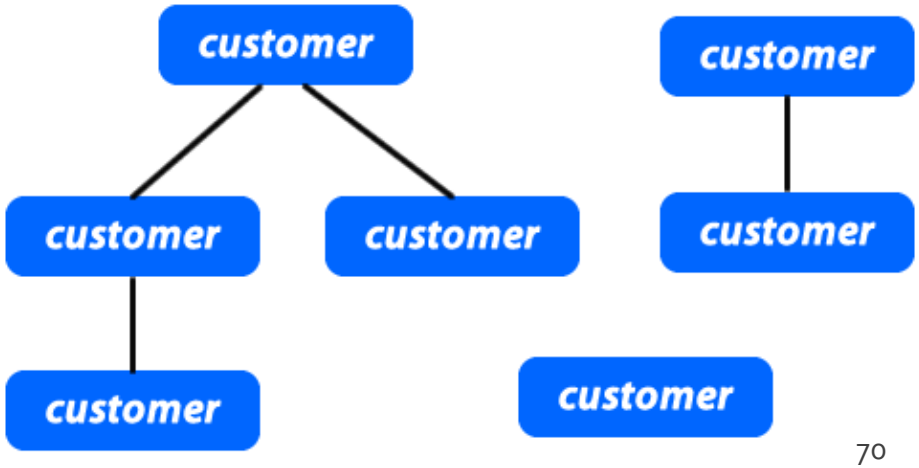
order_id	item_id
555	201
555	202
556	202
556	203



Self Referencing (unare)

- Un caz particular de legatura “one to many” in care legatura e in interiorul aceluiasi tabel
- rezolvarea este similara, introducerea unei coloane suplimentara, cu referinta la cheia primara din tabel
- analogie cu relatii parinte copil cand ambele persoane se regasesc in acelasi tabel

CUSTOMERS		
customer_id	customer_name	referrer_customer_id
101	John Doe	0
102	Bruce Wayne	101
103	James Smith	101



Relatii in Bazele de date

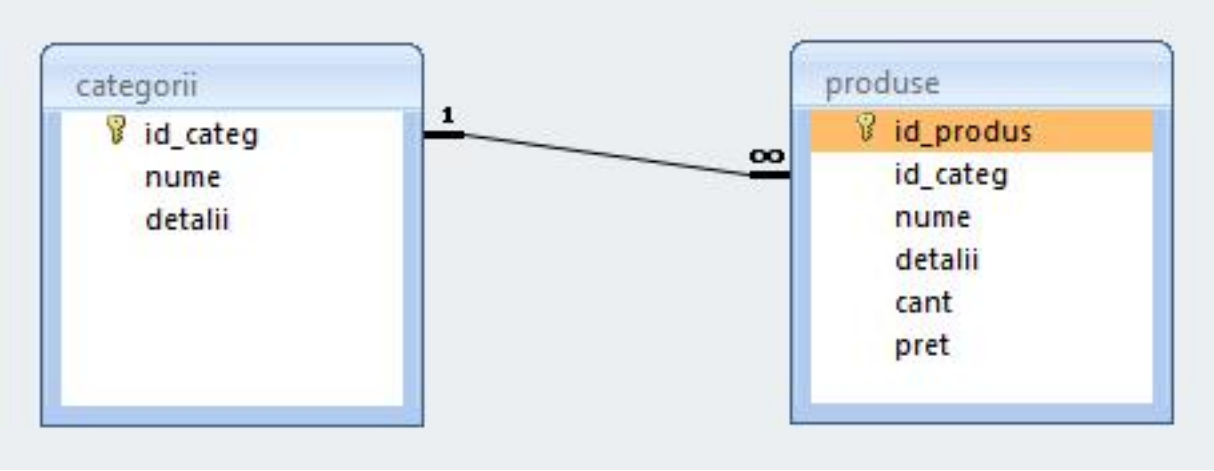
- Respectarea formelor normale ale bazelor de date aduce nenumarate avantaje
- Efectul secundar este dat de necesitatea separarii datelor intre mai multe tabele
- In exemplul utilizat avem doua concepte diferite din punct de vedere logic
  - produs
  - categorie de produs

Relatii in Bazele de date

- In exemplul utilizat avem doua concepte diferite din punct de vedere logic
  - **produs**
  - **categorie** de produs
- Cele doua tabele nu sunt independente
- Intre ele exista o legatura data de functionalitatea dorita pentru aplicatie: **un produs va apartine unei anumite categorii de produse**

Relatii in Bazele de date

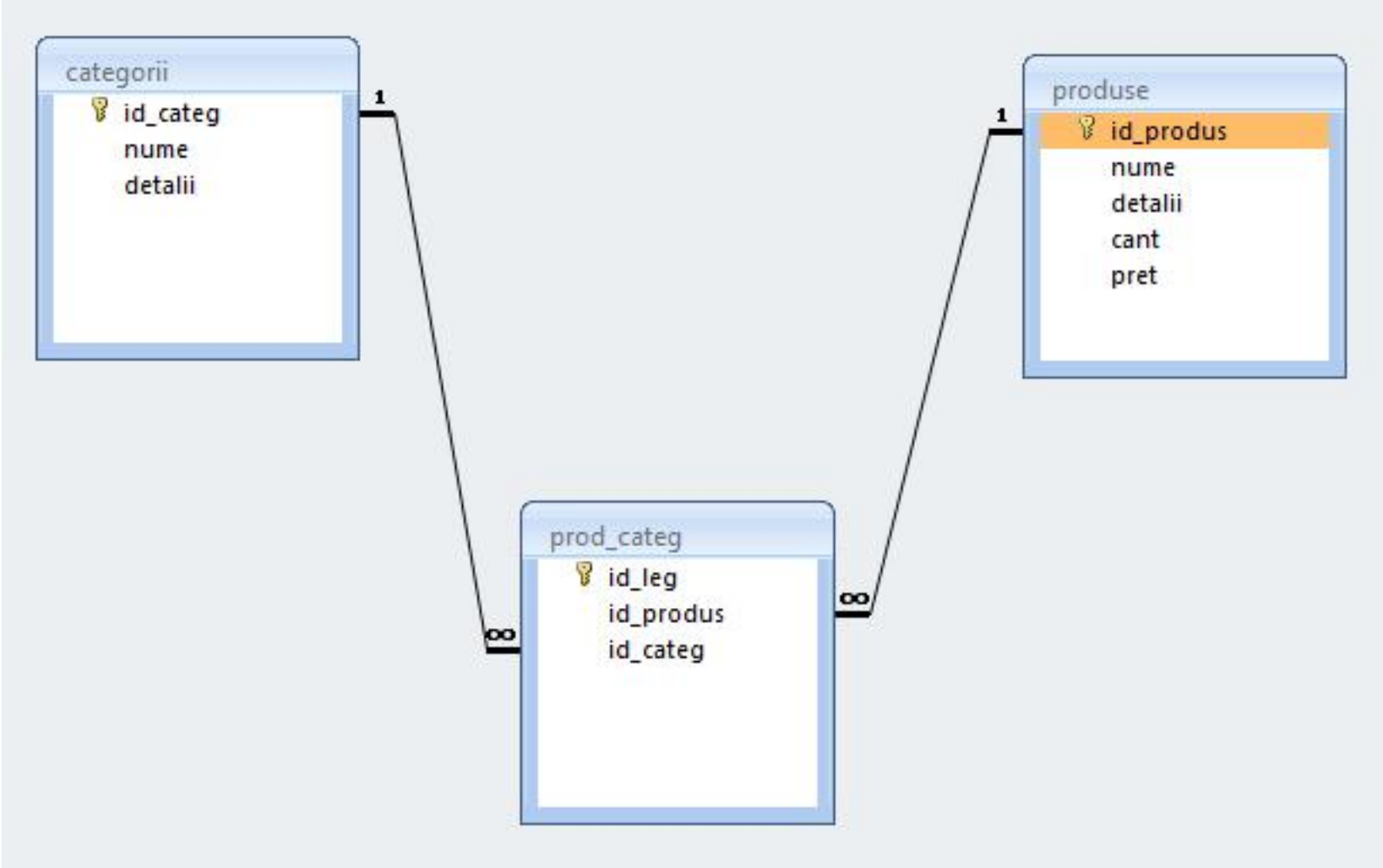
- Legaturile implementata
  - One to Many
  - in tabelul “produse” apare cheia externa (foreign key): “id_categ”



Relatii in Bazele de date

- Daca se doreste o situatie cand un produs poate apartine **mai multor categorii** (o carte cu CD poate fi inclusa si in "papetarie" si in "audio-video")
  - relatia devine de tipul **Many to Many**
  - e necesara introducerea unui tabel de legatura cu coloanele "id_leg" (cheie primara), "id_categorie" si "id_produs" (chei externe)

Relatii in Bazele de date



Relatii

- **Nu** trebuie evitate relatiile
  - Many to Many
  - One to Many
- Prelucrarea cade in sarcina server-ului de baze de date (**R**DB**MS**)
  - JOIN – **esential** in aplicatii cu baze de date

MySql – eficienta

- eficienta unei aplicatii web
  - 100% - **toate prelucrarile "mutate" in RDBMS**
  - PHP **doar** afisarea datelor
- eficienta unei aplicatii MySql
  - 25% **alegerea corecta a tipurilor de date**
  - 25% **crearea indecsilor necesari in aplicatii**
  - 25% **normalizarea corecta a bazei de date**
  - 20% **cresterea complexitatii interogarilor pentru a "muta" prelucrarile pe server-ul de baze de date**
  - 5% **scrierea corecta a interogarilor**

MySql

Tipuri de date

MySql – tipuri de date

- numeric
  - intregi
    - BIT (implicit 1 bit)
    - TINYINT (implicit 8 biti)
    - SMALLINT (implicit 16 biti)
    - INTEGER (implicit 32biti)
    - BIGINT (implicit 64biti)
  - real
    - FLOAT
    - DOUBLE
    - DECIMAL – fixed point

MySql – tipuri de date

- data/timp
  - DATE ('YYYY-MM-DD')
    - '1000-01-01' pana la '9999-12-31'
  - DATETIME ('YYYY-MM-DD HH:MM:SS')
    - '1000-01-01 00:00:00' pana la '9999-12-31 23:59:59'
  - TIMESTAMP ('YYYY-MM-DD HH:MM:SS')
    - '1970-01-01 00:00:00' pana la partial 2037

MySql – tipuri de date

- sir
  - CHAR (M)
    - sir de lungime constanta M, M<255
  - VARCHAR (M)
    - sir de lungime variabila, maxim M, M<255 (M<65535)
- cantitati mari de date
  - TEXT
    - au alocat un set de caractere, operatiile tin cont de acesta
  - BLOB
    - sir de octeti, operatiile tin cont de valoarea numerica
  - TINYBLOB/TINYTEXT, BLOB/TEXT, MEDIUMBLOB/MEDIUMTEXT, LARGEBLOB/LARGETEXT
    - date 2^8-1, 2^{16}-1, 2^{24}-1, 2^{32}-1 = 4GB

MySql – tipuri de date

- enumerare
  - ENUM('val1','val2',...)
    - una singura din cele maxim 65535 valori distincte posibile
  - SET('val1','val2',...)
    - niciuna sau mai multe din cele maxim 64 valori distincte
    - echivalent cu "setare de biti" intr-un intreg pe 64 biti cu tabela asociata

Metode de stocare

Metode de stocare

- Metoda de stocare a datelor nu e o caracteristica a server-ului ci a fiecarui tabel in parte
- Exemplu ulterior CREATE: "ENGINE = InnoDB"
- MySql suporta diferite metode de stocare, fiecare cu avantajele/dezavantajele sale
- Implicit se foloseste metoda MyISAM, dar la instalarea server-ului (laborator 1) o anumita selectie poate schimba valoarea implicita in InnoDB
- **Alegerea metodei de stocare potrivita are implicatii majore asupra performantei aplicatiei**

Metode de stocare

- MyISAM
- InnoDB
- Memory
- Merge
- Archive
- Federated
- NDBCLUSTER
- CSV
- Blackhole
- Example

Metode de stocare

- **MyISAM**
  - metoda de stocare implicita in MySql (**<5.5**)
  - performanta ridicata (resurse ocupate si viteza)
  - posibilitatea cautarii in intregul text (index FULLTEXT)
  - blocare acces la nivel de tabel
  - **nu** accepta tranzactii
  - **nu** accepta FOREIGN KEY
    - probleme relative la integritatea datelor
- **InnoDB**
- **Memory**

Metode de stocare

- MyISAM
- InnoDB
  - devine metoda de stocare implicita in MySql daca la instalare se alege model tranzactional (**sau >5.5**)
  - performanta medie (resurse ocupate si viteza)
  - blocare acces la nivel de linie
  - nu accepta index FULLTEXT
    - incepand cu MySql 5.6.4 este introdus index FULLTEXT
  - accepta tranzactii
  - accepta FOREIGN KEY
    - probleme mai putine la integritatea datelor prin constrangeri intre tabele
- Memory

Metode de stocare

- MyISAM
- InnoDB
- Memory
  - metoda de stocare recomandata pentru tabele temporare
  - performanta maxima (viteza – datele sunt stocate in RAM)
    - **la oprirea server-ului datele se pierd**, tabelul este pastrat dar va fi fara nici o linie
  - **nu** accepta tipuri de date mari (BLOB, TEXT) – maxim 255 octeti
  - **nu** accepta index FULLTEXT
  - **nu** accepta tranzactii
  - **nu** accepta FOREIGN KEY
    - probleme relative la integritatea datelor

Limbaj SQL

Referinta relativa

- Referinta la elementele unei baze de date se face prin utilizarea numelui elementului respectiv daca nu exista dubii (referinta relativa)
  - daca baza de date este selectata se poate utiliza numele tabelului pentru a identifica un tabel
    - USE db_name;
      SELECT * FROM tbl_name;
  - daca tabelul este identificat in instructiune se poate utiliza numele coloanei pentru a identifica coloana implicata
    - SELECT col_name FROM tbl_name;

Referinta absoluta

- In cazul in care apare ambiguitate in identificarea unui element se poate indica descendenta sa pâna la disparitia ambiguitatii
- Astfel, o anumita coloana, col_name, care apartine tabelului tbl_name din baza de date (schema) db_name poate fi identificata in functie de necesitati ca:
  - col_name
  - tbl_name.col_name
  - db_name.tbl_name.col_name

Nume de identificatori permise

- Numele de identificatori pot avea o lungime de reprezentare de maxim 64 octeti cu exceptia Alias care poate avea o lungime de 255 octeti
- Nu sunt permise:
  - caracterul NULL (ASCII 0x00) sau 255 (0xFF)
  - caracterul "/"
  - caracterul "\"
  - caracterul "."
- Numele nu se pot termina cu caracterul spatiu

Nume de identificatori permise

- Numele de baze de date nu pot contine decat caractere permise in numele de directoare
- Numele de tabele nu pot contine decat caractere permise in numele de fisiere
- Anumite caractere utilizate vor impune necesitatea trecerii intre apostroafe a numelui
- Apostroful utilizat pentru nume de identificatori e apostroful invers (**backtick**) "`"
  - pentru a nu aparea confuzie cu variabilele sir
  - nu necesita aparitia apostrofului caracterele alfanumerice normale, "_", "$"
- numele rezervate trebuie de asemenea cuprinse intre apostroafe pentru a fi utilizate

Alias

- Orice identificator poate primi un nume asociat – **Alias**
  - pentru a elimina ambiguitati
  - pentru a usura scrierea
  - pentru a modifica numele coloanelor in rezultate
- Definirea unui alias se face in interiorul unei interogari SQL si are efect in aceeasi interogare
  - SELECT `t`.* FROM `tbl_name` AS t;
  - SELECT `t`.* FROM `tbl_name` t;

Alias

- Desi utilizarea cuvantului cheie AS nu este obligatorie, obisnuinta utilizarii lui este recomandata, pentru a evita/identifica alocari eronate
  - SELECT id, nume FROM produse; ← doua coloane
  - SELECT id nume FROM produse; ← Alias "nume" creat pentru coloana "id"

Alias

- Usurinta scrierii
  - SELECT * FROM un_tabel_cu_nume_lung AS t WHERE t.col1 = 5 AND t.col2 = 'ceva'
- Modificarea numelui de coloana, sau crearea unui nume pentru o coloana calculata in rezultate
  - SELECT CONCAT(nume,' ',prenume) AS nume_intreg FROM studenti AS s;
  - SELECT `n1` AS `Nume`, `n2` AS `Nota`, `n3` AS `Numar matricol` FROM elevi AS e;

Alias

- Eliminarea ambiguitatilor
  - intalnita frecvent la relatii “many to many”
  - SELECT p.*, c.`nume` AS `nume_categ` FROM `produse` AS p
    LEFT JOIN `categorii` AS c ON (c.`id_categ` = p.`id_categ`)";
  - tabelele c si p contin ambele coloanele “nume” si “id_categ”
    - modificarea denumirii coloanei “nume” din categorii pentru evitarea confuziei cu coloana “nume” din produse
    - eventual se pot da nume diferite coloanelor “id_categ” pentru a evita ambiguitatea in interiorul clauzei ON (desi si referinta absoluta rezolva aceasta problema)

Interogari SQL

Interogari

- Interogarile SQL pot fi
  - **Pentru definirea datelor, crearea programatica de baze de date, tabele, coloane etc.**
    - mai putin utilizate in majoritatea aplicatiilor
    - ALTER, CREATE, DROP, RENAME
  - Pentru manipularea datelor
    - SELECT, INSERT, UPDATE, REPLACE etc.
  - Pentru control/administrare tranzactii/server
- De cele mai multe ori aplicatiile doar manipuleaza datele. Structura este definita in avans de asemenea si administrarea este mai facila cu programe specializate
- Urmatoarele definitii sunt cele valabile pentru **MySql 5.0**

ALTER DATABASE

- ALTER {DATABASE | SCHEMA} [db_name] alter_specification ...
  - alter_specification:
    - [DEFAULT] CHARACTER SET [=] charset_name
    - [DEFAULT] COLLATE [=] collation_name
- Modifica caracteristicile generale ale unei baze de date
- E necesar dreptul de acces (privilegiu) ALTER aspra respectivei baze de date

ALTER TABLE

- ALTER TABLE {table_option [, table_option] ... | partitioning_specification}
  - table_option:
    - ADD [COLUMN] col_name column_definition [FIRST | AFTER col_name]
    - ADD {INDEX|KEY} [index_name] [index_type] (index_col_name,...) [index_option] ...
    - ADD [CONSTRAINT [symbol]] PRIMARY KEY [index_type] (index_col_name,...) [index_option] ...
    - CHANGE [COLUMN] old_col_name new_col_name column_definition [FIRST|AFTER col_name]
    - MODIFY [COLUMN] col_name column_definition [FIRST | AFTER col_name]
    - DROP [COLUMN] col_name
    - DROP PRIMARY KEY
    - DROP {INDEX|KEY} index_name
    - DISABLE KEYS
    - ENABLE KEYS
    - RENAME [TO] new_tbl_name
- permite modificarea unui tabel existent

CREATE DATABASE

- CREATE {DATABASE | SCHEMA} [IF NOT EXISTS] db_name [create_specification…]
  - create_specification:
    - [DEFAULT] CHARACTER SET charset_name
    - [DEFAULT] COLLATE collation_name
- Crearea unei noi baze de date
- Necesara la instalarea unei aplicatii
- Fisierele SQL “backup” contin succesiunea DROP…, CREATE… pentru a inlocui datele in intregime

CREATE INDEX

- CREATE [UNIQUE|FULLTEXT|SPATIAL] INDEX index_name [USING index_type] ON tbl_name *(*index_col_name,...*)*
  - index_col_name*:*
    - col_name [(length)] [ASC | DESC]
- Crearea unui index se face de obicei la crearea tabelului
- Interogarea CREATE INDEX ... se transpune in interogare ALTER TABLE ...

CREATE TABLE

- CREATE [TEMPORARY] TABLE [IF NOT EXISTS] tbl_name [(create_definition,...)] [table_options] [select_statement]
- CREATE [TEMPORARY] TABLE [IF NOT EXISTS] tbl_name [(] LIKE old_tbl_name [)]
- Interogarea de creare a tabelului este memorata intern de server-ul MySql pentru utilizari ulterioare (in general in ALTER TABLE sa fie cunoscute specificatiile initiale)

CREATE TABLE

- create_definition – coloana impreuna cu eventualele caracteristici (in special chei - indecsi):
  - column_definition
    - | [CONSTRAINT [symbol]] PRIMARY KEY [index_type] (index_col_name,...)
    - | KEY [index_name] [index_type] (index_col_name,...)
    - | INDEX [index_name] [index_type] (index_col_name,...)
    - | [CONSTRAINT [symbol]] UNIQUE [INDEX] [index_name] [index_type] (index_col_name,...)
    - | [FULLTEXT|SPATIAL] [INDEX] [index_name] (index_col_name,...)
    - | [CONSTRAINT [symbol]] FOREIGN KEY [index_name] (index_col_name,...) [reference_definition]
    - | CHECK (expr)
- column_definition – nume si tipul de date (curs 7-8):
  - col_name type [NOT NULL | NULL] [DEFAULT default_value] [AUTO_INCREMENT] [UNIQUE [KEY] | [PRIMARY] KEY] [COMMENT 'string'] [reference_definition]

CREATE TABLE

- Exemple
  - CREATE TABLE test (a INT NOT NULL AUTO_INCREMENT, PRIMARY KEY (a), KEY(b)) SELECT b,c FROM test2;
  - CREATE TABLE IF NOT EXISTS `schema`.`Employee` (
    `idEmployee` VARCHAR(45) NOT NULL ,
    `Name` VARCHAR(255) NULL ,
    `idAddresses` VARCHAR(45) NULL ,
    PRIMARY KEY (`idEmployee`) ,
    CONSTRAINT `fkEmployee_Addresses`
    FOREIGN KEY `fkEmployee_Addresses` (`idAddresses`)
    REFERENCES `schema`.`Addresses` (`idAddresses`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION)
    ENGINE = InnoDB
    DEFAULT CHARACTER SET = utf8
    COLLATE = utf8_bin

CREATE TABLE

- CREATE … LIKE … creaza un tabel fara date pe baza modelului unui tabel existent. Se pastreaza definitiile coloanelor si eventualele chei (index) definite in tabelul anterior
- CREATE … SELECT … creaza un tabel cu date pe baza modelului si datelor obtinute dintr-un alt tabel existent. Sunt obtinute anumite coloane (SELECT) cu tipul lor, dar fara crearea indecsilor
- CREATE TEMPORARY TABLE creaza un tabel temporar. Utilizat in cazul interogarilor complexe sau cu numar mare de rezultate

DROP

- DROP {DATABASE | SCHEMA} [IF EXISTS] db_name
- DROP INDEX index_name ON tbl_name
- DROP [TEMPORARY] TABLE [IF EXISTS] tbl_name [, tbl_name] ...
- Trebuie utilizate cu foarte mare atentie aceste interogari, stergerea datelor este ireversibila
- Fisierele SQL “backup” contin succesiunea DROP..., CREATE... pentru a inlocui datele in intregime

Interogari SQL

Interogari

- Interogarile SQL pot fi
  - Pentru definirea datelor, crearea programatica de baze de date, tabele, coloane etc.
    - mai putin utilizate in majoritatea aplicatiilor
    - ALTER, CREATE, DROP, RENAME
  - **Pentru manipularea datelor**
    - SELECT, INSERT, UPDATE, REPLACE, DELETE etc.
  - Pentru control/administrare tranzactii/server
- De cele mai multe ori aplicatiile doar manipuleaza datele. Structura este definita in avans de asemenea si administrarea este mai facila cu programe specializate
- Urmatoarele definitii sunt cele valabile pentru **MySql 5.0**

DELETE

- DELETE [LOW_PRIORITY] [QUICK] [IGNORE] FROM table_name [WHERE where_condition] [ORDER BY ...] [LIMIT row_count]
- Sterge linii din tabelul mentionat si returneaza numarul de linii sterse
- [LOW_PRIORITY] [QUICK] [IGNORE] sunt optiuni care instruiesc server-ul sa reactioneze diferit de varianta standard
- Exemplu:
  - DELETE FROM somelog WHERE user = 'jcole' ORDER BY timestamp_column LIMIT 1;

DELETE

- [WHERE where_condition] – folosit pentru a selecta liniile care trebuie sterse
  - In absenta conditiei se sterg **toate liniile** din tabel
- [LIMIT row_count] sterge numai *row_count* linii dupa care se opreste
  - In general pentru a limita ocuparea server-ului (recrearea indecsilor se face "on the fly")
  - Operatia se poate repeta pana valoarea returnata e mai mica decat row_count
- [ORDER BY …] precizeaza ordinea in care se sterg liniile identificate prin conditie

INSERT

- INSERT [LOW_PRIORITY | DELAYED | HIGH_PRIORITY] [IGNORE] [INTO] tbl_name [(col_name,...)] VALUES ({expr | DEFAULT},...) ,(...),... [ON DUPLICATE KEY UPDATE col_name=expr, ...]
- INSERT [LOW_PRIORITY | DELAYED | HIGH_PRIORITY] [IGNORE] [INTO] tbl_name SET col_name={expr | DEFAULT}, ...[ON DUPLICATE KEY UPDATE col_name=expr, ...]
- INSERT [LOW_PRIORITY | HIGH_PRIORITY] [IGNORE] [INTO] tbl_name [(col_name,...)] SELECT ... [ON DUPLICATE KEY UPDATE col_name=expr, ...]

INSERT

- Introduce linii noi intr-un tabel
- Primele doua forme introduc valori exprimate explicit
  - INSERT … VALUES …
  - INSERT … SET …
- INSERT … SELECT … introduce valori rezultate obtinute printr-o interogare SQL
- DELAYED – interogarea primeste raspuns de la server imediat, dar inserarea datelor se face efectiv cand tabelul implicat nu este folosit
  - valabil pentru metodele de stocare MyISAM, Memory, Archive

INSERT

- Exemple
  - INSERT INTO tbl_name (a,b,c) VALUES (1,2,3), (4,5,6), (7,8,9);
  - INSERT INTO tbl_name (col1,col2) VALUES (15,col1*2);
  - INSERT INTO table1 (field1,field3,field9) SELECT field3,field1,field4 FROM table2;

INSERT

- INSERT … ON DUPLICATE KEY UPDATE …
- Daca inserarea unei noi linii ar conduce la duplicarea unei chei primare sau unice, in loc sa se introduca o noua linie se modifica linia anterioara
- Exemple
  - INSERT INTO table (a,b,c) VALUES (1,2,3) ON DUPLICATE KEY UPDATE c=c+1;
  - INSERT INTO table (a,b,c) VALUES (1,2,3),(4,5,6) ON DUPLICATE KEY UPDATE c=VALUES(a)+VALUES(b);

REPLACE

- REPLACE [LOW_PRIORITY | DELAYED] [INTO] tbl_name [(col_name,...)] VALUES ({expr | DEFAULT},...),(...),...
- REPLACE [LOW_PRIORITY | DELAYED] [INTO] tbl_name SET col_name={expr | DEFAULT}, ...
- REPLACE [LOW_PRIORITY | DELAYED] [INTO] tbl_name [(col_name,...)] SELECT ...
- REPLACE functioneaza similar cu INSERT
  - daca noua linie nu realizeaza duplicarea unei chei primare sau unice se realizeaza insertie
  - daca noua linie realizeaza duplicarea unei chei primare sau unice se sterge linia anterioara dupa care se insereaza noua linie
- REPLACE e extensie MySql a limbajului SQL standard

UPDATE

- UPDATE [LOW_PRIORITY] [IGNORE] tbl_name SET col_name1=expr1 [, col_name2=expr2 ...] [WHERE where_condition] [ORDER BY ...] [LIMIT row_count]
- Modificarea valorilor stocate intr-o linie
- Exemple
  - UPDATE persondata SET age=15 WHERE id=6;
  - UPDATE persondata SET age=age+1;

SELECT

- SELECT [ALL | DISTINCT | DISTINCTROW] [HIGH_PRIORITY] [STRAIGHT_JOIN] select_expr, ... [FROM table_references
  - [WHERE where_condition]
  - [GROUP BY {col_name | expr | position} [ASC | DESC], ... [WITH ROLLUP]]
  - [HAVING where_condition]
  - [ORDER BY {col_name | expr | position} [ASC | DESC], ...]
  - [LIMIT {[offset,] row_count | row_count OFFSET offset}]
-]

SELECT

- SELECT este **cea mai importanta** interogare SQL.
- Intelegerea setarilor si utilizarea inteligenta a indecsilor stau la baza eficientei unei aplicatii
- E absolut necesara realizarea interogarii in asa fel incat datele returnate sa fie exact cele dorite (prelucrarea sa se realizeze pe server-ul MySql)

SELECT

- select_expr: macar o expresie selectata trebuie sa apara
  - identifica ceea ce trebuie extras ca valori de iesire din baza de date
  - pot fi nume de coloana(e)
  - pot fi date de sinteza (rezultate din utilizarea unor functii MySql) – necesara atribuirea unui Alias
    - SELECT CONCAT(last_name,', ',first_name) AS full_name FROM mytable ORDER BY full_name;

SELECT

- WHERE where_condition, HAVING where_condition sunt utilizate pentru a introduce criterii de selectie
  - in general au comportare similara si sunt interschimbabile
  - WHERE accepta orice operatori mai putin functii aggregate – de "sumare" (COUNT, MAX)
  - HAVING acepta functii aggregate, dar se aplica la sfarsit, exact inainte de a fi trimise datele clientului, **fara nici o optimizare** – utilizarea este recomandata doar cand nu exista echivalent WHERE

SELECT

- ORDER BY {col_name | expr | position} [ASC | DESC]
  - ordoneaza datele returnate dupa anumite criterii (valoarea unei anumite coloane sau functii).
    - Implicit ordonarea este crescatoare ASC, dar se poate specifica ordine descrescatoare DESC
- GROUP BY {col_name | expr | position}
  - realizeaza gruparea liniilor returnate dupa anumite criterii
  - permite utilizarea functiilor aggregate (de sumare)

SELECT

- GROUP BY – functii aggregate
  - AVG(expresie) – mediere valorilor
    - SELECT student_name, AVG(test_score) FROM student GROUP BY student_name;
  - COUNT(expresie), COUNT(*)
    - SELECT COUNT(*) FROM student;
    - SELECT COUNT(DISTINCT results) FROM student;
    - SELECT student.student_name,COUNT(*) FROM student,course WHERE student.student_id=course.student_id GROUP BY student_name;
    - SELECT columnname, COUNT(columnname) FROM tablename GROUP BY columnname HAVING COUNT(columnname)>1
- Cuvantul cheie DISTINCT este utilizat pentru a procesa doar liniile cu valori diferite
  - exemplu: 100 de note (rezultate) la examen
    - COUNT(results) va oferi raspunsul 100
    - COUNT(DISTINCT results) va oferi raspunsul 7 (notele diferite 4,5,6,7,8,9,10)

SELECT

- GROUP BY – functii aggregate
  - MIN(expresie), MAX(expresie) – minim si maxim
    - SELECT student_name, MIN(test_score), MAX(test_score) FROM student GROUP BY student_name;
  - SUM(expresie) – sumarea valorilor
    - SELECT year, SUM(profit) FROM sales GROUP BY year;
- WITH ROLLUP – operatii de sumare super-aggregate (un nivel suplimentar de agregare)

SELECT ... WITH ROLLUP

- SELECT year, SUM(profit) FROM sales GROUP BY year;
- SELECT year, SUM(profit) FROM sales GROUP BY year WITH ROLLUP;
  - se obtine un total general, linia "super-aggregate" este identificata dupa valoarea NULL a coloanei dupa care se face sumarea

```
+------+-------------+
| year | SUM(profit) |
+------+-------------+
| 2000 |        4525 |
| 2001 |        3010 |
+------+-------------+
```

```
+------+-------------+
| year | SUM(profit) |
+------+-------------+
| 2000 |        4525 |
| 2001 |        3010 |
| NULL |        7535 |
+------+-------------+
```

SELECT

- LIMIT [offset,] row_count | row_count
  - se limiteaza numarul de linii returnate
  - utilizat **frecvent** in aplicatiile web
  - LIMIT 15 – returneaza doar primele 15 linii (1÷15)
  - LIMIT 10,15 – returneaza 15 linii dupa primele 10 linii (11÷25)

JOIN

- Normalizarea si existenta relatiilor intre diversele tabele ale unei baze de date implica faptul ca pentru aflarea unor informatii utilizabile (complete), acestea trebuie extrase **simultan** din mai multe tabele
  - informatie inutilizabila: studentul cu id-ul 253 a luat nota 8 la examenul cu id-ul 35
- Uneori asamblarea informatiilor din mai multe tabele e necesara pentru obtinerea unor rapoarte complexe
  - Exemplu: tabel cu clienti, tabel cu comenzi, tabel cu produse; legatura produse-comenzi e implementata printr-un tabel suplimentar. Raspunsul la intrebarea cate produse x a cumparat clientul y cere tratarea unitara a celor 4 tabele implicate

JOIN

- In general in SQL se poate descrie o astfel de unificare de date intre doua tabele:
  - left_table JOIN_type right_table criteriu_unificare
- JOIN_type
  - JOIN – selecteaza toate liniile compuse in care criteriul este indeplinit pentru ambele tabele
  - LEFT JOIN – compune si selecteaza toate liniile din left_table chiar daca nu este gasit un corespondent in right_table
  - RIGHT JOIN – compune si selecteaza toate liniile din right table (similar)
  - FULL JOIN – compune si selecteaza toate liniile din left_table si right_table fie ca este indeplinit criteriul fie ca nu (nu este implementat in MySql, poate fi simulat)

JOIN

- Clauza JOIN e utilizata pentru a realiza o unificare temporara, dupa anumite criterii, din punct de vedere logic, a doua tabele in vederea extragerii informatiei "suma" dorite
  - left_table [INNER | CROSS] JOIN right_table [join_condition]
  - left_table STRAIGHT_JOIN right_table
  - left_table STRAIGHT_JOIN right_table ON condition
  - left_table LEFT [OUTER] JOIN right_table join_condition
  - left_table NATURAL [LEFT [OUTER]] JOIN right_table
  - left_table RIGHT [OUTER] JOIN right_table join_condition
  - left_table NATURAL [RIGHT [OUTER]] JOIN right_table
  - join_condition: ON conditional_expr | USING (column_list)

JOIN – Exemplu

- Tabel clienti
  - 4 clienti
- Tabel comenzi
  - client 1 – 2 comenzi
  - client 2 – 0 comenzi
  - client 3,4 – 1 comanda

```
CREATE TABLE `clienti` (
  `id_client` int(10) unsigned NOT NULL auto_increment,
  `nume` varchar(100) NOT NULL,
  PRIMARY KEY  (`id_client`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

INSERT INTO `clienti` (`id_client`,`nume`) VALUES
 (1,'Ionescu'),
 (2,'Popescu'),
 (3,'Vasilescu'),
 (4,'Georgescu');

CREATE TABLE `comenzi` (
  `id_comanda` int(10) unsigned NOT NULL auto_increment,
  `id_client` int(10) unsigned NOT NULL,
  `suma` double NOT NULL,
  PRIMARY KEY  (`id_comanda`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

INSERT INTO `comenzi` (`id_comanda`,`id_client`,`suma`) VALUES
 (1,1,19.99),
 (2,1,35.15),
 (3,3,17.56),
 (4,4,12.34);
```

INNER JOIN

- INNER JOIN sunt unificarile implicite, in care criteriul (join_condition) trebuie indeplinit in ambele tabele (extensie a cuvantului cheie JOIN pentru evitarea ambiguitatii)
  - OUTER JOIN = {LEFT JOIN | RIGHT JOIN | FULL JOIN } – nu e obligatoriu sa fie indeplinit criteriul in ambele tabele
  - FULL JOIN nu e implementat in MySql, poate fi simulat ca UNION intre LEFT JOIN si RIGHT JOIN
- INNER JOIN sunt echivalente cu realizarea produsului cartezian intre cele doua tabele implicate urmata de verificarea criteriului, daca acesta exista

CROSS JOIN

- In MySql INNER JOIN si CROSS JOIN sunt echivalente in totalitate
  - In SQL standard INNER este folosit in prezenta unui criteriu, CROSS in absenta sa
- INNER (CROSS) JOIN si "," sunt echivalente cu produsul cartezian intre cele doua tabele implicate in conditile lipsei criteriului de selectie: fiecare linie a unui tabel este alaturata fiecarei linii din al doilea tabel
  - (un tabel cu M linii si A coloane) CROSS JOIN (un tabel cu N linii si B coloane) → (un tabel cu MxN linii si A+B coloane)

CROSS JOIN

SQL Query Area

```
1 SELECT * FROM clienti JOIN comenzi;
2 SELECT * FROM clienti, comenzi;
3 SELECT * FROM clienti INNER JOIN comenzi;
4 SELECT * FROM clienti CROSS JOIN comenzi;
```

id_client	nume	id_comanda	id_client	suma
1	Ionescu	1	1	19.99
2	Popescu	1	1	19.99
3	Vasilescu	1	1	19.99
4	Georgescu	1	1	19.99
1	Ionescu	2	1	35.15
2	Popescu	2	1	35.15
3	Vasilescu	2	1	35.15
4	Georgescu	2	1	35.15
1	Ionescu	3	3	17.56
2	Popescu	3	3	17.56
3	Vasilescu	3	3	17.56
4	Georgescu	3	3	17.56
1	Ionescu	4	4	12.34
2	Popescu	4	4	12.34
3	Vasilescu	4	4	12.34
4	Georgescu	4	4	12.34

INNER JOIN – criterii

- USING – trebuie sa aiba o coloana cu nume identic in cele doua tabele
  - coloana comuna este afisata o singura data
- ON – accepta orice conditie conditionala
  - chiar daca numele coloanelor din conditie sunt identice, sunt tratate ca entitati diferite (id_client apare de doua ori provenind din cele doua tabele)

SQL Query Area

```
1 SELECT * FROM clienti INNER JOIN comenzi USING (id_client);
```

id_client	nume	id_comanda	suma
1	Ionescu	1	19.99
1	Ionescu	2	35.15
3	Vasilescu	3	17.56
4	Georgescu	4	12.34

```
1 SELECT * FROM clienti INNER JOIN comenzi ON (clienti.id_client=comenzi.id_client);
```

id_client	nume	id_comanda	id_client	suma
1	Ionescu	1	1	19.99
1	Ionescu	2	1	35.15
3	Vasilescu	3	3	17.56
4	Georgescu	4	4	12.34

NATURAL JOIN

- NATURAL JOIN e echivalent cu o unificare INNER JOIN cu o clauza USING(...) care utilizeaza toate coloanele cu nume comun intre cele doua tabele

SQL Query Area

```
1 SELECT * FROM clienti NATURAL JOIN comenzi;
```

id_client	nume	id_comanda	suma
1	Ionescu	1	19.99
1	Ionescu	2	35.15
3	Vasilescu	3	17.56
4	Georgescu	4	12.34

LEFT JOIN

- Unificare de tip OUTER JOIN
- Se returneaza linia din left_table chiar daca nu exista corespondent in right_table (se introduc valori NULL)
- Cuvantul cheie OUTER este optional

SQL Query Area

```
1 SELECT * FROM clienti LEFT OUTER JOIN comenzi USING(id_client);
```

id_client	nume	id_comanda	suma
1	Ionescu	1	19.99
1	Ionescu	2	35.15
2	Popescu	NULL	NULL
3	Vasilescu	3	17.56
4	Georgescu	4	12.34

RIGHT JOIN

- Unificare de tip OUTER JOIN
- Se returneaza linia din right_table chiar daca nu exista corespondent in left_table
- Echivalent cu LEFT JOIN cu tabelele scrise in ordine inversa

SQL Query Area

```
1 SELECT * FROM clienti RIGHT OUTER JOIN comenzi USING(id_client);
```

id_client	id_comanda	suma	nume
1	1	19.99	Ionescu
1	2	35.15	Ionescu
3	3	17.56	Vasilescu
4	4	12.34	Georgescu

SQL Query Area

```
1 SELECT * FROM comenzi RIGHT OUTER JOIN clienti USING(id_client);
```

id_client	nume	id_comanda	suma
1	Ionescu	1	19.99
1	Ionescu	2	35.15
2	Popescu	NULL	NULL
3	Vasilescu	3	17.56
4	Georgescu	4	12.34

JOIN

- STRAIGHT_JOIN – forteaza citirea mai intai a valorilor din left_table si apoi a celor din right_table (in anumite cazuri citirea se realizeaza invers)
- USE_INDEX, IGNORE_INDEX, FORCE_INDEX controlul index-ului utilizat pentru gasirea si selectia liniilor, poate aduce spor de viteza

UNION

- Combina rezultatele mai multor interogari SELECT intr-un singur rezultat general
- SELECT ... UNION [ALL | DISTINCT] SELECT ... [UNION [ALL | DISTINCT] SELECT ...]
- Poate fi folosit pentru a realiza FULL JOIN

SQL Query Area

```
1 SELECT * FROM comenzi LEFT JOIN clienti ON (comenzi.id_client=clienti.id_client)
2 UNION
3 SELECT * FROM comenzi RIGHT JOIN clienti ON (comenzi.id_client=clienti.id_client)
4 WHERE  comenzi.id_client IS NULL
```

id_comanda	id_client	suma	id_client	nume
1	1	19.99	1	Ionescu
2	1	35.15	1	Ionescu
3	3	17.56	3	Vasilescu
4	4	12.34	4	Georgescu
NULL	NULL	NULL	2	Popescu

Subquery

- O “subinterogare” este o interogare de tip SELECT utilizata ca operand intr-o alta interogare
- O “subinterogare” poate fi privit ca un tabel temporar si tratat ca atare (inclusiv cu JOIN) eventual cu atribuire de nume (Alias) daca este nevoie
- Exemple
  - SELECT * FROM t1 WHERE column1 = (SELECT column1 FROM t2);

Subquery

- Subquery – un instrument foarte puternic
- permite selectii in doua sau mai multe etape
  - o prima selectie **dupa un criteriu**
  - urmata de o doua selectie **dupa un alt criteriu** in **rezultatele primei selectii**
  - ... samd
- Exista restrictii asupra tabelelor implicate pentru evitarea prelucrarilor recursive (bucle potential infinite)
  - ex: UPDATE tabel1 SET ... SELECT ... FROM tabel1 nu este permis

Subquery

- Subquery – un instrument foarte puternic
- Permite evitarea multor prelucrari PHP si trimiterea lor spre server-ul MySql
  - INSERT INTO tabel1 … SELECT … FROM tabel2 permite inserarea printr-o singura interogare a mai multor linii in tabel1 (in functie de numarul de linii rezultate din tabel2)

Acces la server-ul MySql din PHP

Acces la server-ul MySql din PHP

- Bibliotecile corespunzatoare trebuie activate in php.ini – vezi laboratorul 1.
  - mysql
  - mysqli (improved accesul la functionalitati ulterioare MySql 4.1)
- O baza de date existenta poate fi accesata daca exista un utilizator cunoscut in PHP cu drepturi de acces corespunzatoare – vezi laboratorul 1.
- O baza de date poate fi creata si din PHP dar nu e metoda recomandata daca nu e necesara
  - cod dificil de implementat pentru **o singura** utilizare
  - necesita existenta unui utilizatori cu drepturi mai mari pentru crearea bazei de date si alocarea de drepturi unui utilizator restrans

Functii PHP de acces MySql

- mysql_connect
  - realizarea unei conexiuni cu server-ul MySQL
  - resource **mysql_connect** (string server, string user, string password)
  - rezultatul
    - succes – resursa (conexiune, link_identifier)
    - esec – false
- mysql_select_db
  - selecteaza **baza de date** de pe server cu care se va lucra in continuare
  - bool **mysql_select_db** (string database [, resource link_identifier])

Functii PHP de acces MySql

- mysql_query
  - trimiterea unei interogari SQL spre server
  - resource **mysql_query** (string query [, resource link_identifier])
  - rezultatul
    - SELECT, SHOW, DESCRIBE sau EXPLAIN – resursa (tabel)
    - UPDATE, DELETE, DROP, etc – true/false
- mysql_fetch_assoc
  - returneaza o **matrice asociativa** corespunzatoare liniei de la indexul intern (indecsi de tip sir corespunzatori denumirii coloanelor – field – din tabelul de date) si incrementeaza indexul intern sau **false** daca nu mai sunt linii
  - array **mysql_fetch_assoc** (resource result)

Functii PHP de acces MySql
Parcurgerea resurselor rezultat

- mysql_fetch_assoc
  - returneaza o **matrice asociativa** corespunzatoare liniei de la indexul intern (indecsi de tip sir corespunzatori denumirii coloanelor – field – din tabelul de date) si incrementeaza indexul intern sau **false** daca nu mai sunt linii
  - array **mysql_fetch_assoc** (resource result)
- mysql_fetch_row
  - returneaza o matrice cu indecsi intregi
  - array mysql_fetch_row (resource result)

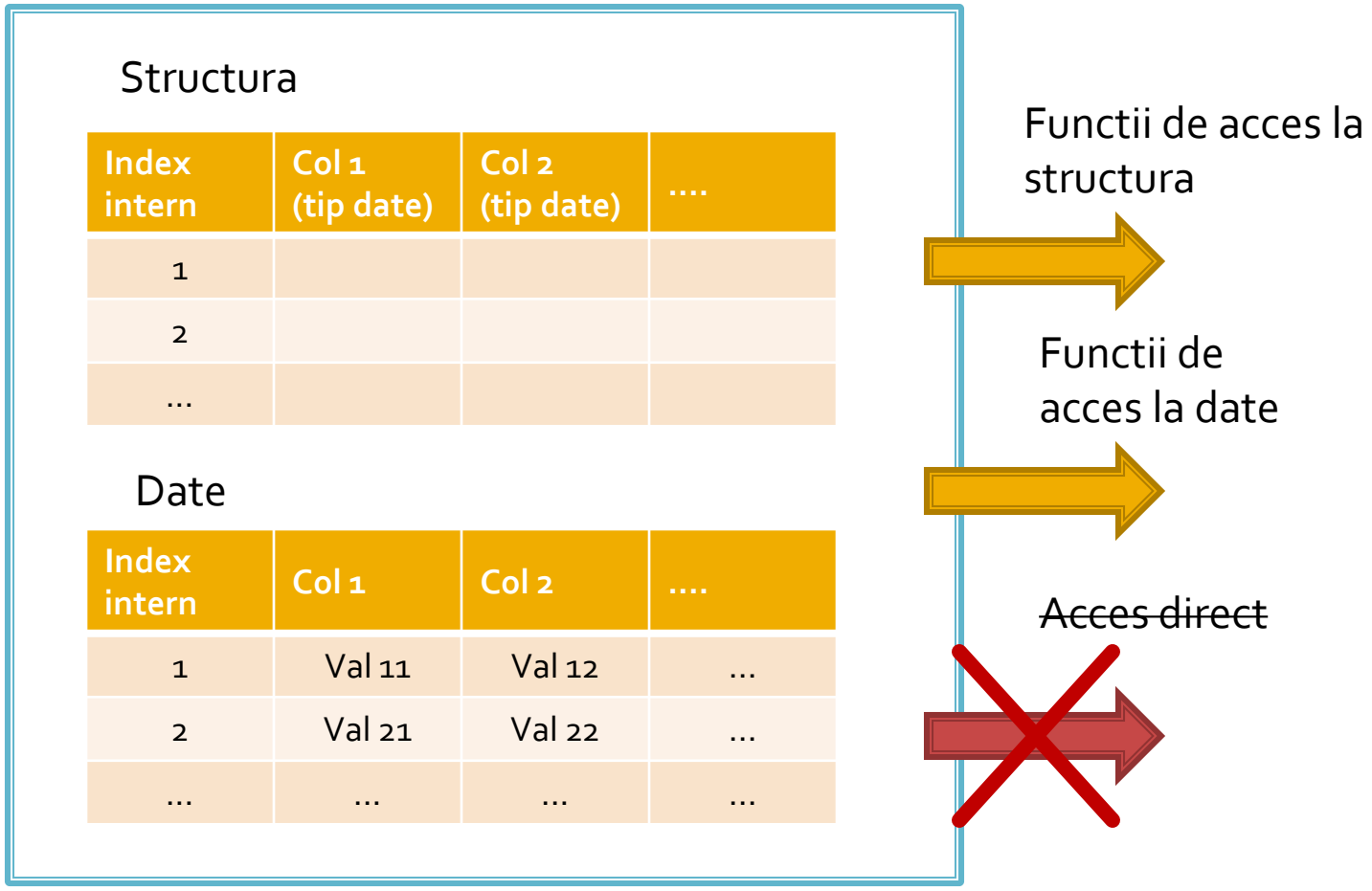
Functii PHP de acces MySql
Parcurgerea resurselor rezultat

- mysql_fetch_array
  - grupeaza functionalitatea mysql_fetch_assoc si mysql_fetch_row
  - array **mysql_fetch_array** (resource result [, int result_type])
  - MYSQL_ASSOC, MYSQL_NUM, MYSQL_BOTH (implicit)
- mysql_data_seek
  - muta indexul intern la valoarea indicata
  - bool **mysql_data_seek** (resource result, int row_number)

Resurse MySQL

- Resursele reprezinta o combinatie intre
  - date structurate (valori + structura) rezultate in urma unor interogari SQL
  - functii de acces la aceste date/structuri
- Analogie cu POO
  - o "clasa speciala" creata in urma interogarii cu functii predefinite de acces la datele respective

Resurse MySQL



Resurse MySQL

- Functiile de acces la structura sunt rareori utilizate
  - majoritatea aplicatiilor sunt concepute pe structura fixa, si cunosc structura datelor primite
  - exceptie: aplicatii generale, ex.: PhpMyAdmin
- Majoritatea functiilor de acces la date sunt caracterizate de acces secvential
  - se citesc in intregime valorile stocate pe o linie
  - simultan se avanseaza indexul intern pe urmatoarea pozitie, pregatindu-se urmatoarea citire

Resurse MySQL

- Functiile sunt optimizate pentru utilizarea lor intr-o structura de control **do { } while()**, sau **while() { }** de control
  - returneaza FALSE cand "s-a ajuns la capat"
- tipic se realizeaza o citire (mysql_fetch_assoc) urmata de o bucla **do { } while()**
  - pentru a se putea introduce cod de detectie probleme rulat o singura data

Exemplu de utilizare

```
$hostname = "localhost";
$database = "world";
$username = "web";
$password = “ceva";
$conex= mysql_connect($hostname, $username, $password);
mysql_select_db($database, $ conex);
```

```
$query = "SELECT `Code`,`Name`,`Population` FROM `country` AS c ";
$result = mysql_query($ query, $ conex) or die(mysql_error());
$row_result = mysql_fetch_assoc($ result );
$totalRows_ result = mysql_num_rows($ result );
```

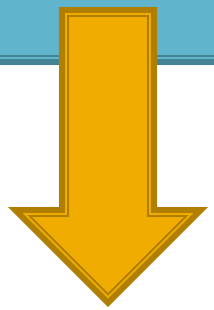
Exemplu de utilizare

```
<?php
do { ?>
<tr>
        <td><?php echo $index; ?> </td>
        <td><?php echo $ row_result ['Code']; ?> </td>
        <td><?php echo $ row_result ['Name']; ?> </td>
        <td><?php echo $ row_result ['Population']; ?> </td>
</tr>
<?php
        $index++;
        }
while ($ row_result = mysql_fetch_assoc($ result )); ?>
```

Modificari laborator cu date stocate text

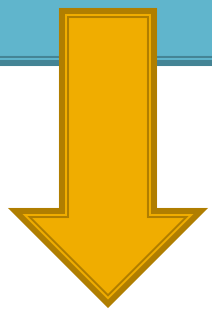
- Codul aplicatiei ramane in mare parte acelasi
- Se modifica doar citirea valorilor pentru popularea matricii $produse (“antet.php”)

```
$vect=file("produse.txt");
foreach ($vect as $linie)
                {
                $valori=explode("\t",$linie,5);
                $produse[$valori[0]] [$valori[1]]=array ("descr" => $valori[2], "pret" => $valori[3], "cant" =>
$valori[4]);
                }
```



Modificari laborator cu date stocate XML

```
$xml = simplexml_load_file("lista.xml");
if ($xml)
{
foreach ($xml->categorie as $categorie)
        {
        $produse[(string)$categorie["nume"]]=array();
        foreach ($categorie->produs as $prod_cur)
                {
                $produse[(string)$categorie["nume"]][(string)$prod_cur->nume]=array
                ("descr" => (string)$prod_cur->desc, "pret" => (string)$prod_cur->pret,
                "cant" => (string)$prod_cur->cant);
                }
        }
}
```



Modificari laborator cu date stocate MySQL

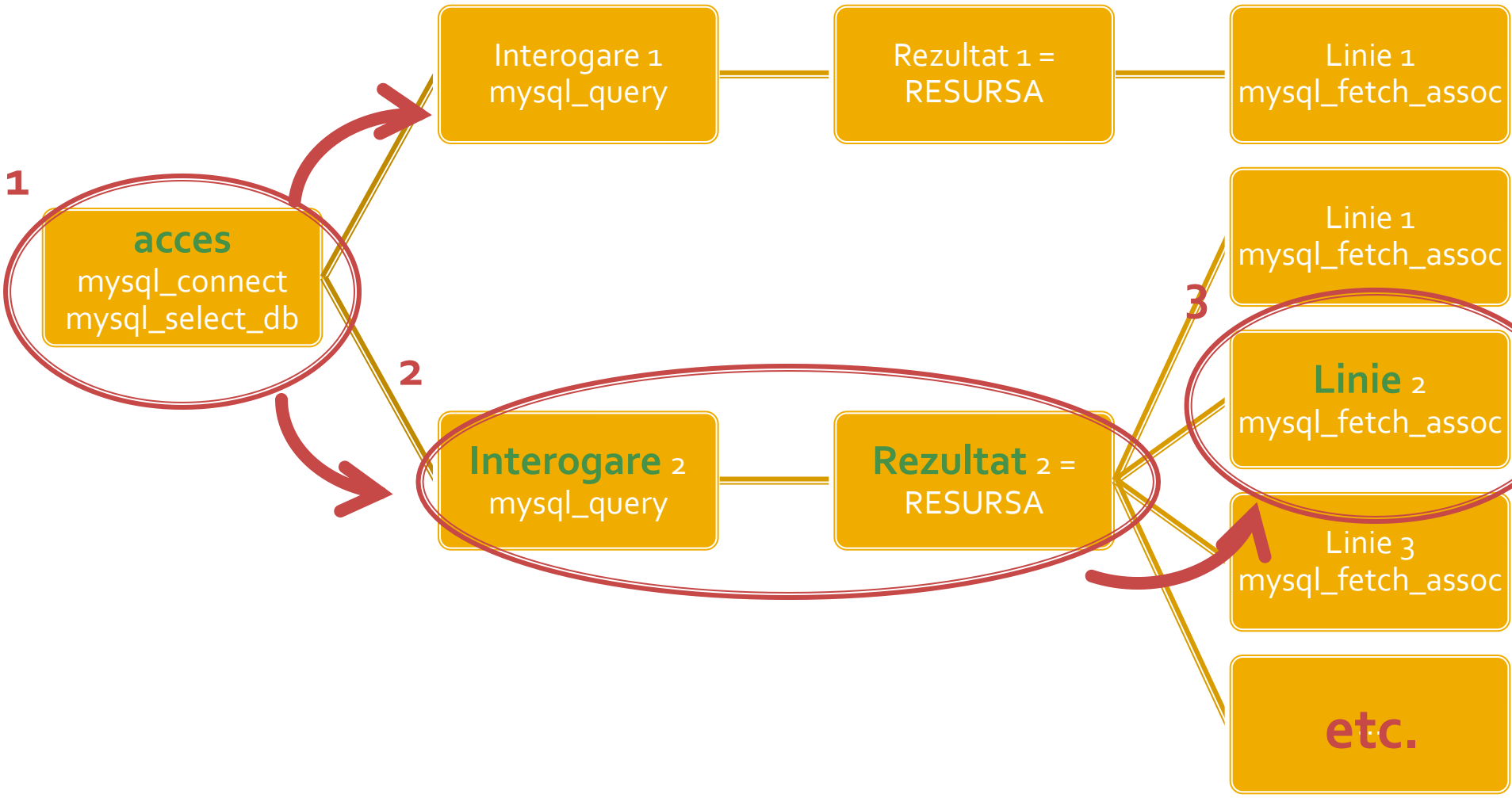
```
$hostname = "localhost";
$database = "tmpaw";
$username = "web";
$password = "test";
$conex= mysql_connect($hostname, $username, $password);
mysql_select_db($database, $conex);
$query = "SELECT * FROM `categorii` AS c";
$result_c = mysql_query($query, $conex) or die(mysql_error());
$row_result_c = mysql_fetch_assoc($result_c);
$totalRows_result = mysql_num_rows($result_c);
do {
        $query = "SELECT * FROM `produse` AS p WHERE `id_categ` = ".$row_result_c['id_categ'];
        $result_p = mysql_query($query, $conex) or die(mysql_error());
        $row_result_p = mysql_fetch_assoc($result_p);
        $totalRows_result = mysql_num_rows($result_p);
        $produse[$row_result_c['nume']]=array();
        do {
                $produse[$row_result_c['nume']][$row_result_p['nume']]=array ("descr" =>
$row_result_p['detalii'], "pret" => $row_result_p['pret'], "cant" => $row_result_p['cant']);
                }
        while ($row_result_p = mysql_fetch_assoc($result_p));
        }
while ($row_result_c = mysql_fetch_assoc($result_c));
```

Optimizare

- o singura interogare SQL, unirea tabelelor (JOIN) lasata in baza server-ului MySql

```
$hostname = "localhost";
$database = "tmpaw";
$username = "web";
$password = "test";
$conex= mysql_connect($hostname, $username, $password);
mysql_select_db($database, $conex);

$query = "SELECT p.*, c.`nume` AS `nume_categ` FROM `produse` AS p
                LEFT JOIN `categorii` AS c ON (c.`id_categ` = p.`id_categ`)";
$result = mysql_query($query, $conex) or die(mysql_error());
$row_result = mysql_fetch_assoc($result);
$totalRows_result = mysql_num_rows($result);

do {
                $produse[$row_result['nume_categ']][$row_result['nume']]=array ("descr" => $row_result['detalii'], "pret"
=> $row_result['pret'], "cant" => $row_result['cant']);
                }
while ($row_result = mysql_fetch_assoc($result));
```

Functii de acces la server-ul MySql



!! IMPORTANT

PHP > 5.5

PHP 5.5

- Incapand cu versiunea 5.5 a PHP extensia mysql este declarata **depreciata**
  - orice utilizare a unei functii genereaza eroare de tip **E_DEPRECATED**
  - se preconizeaza ca in PHP > 6 aceasta extensie va fi eliminata total (**realizat PHP7 PHP8**)
- Alternativele de utilizare sunt
  - extensia **mysqli** (MySQL Improved)
  - extensia **PDO** (PHP Data Objects)

Extensia mysqli

- Inafara securitatii sporite ofera acces la facilitatile curente ale server-ului MySQL
  - accesul la interogari predefinite (Prepared Statements) (viteza, securitate)
    - server side
    - client side
  - proceduri stocate pe server (viteza, securitate)
  - interogari multiple
  - tranzactii (integritate)

Extensia mysqli

- Doua modalitati de utilizare
  - procedurala (similar mysql)
  - POO (similar PDO)
- Utilizarea procedurala (aproape) similara cu utilizarea extensiei originale mysql
  - tranzitie facila
  - tranzitie cu mici diferente de parametri

mysqli – Procedural

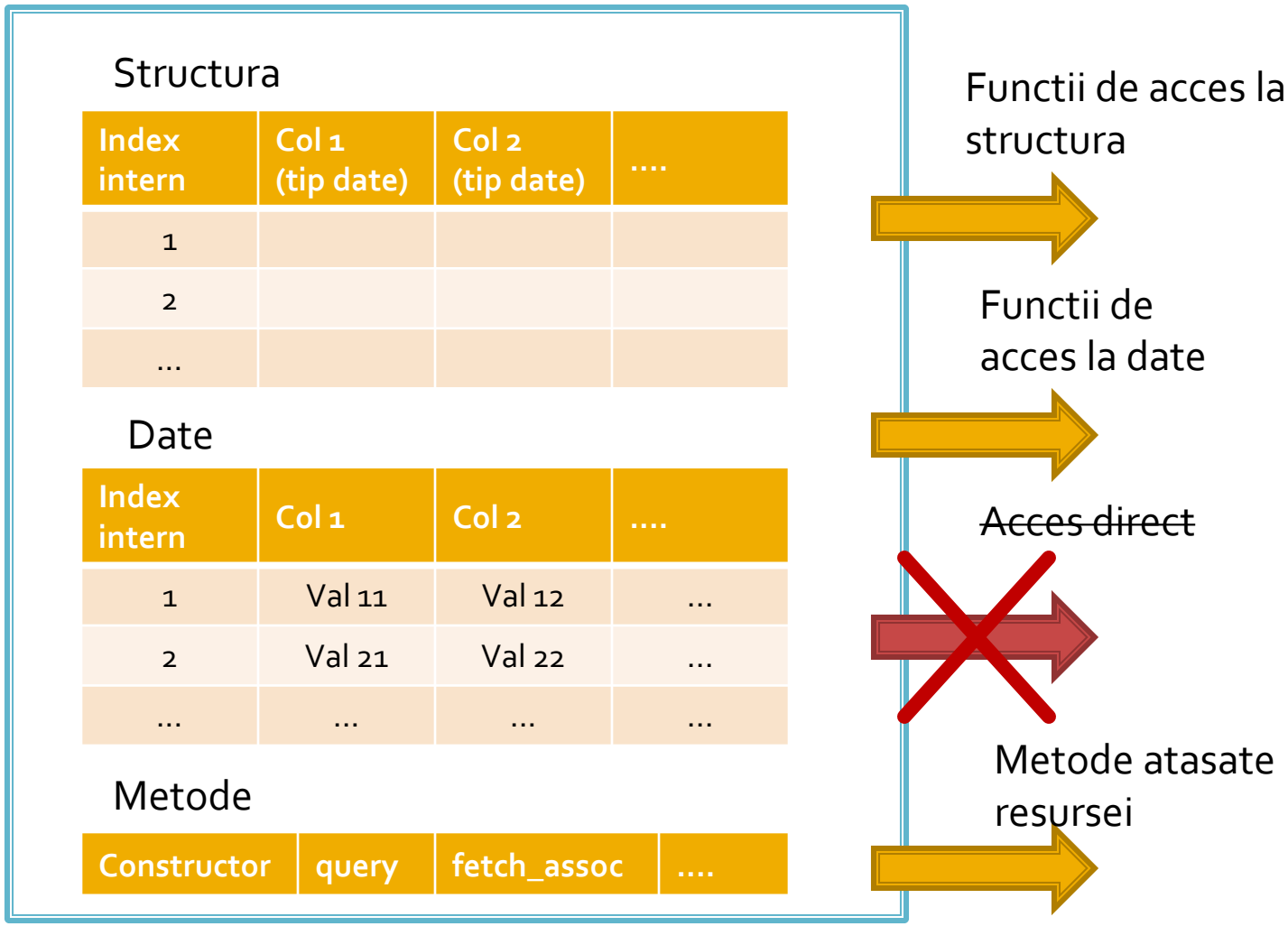
```php
<?php
$mysqli = mysqli_connect("example.com", "user", "password", "database");
$res = mysqli_query($mysqli, "SELECT 'Please do not use the mysql extension ' AS _msg FROM DUAL");
$row = mysqli_fetch_assoc($res);
echo $row['_msg'];

$mysql = mysql_connect("example.com", "user", "password");
mysql_select_db("test");
$res = mysql_query("SELECT ' for new developments.' AS _msg FROM DUAL", $mysql);
$row = mysql_fetch_assoc($res);
echo $row['_msg'];
?>
```

- toate functiile mysql au un echivalent mysqli
- majoritatea functiilor au aceeasi parametri in aceeasi ordine
- sunt totusi functii cu mici diferente (Ex: **mysqli_connect**, **mysqli_query**)

mysqli – Programare orientata obiect

```php
<?php
$var = new mysqli("example.com", "user", "password", "database");
$res = $var->query ($mysqli, "SELECT 'Please do not use the mysql extension ' AS _msg FROM DUAL");
$row = $res->fetch_assoc();
echo $row['_msg'];

$mysql = mysql_connect("example.com", "user", "password");
mysql_select_db("test");
$res = mysql_query("SELECT ' for new developments.' AS _msg FROM DUAL", $mysql);
$row = mysql_fetch_assoc($res);
echo $row['_msg'];
?>
```

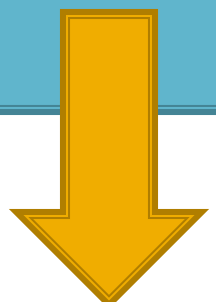
Resurse MySQL – mysqli



Conversia la mysqli (obligatorie)

- exemplul anterior

```
$hostname = "localhost";
$database = "tmpaw";
$username = "web";
$password = "test";
$conex= mysql_connect($hostname, $username, $password);
mysql_select_db($database, $conex);

$query = "SELECT p.*, c.`nume` AS `nume_categ` FROM `produse` AS p
                LEFT JOIN `categorii` AS c ON (c.`id_categ` = p.`id_categ`)";
$result = mysql_query($query, $conex) or die(mysql_error());
$row_result = mysql_fetch_assoc($result);
$totalRows_result = mysql_num_rows($result);

do {
                $produse[$row_result['nume_categ']][$row_result['nume']]=array ("descr" => $row_result['detalii'], "pret"
=> $row_result['pret'], "cant" => $row_result['cant']);
                }
while ($row_result = mysql_fetch_assoc($result));
```



mysqli (Procedural)

```
//$conex= mysql_connect($hostname, $username, $password);
//mysql_select_db($database, $conex);
$conex = mysqli_connect($hostname, $username, $password, $database);

$query = "SELECT p.*, c.`nume` AS `nume_categ` FROM `produse` AS p
                LEFT JOIN `categorii` AS c ON (c.`id_categ` = p.`id_categ`)";
//$result = mysql_query($query, $conex) or die(mysql_error());
$result = mysqli_query($conex, $query);

//$row_result = mysql_fetch_assoc($result);
$row_result = mysqli_fetch_assoc($result);

//$totalRows_result = mysql_num_rows($result);
$totalRows_result = mysqli_num_rows($result);

do {
                $produse[$row_result['nume_categ']][$row_result['nume']]=array ("descr" => $row_result['detalii'], "pret"
=> $row_result['pret'], "cant" => $row_result['cant']);
                }
//while ($row_result = mysql_fetch_assoc($result));
while ($row_result = mysqli_fetch_assoc($result));
```

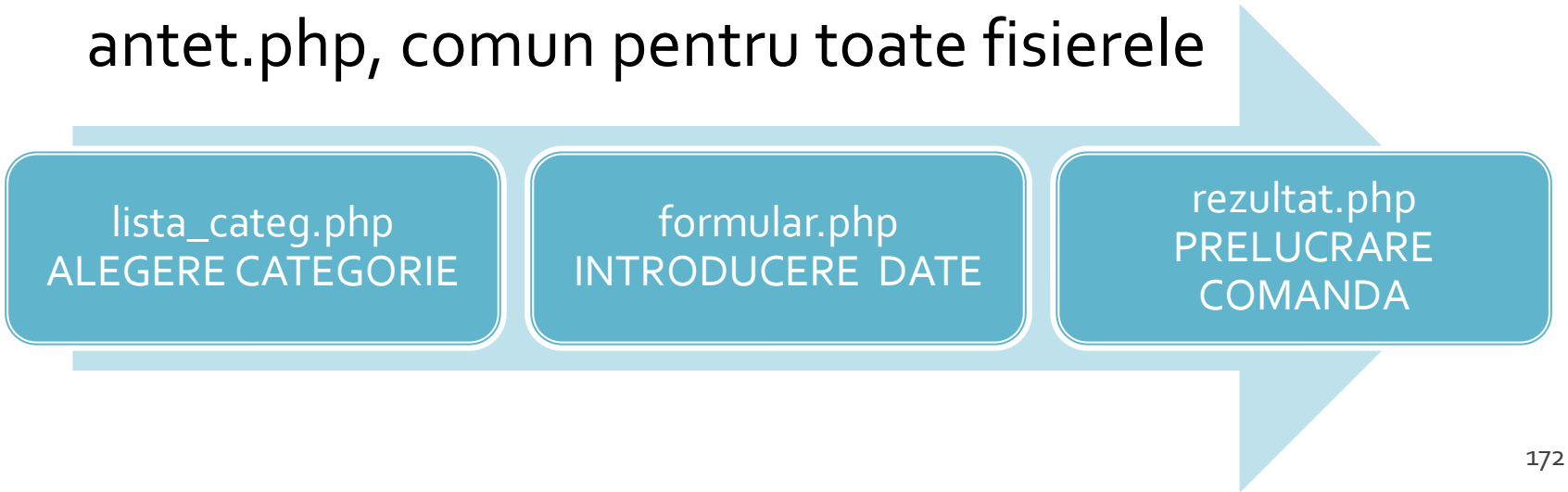
mysqli (POO)

```
//$conex= mysql_connect($hostname, $username, $password);
//mysql_select_db($database, $conex);
//$conex = mysqli_connect($hostname, $username, $password, $database);
$conex = new mysqli($hostname, $username, $password, $database);

$query = "SELECT p.*, c.`nume` AS `nume_categ` FROM `produse` AS p
                LEFT JOIN `categorii` AS c ON (c.`id_categ` = p.`id_categ`)";
//$result = mysql_query($query, $conex) or die(mysql_error());
//$result = mysqli_query($conex, $query);
$result = $conex->query( $query );

//$row_result = mysql_fetch_assoc($result);
//$row_result = mysqli_fetch_assoc($result);
$row_result = $result->fetch_assoc();

//$totalRows_result = mysql_num_rows($result);
//$totalRows_result = mysqli_num_rows($result);
$totalRows_result = $result->num_rows;

do {
                $produse[$row_result['nume_categ']][$row_result['nume']]=array ("descr" => $row_result['detalii'], "pret"
=> $row_result['pret'], "cant" => $row_result['cant']);
                }
//while ($row_result = mysql_fetch_assoc($result));
while ($row_result = $result->fetch_assoc());
```

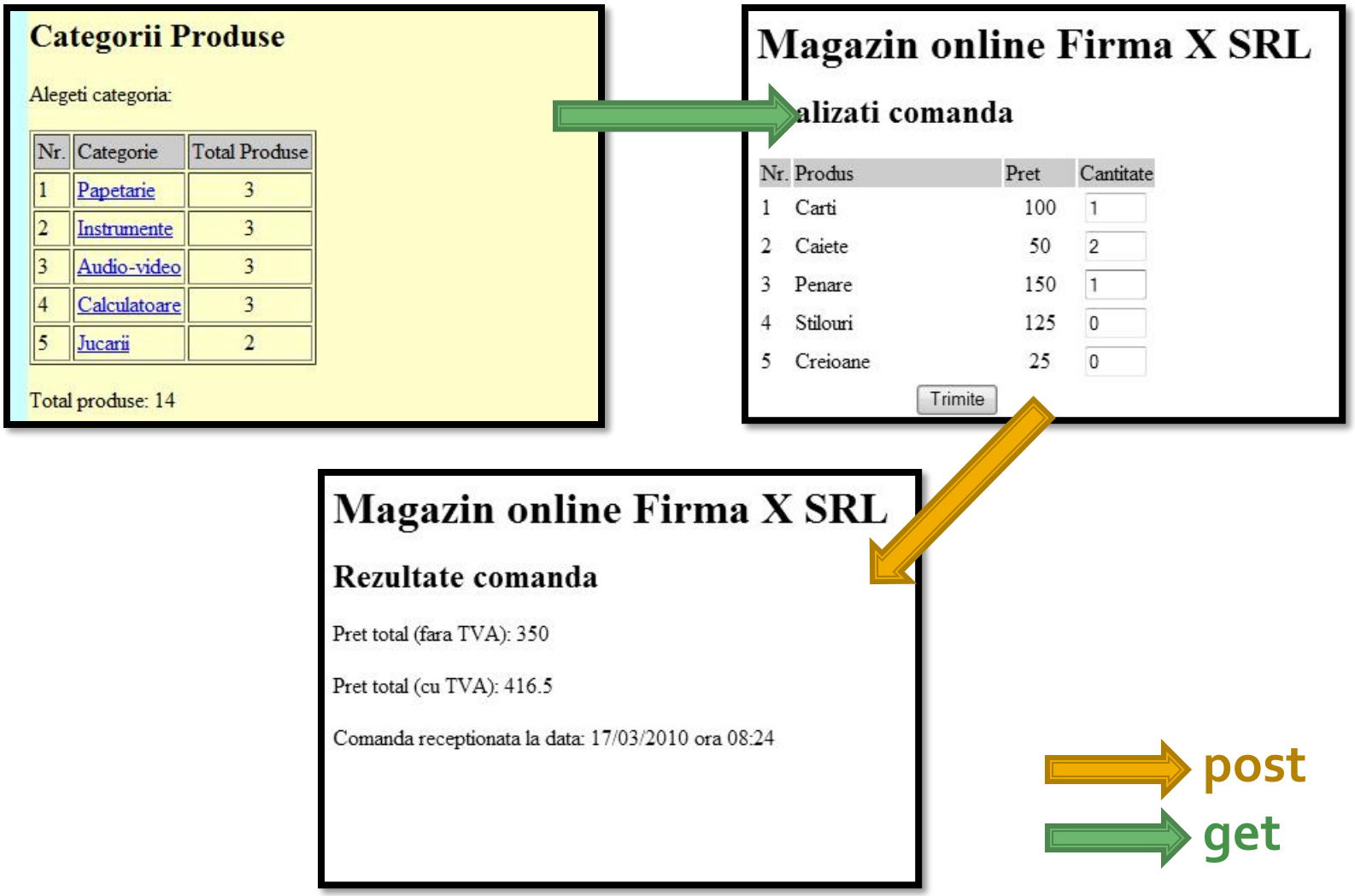
Laborator 6

Plan aplicatie – Cumparator

- Pe masura ce aplicatia paraseste un fir liniar de executie este necesara introducerea unui plan (graf) al aplicatiei
- Cumparator
  - citirea fisierului text (XML) se realizeaza in antet.php, comun pentru toate fisierele



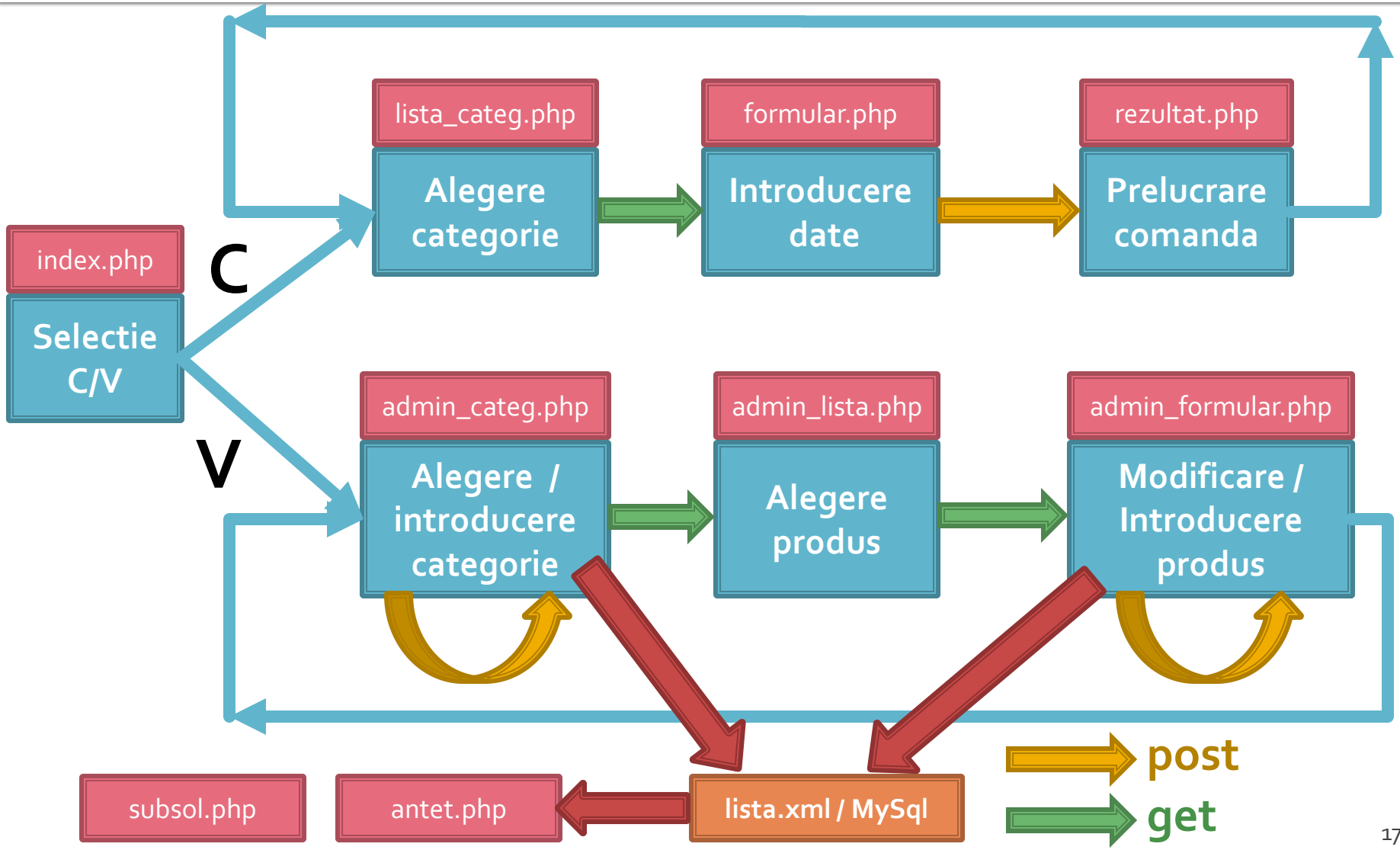
Rezultat (cumparator)



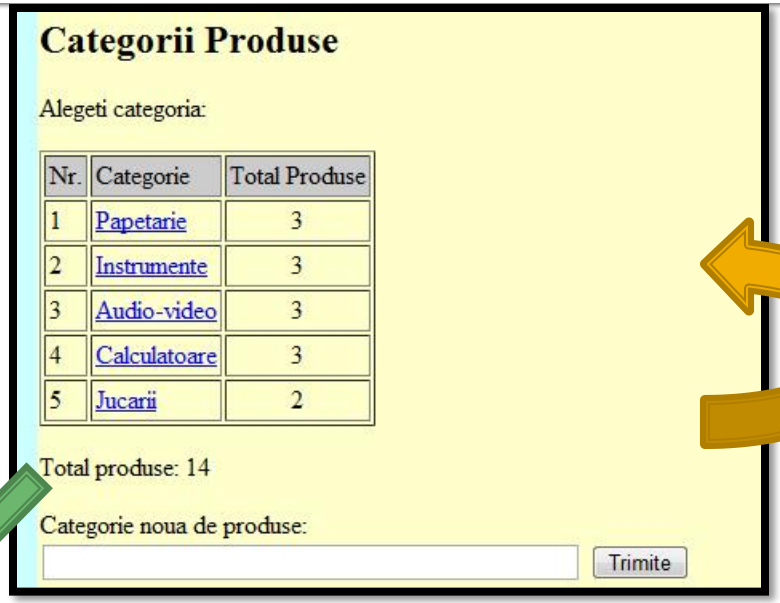
Plan aplicatie – Vanzator

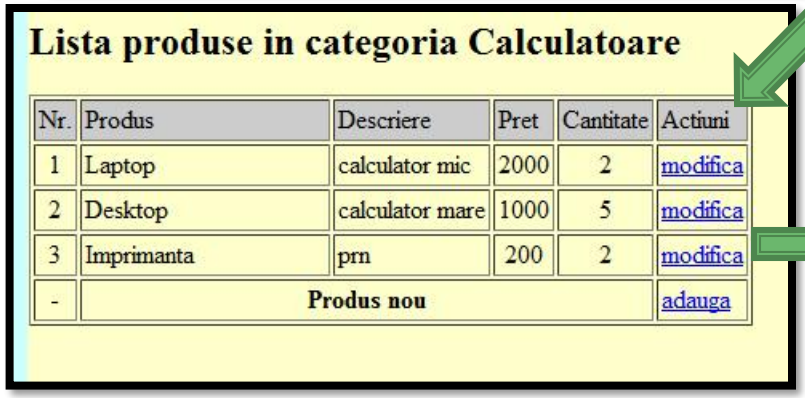
- Aparitia aplicatiei pentru vanzator
  - introduce un fir paralel de executie cu necesitatea alegerii initiale: cumparator/vanzator
  - aduce posibilitatea scrierii fisierului XML
  - diverse operatii de scriere
    - introducere categorie de produse
    - introducere produs nou intr-o categorie existenta
    - modificare produs existent
  - modificarea fisierului implica 2 actiuni:
    - colectare date
    - prelucrare

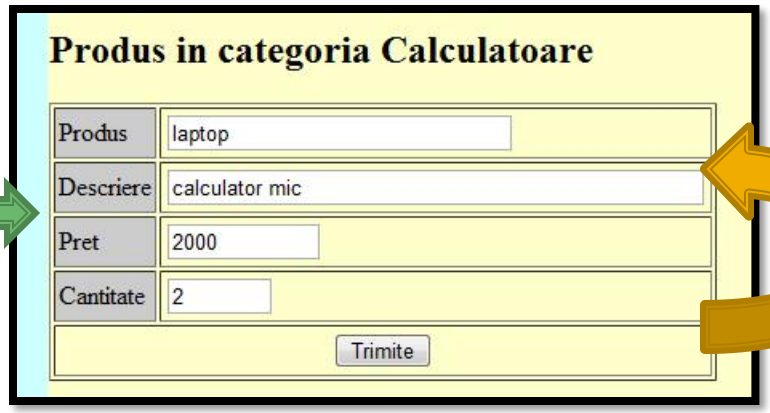
Plan aplicatie (Proiect !!)



Rezultat (vanzator)







post

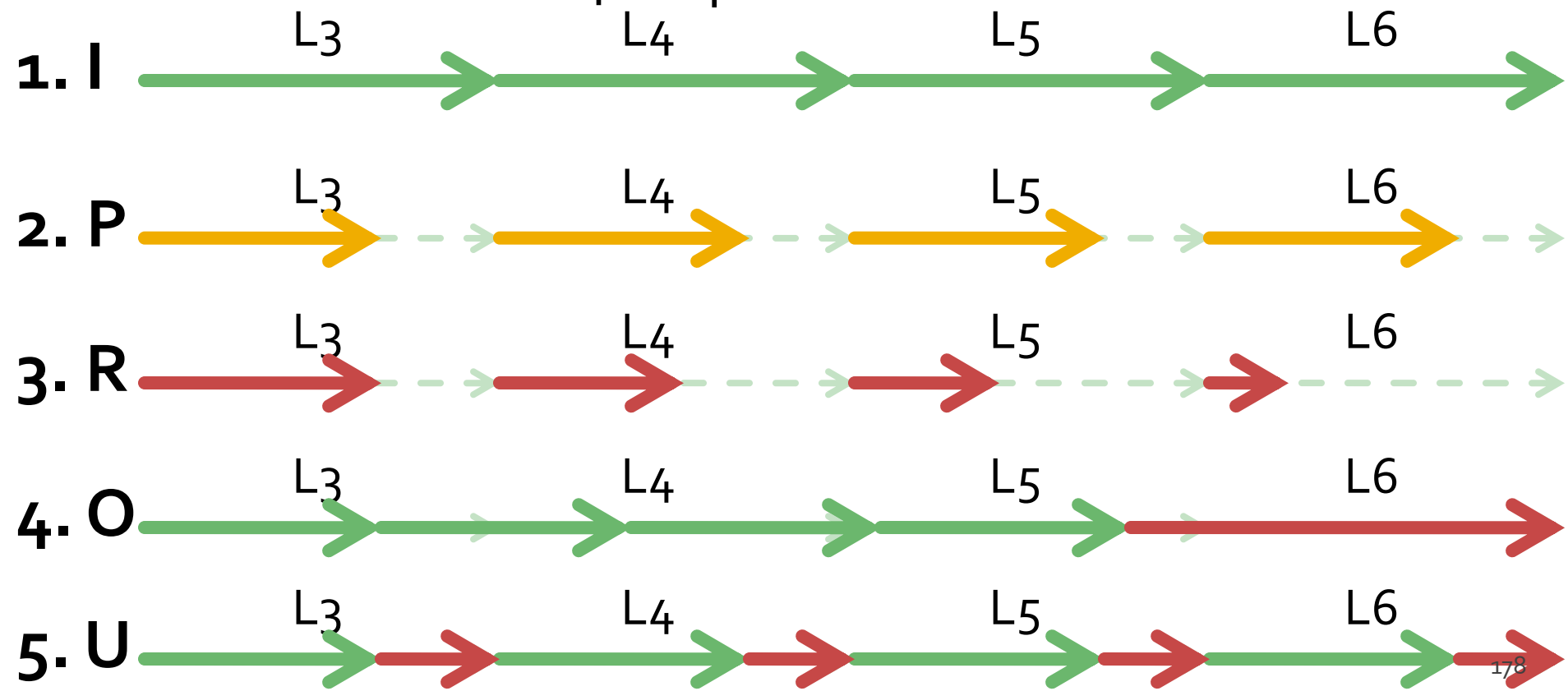
get

Laborator 6

- Sa se continue magazinul virtual cu:
  - produsele sunt grupate pe categorii de produse
  - sa prezinte utilizatorului o lista de grupe de produse pentru a alege
  - sa prezinte utilizatorului o lista de produse si preturi in grupa aleasa
  - lista de produse si preturi se citeste dintr-o baza de date **MySQL**
  - se preia comanda si se calculeaza suma totala
  - **se creaza paginile prin care vanzatorul poate modifica preturile, produsele, categoriile**

! Important

- Laborator **asincron!**
  - recomandat – 4 = Optim



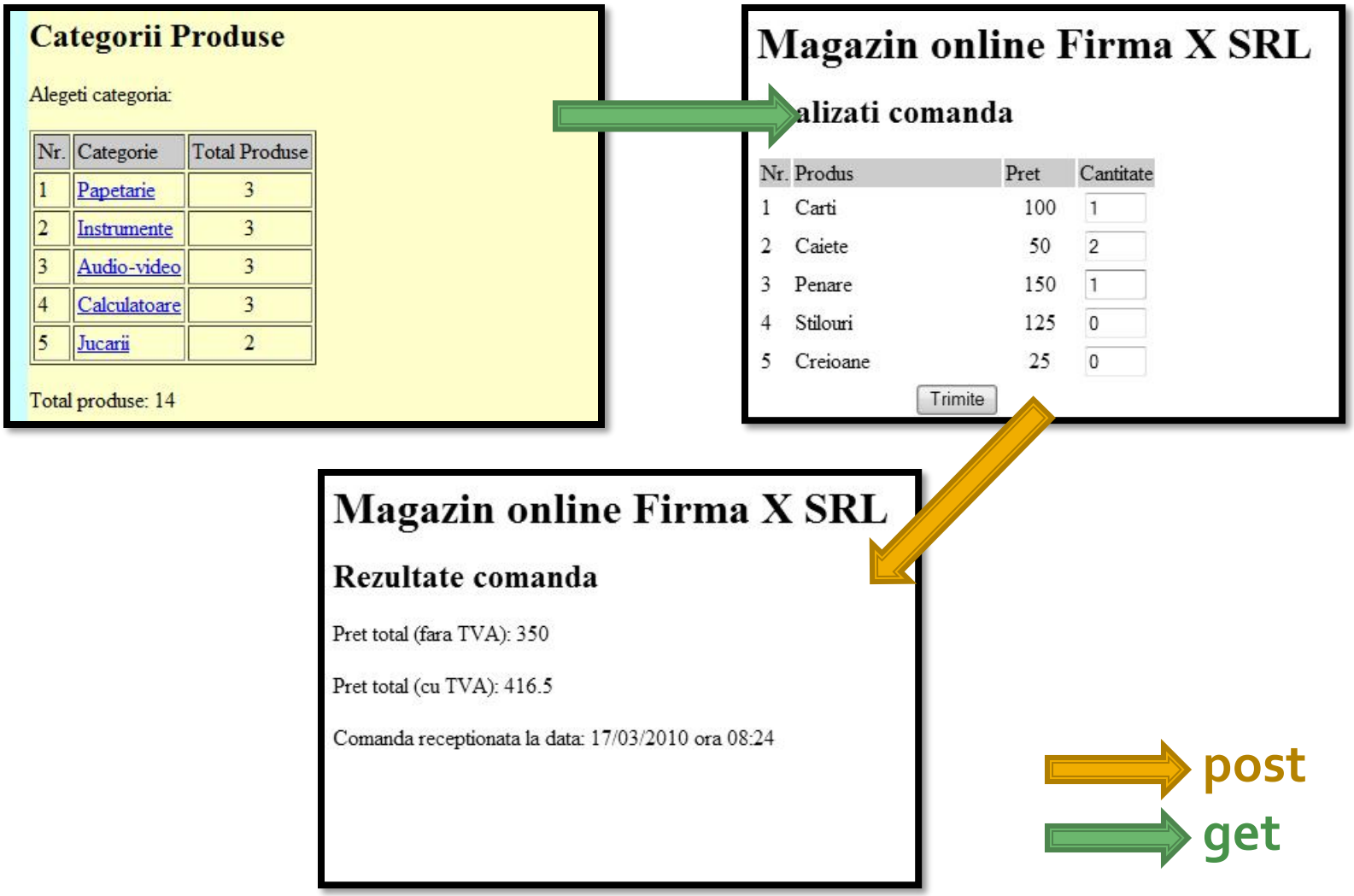
Laborator 6/7 – Mod de lucru

- Se continua lucrul la aplicatie (L5)
- Se recomanda laboratorul **asincron**
- Se poate folosi fisierul cu surse cpypaste.txt (site-https://rf-opto.etti.tuiasi.ro)

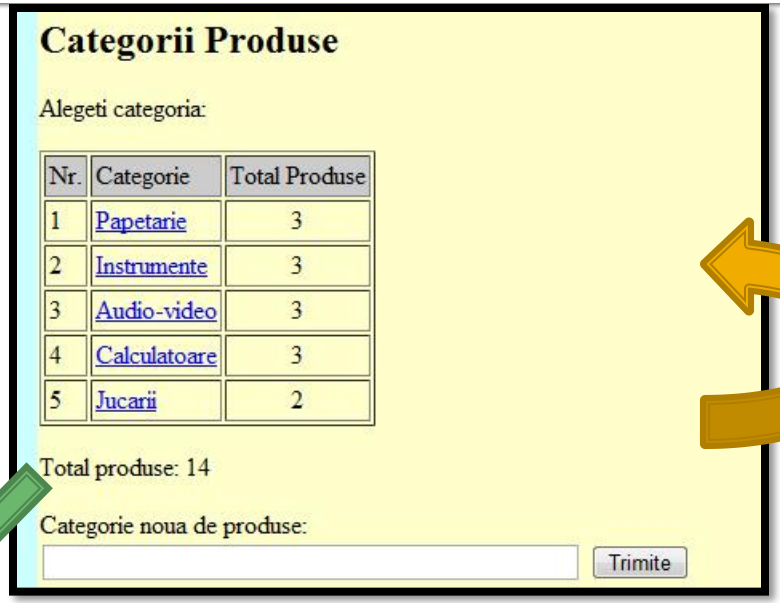
Laborator 6/7 – Mod de lucru

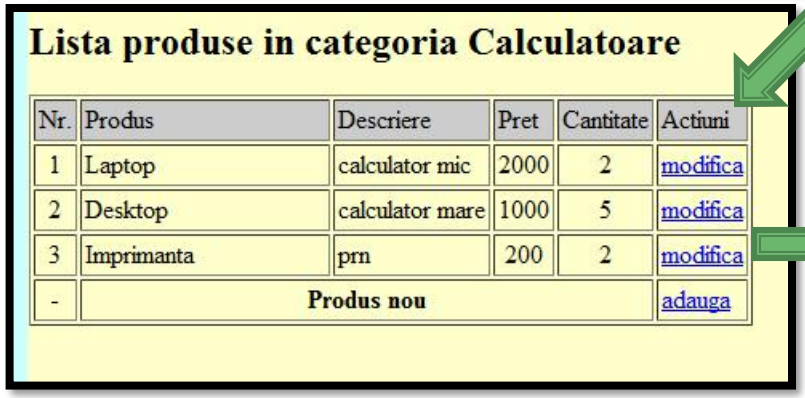
- Se ia o decizie relativ la relatia dintre produse si categorii (S70-S73)
  - One to Many
  - Many to Many
- Se creaza cele 2(3) tabele corespunzatoare
- Se populeaza cu date
- Se actualizeaza planul aplicatiei pentru a corespunde cu aplicatia proprie
  - nume de fisiere, tipuri de transfer a datelor

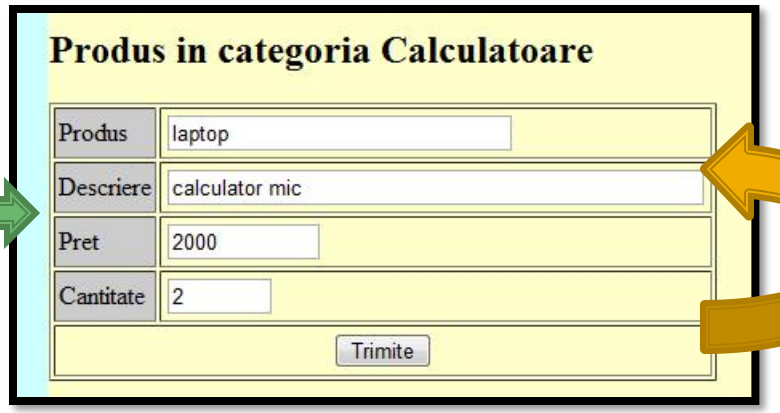
Rezultat (cumparator)



Rezultat (vanzator)



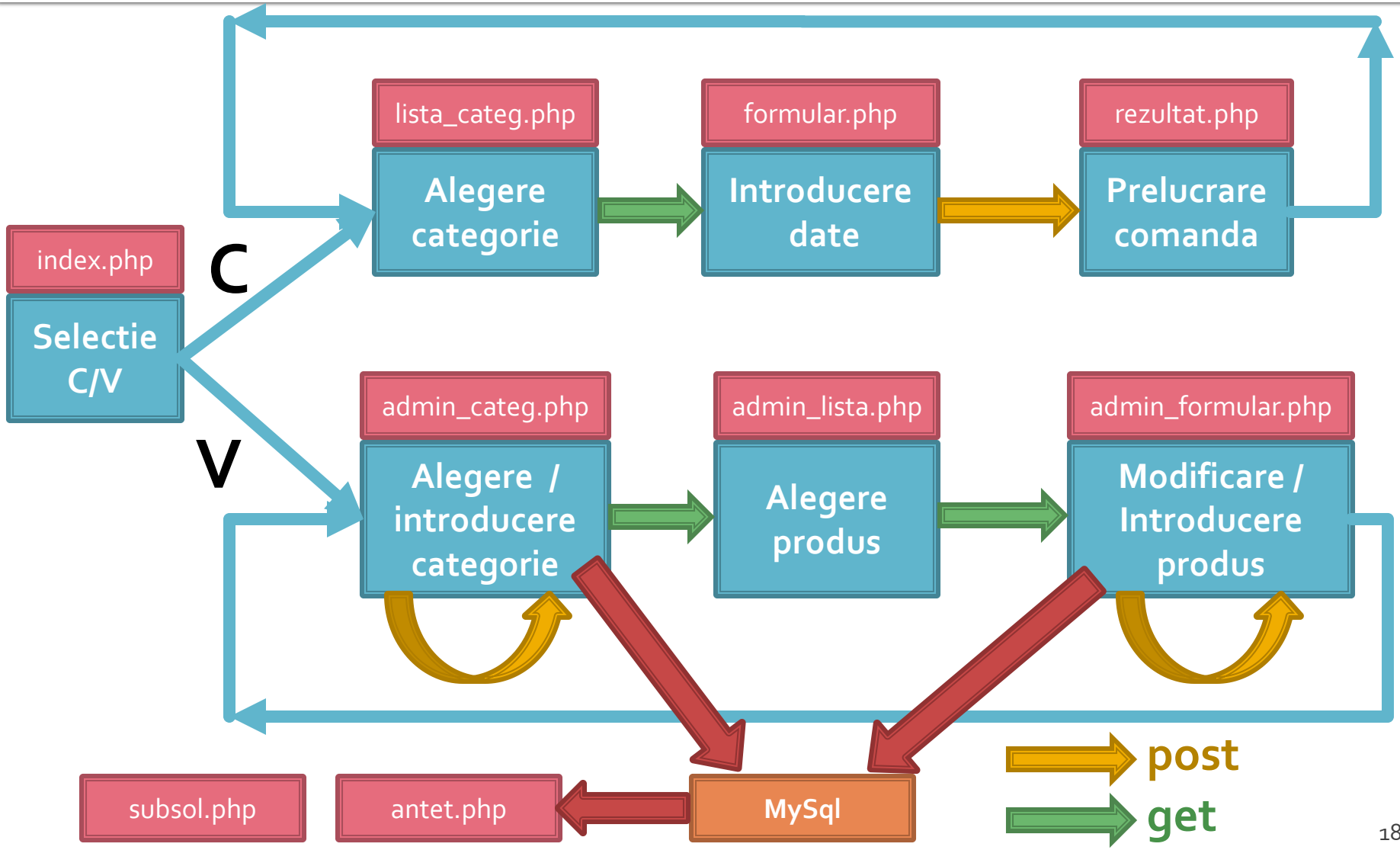




post

get

Plan aplicatie



Laborator 6/7 – Mod de lucru

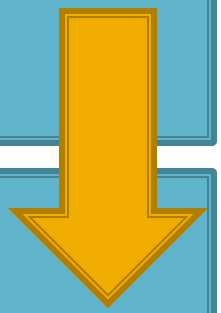
- Se creaza firul de executie paralel pentru vânzător
  - fisierele pentru cumpărător reprezinta o buna cale de pornire (Save As, Copy/Paste) pentru 2 din cele 3 fisiere pentru vânzător
- Se lucreaza cat mai mult la conversia text -> MySQL
  - activitatea se continua la laboratorul 7

Plan aplicatie – vanzator

- Deoarece citirea datelor se face in fisierul antet.php (modificat anterior) vor aparea modificari doar la nivelul scrierii datelor noi introduse
- Fisiere
  - admin_lista.php – nemodificat
  - admin_categ.php – scrie categorii noi in baza de date: se incuieste cod XML cu cod MySql
  - admin_formular.php – scrie produse noi / corectii in baza de date: se incuieste cod XML cu cod MySql

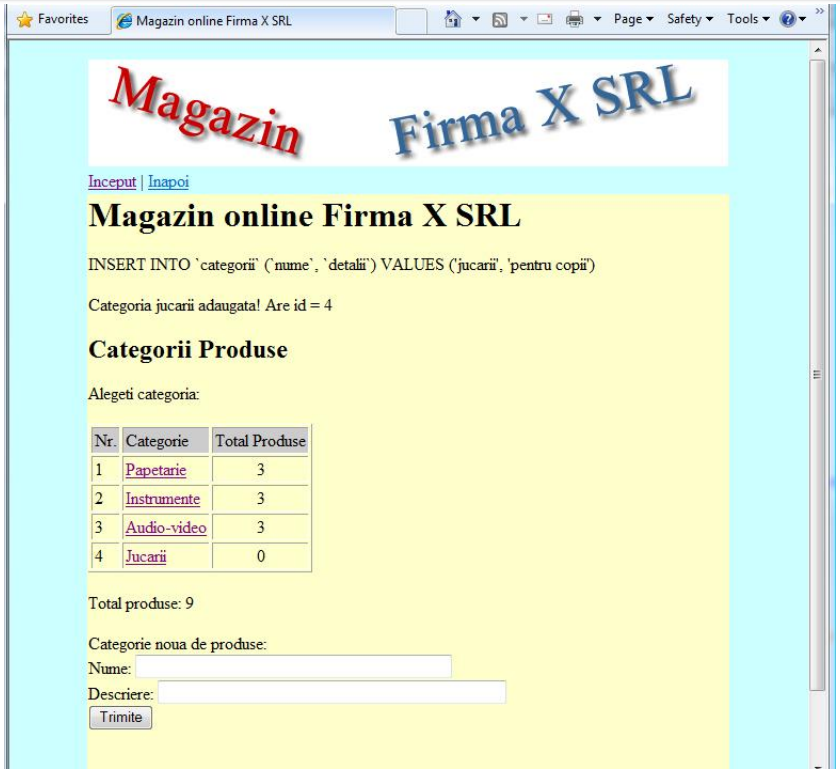
admin_categ.php

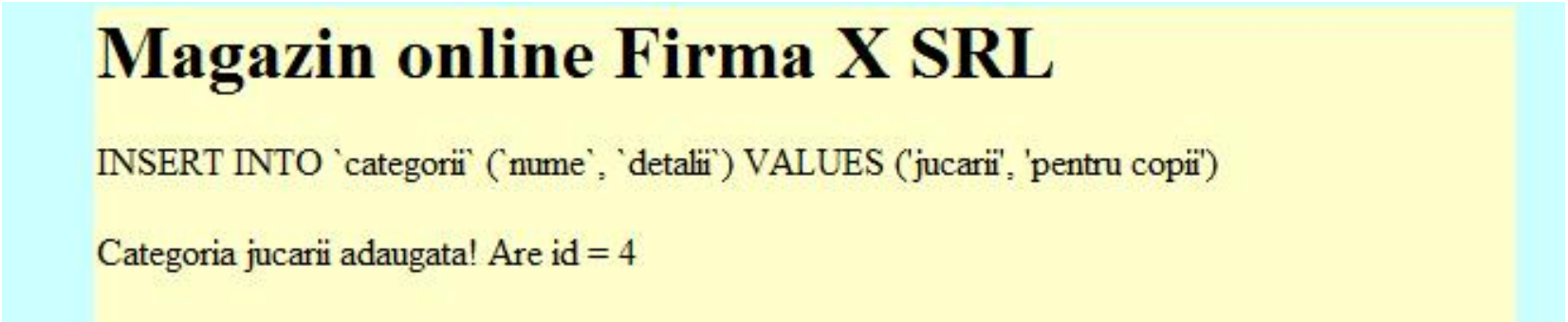
```
if (isset($_POST["c_nou"]))
		{//categorie noua introdusa
		$categ_nou=$xml->addChild("categorie");
		$categ_nou->addAttribute("nume", $_POST["nou"]);
		$xml->asXML("lista.xml"); // salvare fisier
		$produse[$_POST["nou"]]=array(); // update matrice produse
		echo "<p>Categoria ".$_POST["nou"]." adaugata!</p>";
		}
```



```
if (isset($_POST["c_nou"]))
		{//categorie noua introdusa
		$query = "INSERT INTO `categorii` (`nume`, `detalii`) VALUES ('
".$_POST["nou_nume"]."', '".$_POST["nou_desc"]."')";
		echo $query;//util in perioada de testare
		$result = mysql_query($query, $conex) or die(mysql_error());
		$record=mysql_insert_id();//obtinerea id-ului nou
		$produse[$_POST["nou_nume"]]=array(); // update matrice produse
		echo "<p>Categoria ".$_POST["nou_nume"]." adaugata! Are id = ".$record."</p>";
		}
```

admin_categ.php





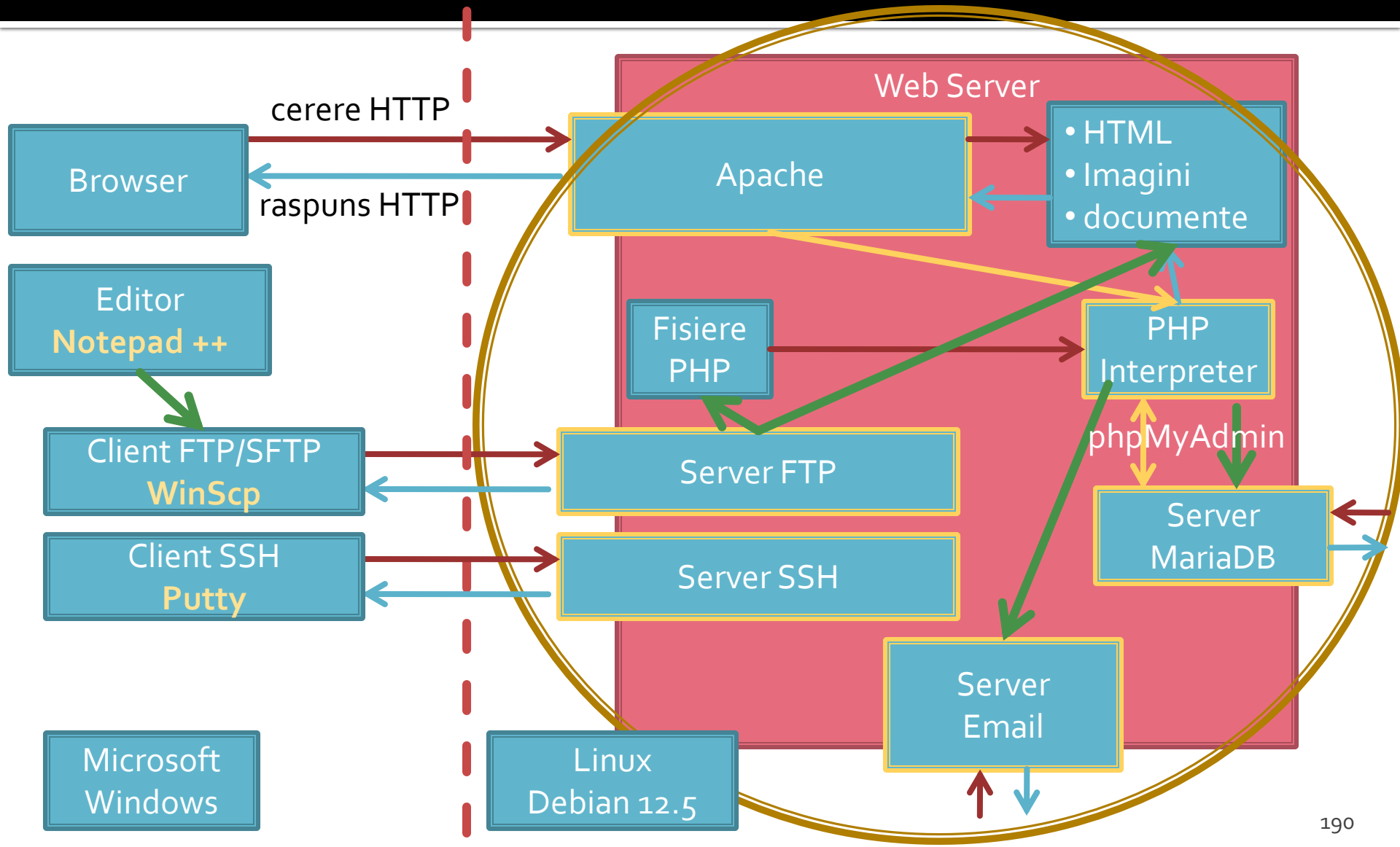
admin_formular.php

- Pentru inlocuire/adaugare produs apare o tratare diferita a celor doua situatii:
  - Adaugarea de produs face apel la interogarea SQL **INSERT INTO `produse` ...**
  - Modificarea unui produs existent va face apel la interogarea SQL **UPDATE `produse` SET ...**

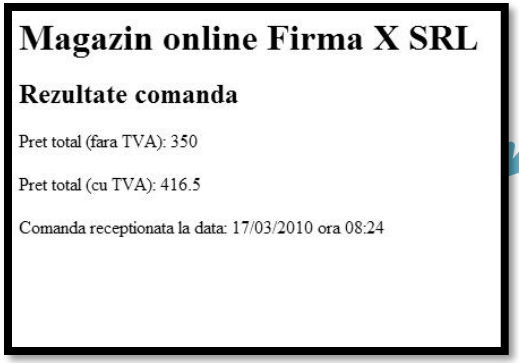
admin_formular.php

```
if (isset($_POST["prod_ant"]))//exista deja acest produs anterior?
		{//exista deja acest produs UPDATE
		unset($produse[$_POST['categ']][$_POST['prod_ant']]);//trebuie sters produsul anterior inlocuit
		$query = "UPDATE `produse` SET `nume`='".$_POST["prod"]."', `detalii`='".$_POST["descriere"]."',
`cant`=".$_POST["cantitate"].", `pret`=".$_POST["pret"]." WHERE `nume`='".$_POST["prod_ant"]."'";
		echo $query;//util in perioada de testare
		$result = mysql_query($query, $conex) or die(mysql_error());
		echo "<p>Produsul \"".$_POST["prod"]."\" modificat in categoria \"".$_POST['categ']."\"!</p>";
		}
else
		{//NU exista acest produs INSERT
		$query = "INSERT INTO `produse` (`nume`, `detalii`, `pret`, `cant`, `id_categ`) VALUES
('".$_POST["prod"]."', '".$_POST["descriere"]."', ".$_POST['pret'].", ".$_POST['cantitate'].",
		(SELECT `id_categ` FROM categorii WHERE `nume` = '".$_POST['categ']."') )";
		echo $query;//util in perioada de testare
		$result = mysql_query($query, $conex) or die(mysql_error());
		$record=mysql_insert_id();//obtinerea id-ului nou
		echo "<p>Produsul \"".$_POST["prod"]."\" adaugat in categoria \"".$_POST['categ']."\"! Are id =
".$record."</p>";
		}
$produse[$_POST['categ']][$_POST['prod']]=array("descr" => $_POST['descriere'], "pret" => $_POST['pret'], "cant" =>
$_POST['cantitate']);
```

Utilizare LAMP



Utilizare LAMP



<input name="x" ..

$_POST['x']

$_GET['x']

Web Server

Apache

Server FTP

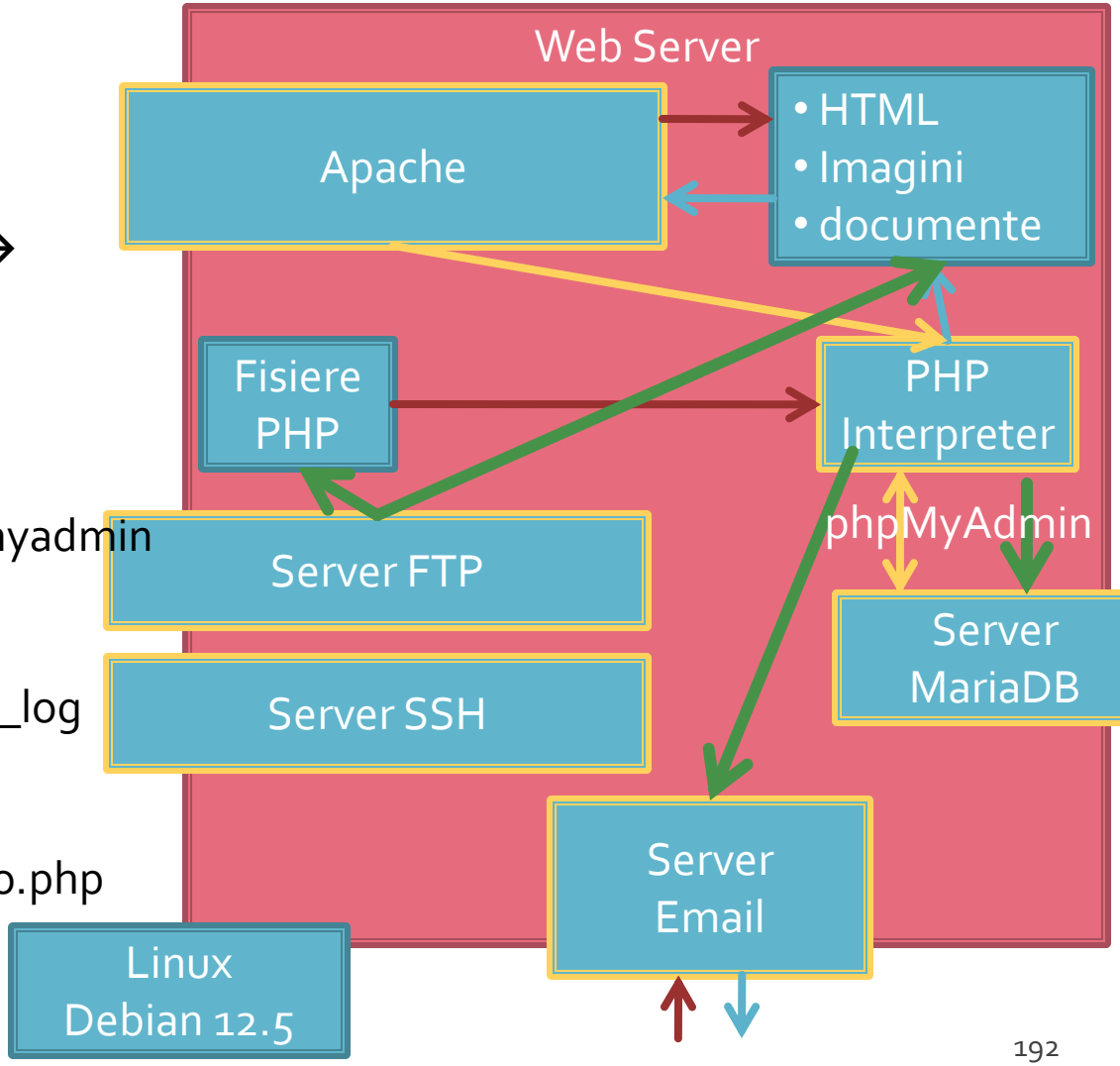
Server SSH

Utilizare LAMP

1. login → paw:masteretti
2. su - → root:masteretti

2. ifconfig → 192.168.30.5
3. putty.exe → 192.168.30.5 → SSH → root:masteretti (remote login)
4. [alte comenzi linux dorite]
5. FTP → Winscp → SFTP → student:masterrc@192.168.30.5
6. MySql → http://192.168.30.5/phpmyadmin → root:masteretti
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



Utilizare LAMP

1. login → root:masteretti
2. ifconfig → 192.168.30.5
3. putty.exe → 192.168.30.5 → SSH → root:masteretti (remote login)
4. [alte comenzi linux dorite]
5. FTP → Winscp → SFTP → student:masterrc@192.168.30.5
6. MySql → http://192.168.30.5/phpmyadmin → root:masteretti
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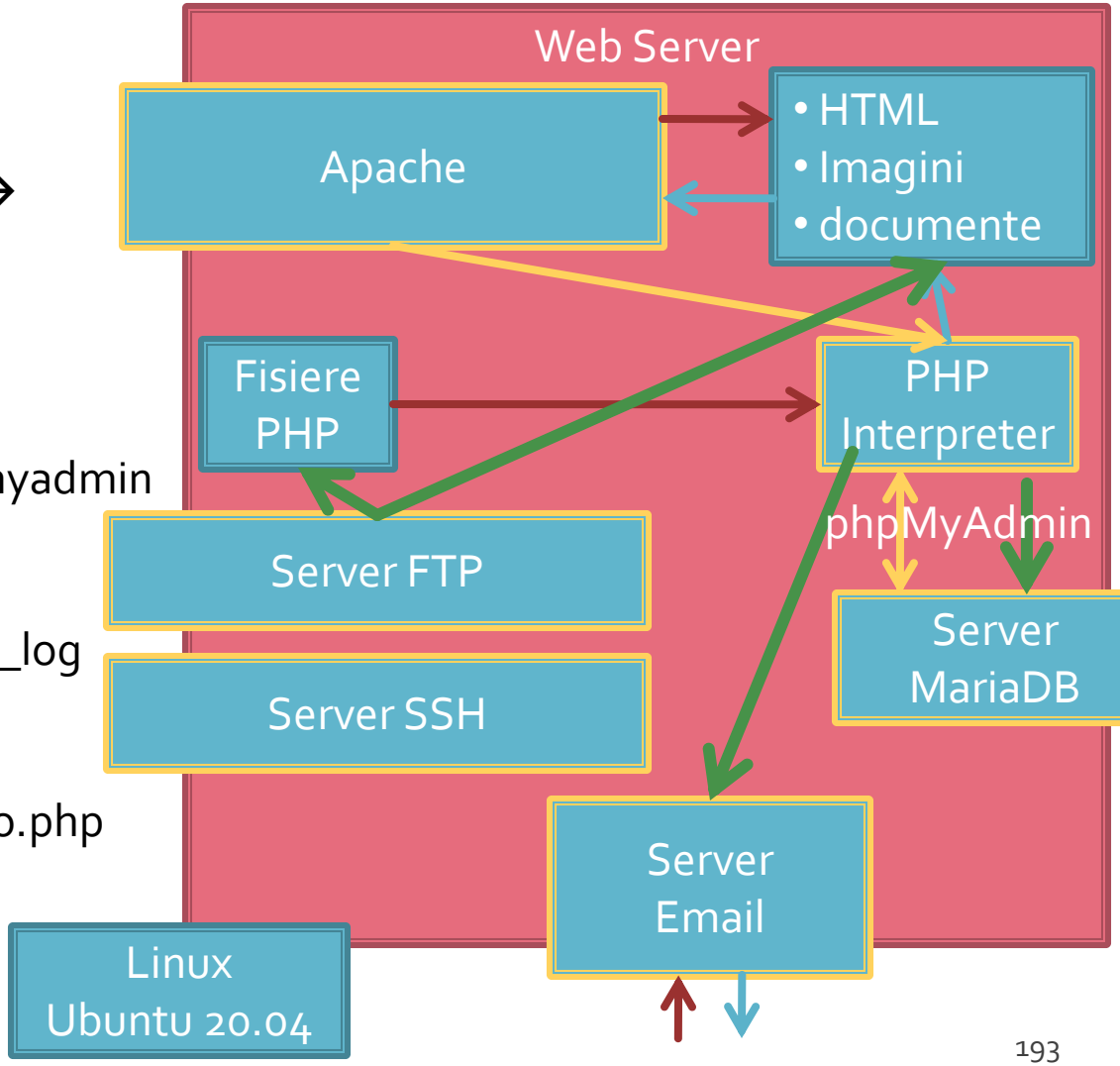
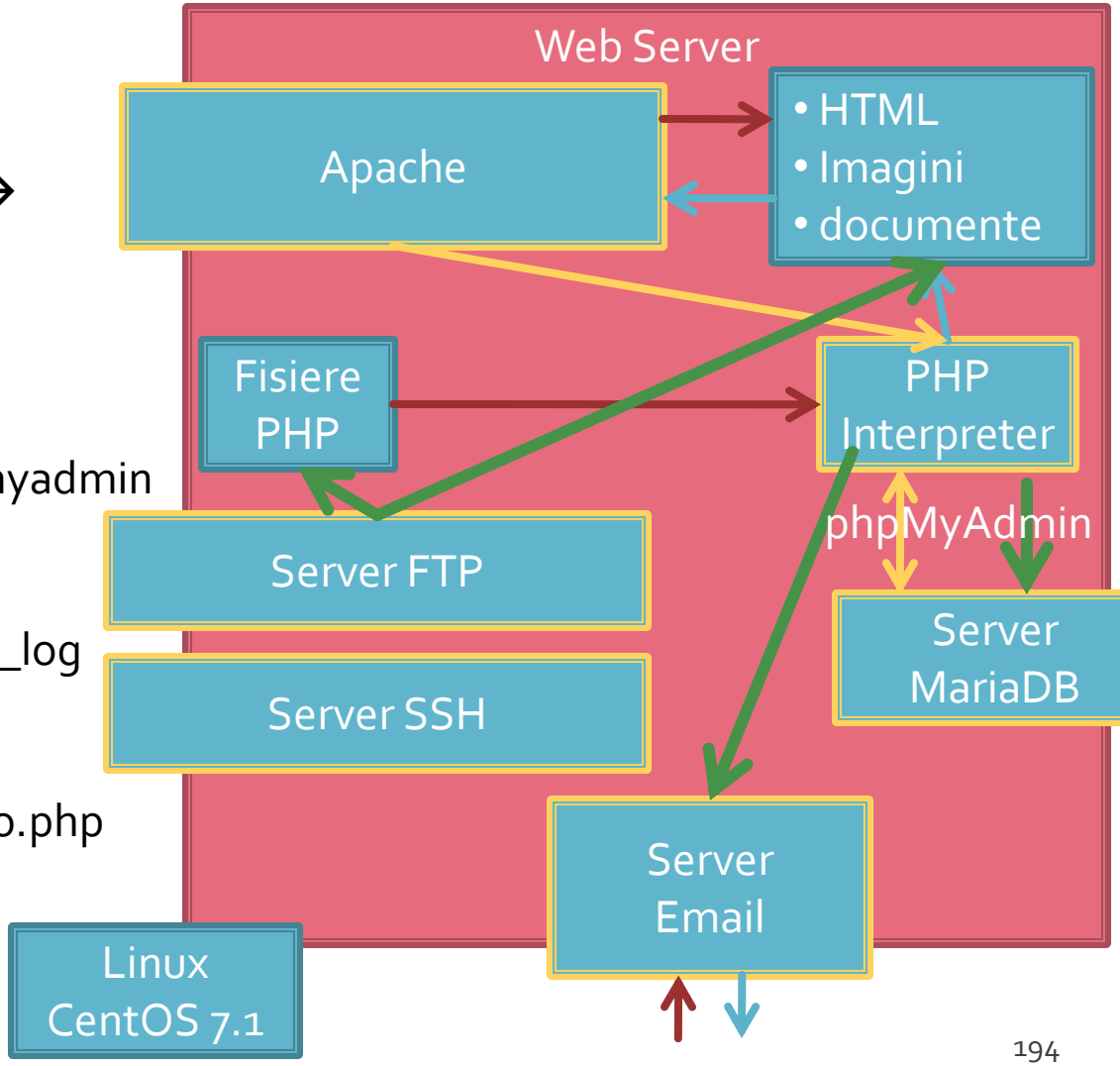
7a. putty → nano /var/log/httpd/error_log
7b. http://192.168.30.5/logfile.php (nonstandard)
8. PHP info → http://192.168.30.5/info.php

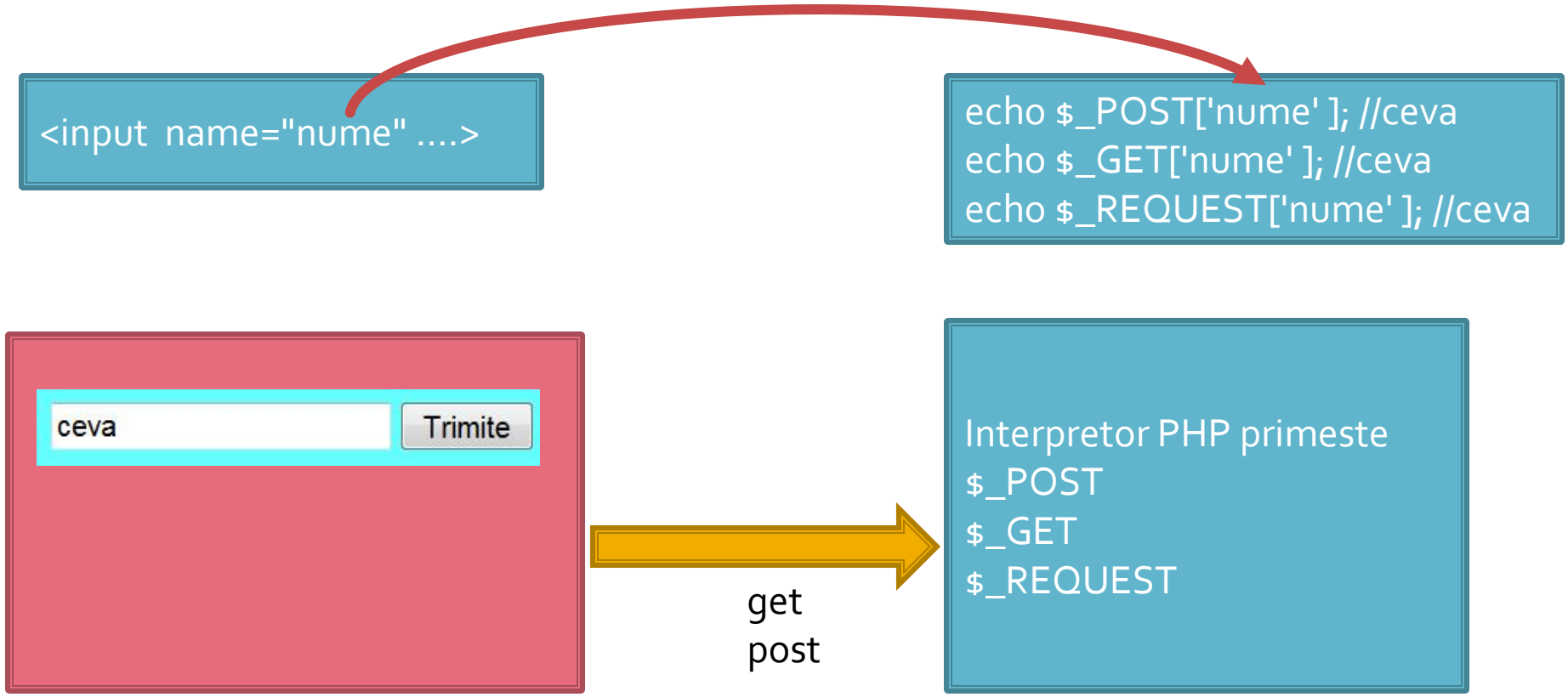


Utilizare LAMP

1. login → root:masterrc
2. ifconfig → 192.168.30.5
3. putty.exe → 192.168.30.5 → SSH → root:masterrc (remote login)
4. [alte comenzi linux dorite]
5. FTP → Winscp → SFTP → student:masterrc@192.168.30.5
6. MySql → http://192.168.30.5/phpmyadmin → root:masterrc
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



Client / Server



Depanare

```
echo "<pre>";
print_r ($_POST);
echo "</pre>";
```

```
<p>temp <?php echo
"a=";echo $a; ?> </p>
```

Anexa

Server referinta LAMP 2026

- 3 variante acceptate
  - CentOS 7.1
  - Ubuntu 20.04
  - Debian 12.5

Server referinta LAMP

- Centos 7.1
  - PHP 5.4.16
  - MariaDB 5.5.44 / root:masterrc
  - Apache 2.4.6
  - PhpMyAdmin/4.4.15
  - **root**/student:masterrc
  - Python 2.7.5
  - creat: Workstation Player 12.x (**12**)

Server referinta LAMP

- Ubuntu 20.04
  - PHP 7.4.3
  - MariaDB 10.3.31 / root:masteretti
  - Apache 2.4.41
  - **paw**/student:masteretti
  - necesar suplimentar pentru **acces FTP user paw**:
    - sudo usermod -a -G upload paw
    - sudo chmod -R 775 /var/www
  - Python 3.8.10
  - creat: Workstation Player 15.x (**16**)

Server referinta LAMP

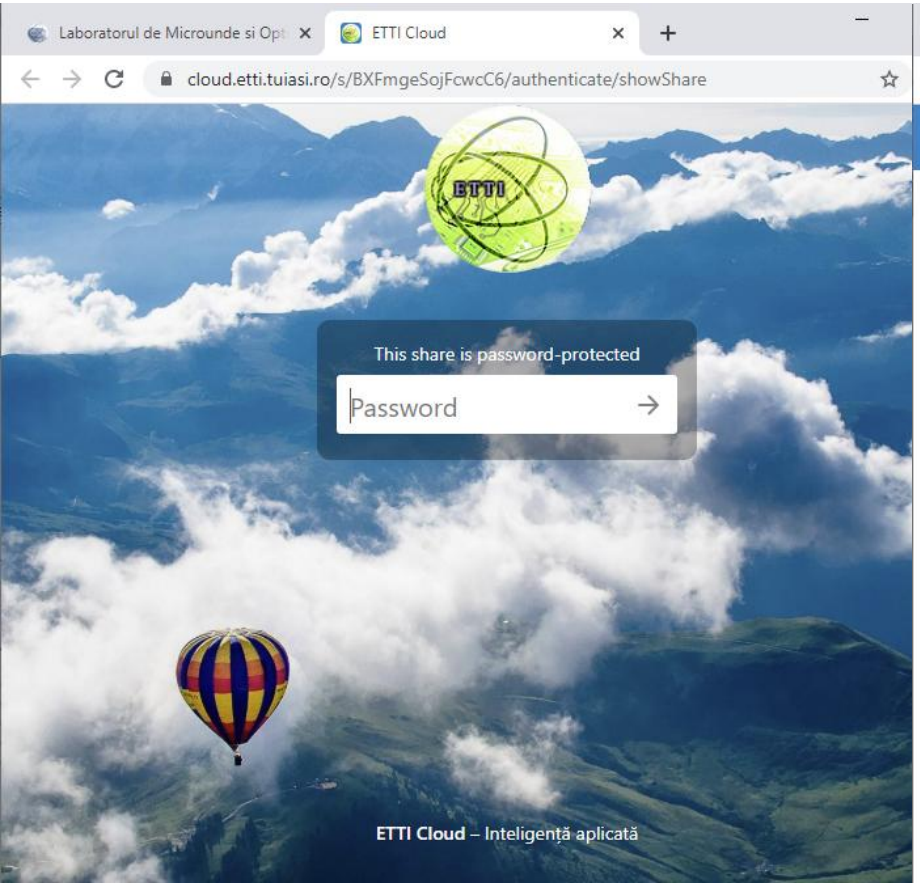
- Debian 12.5
  - PHP 8.2.7
  - MariaDB 10.11.6 / root:masteretti
  - Apache 2.4.57
  - PhpMyAdmin/5.2.1 deb
  - **root**/paw/student:masteretti
  - Python 3.11.2
  - creat: Workstation Player 17.5 (**21**)

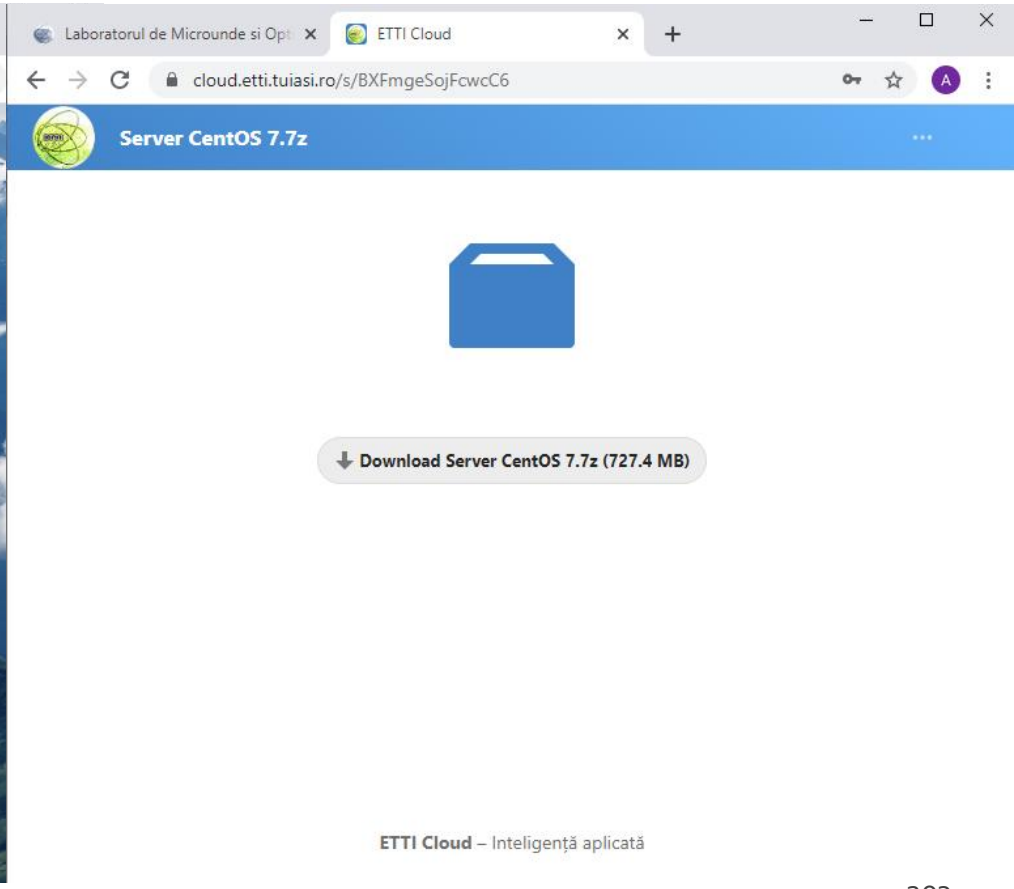
Server referinta

- rf-opto.etti.tuiasi.ro > Master > Web Design

Server referinta

- Cloud ETTI: **RF-opto3#**



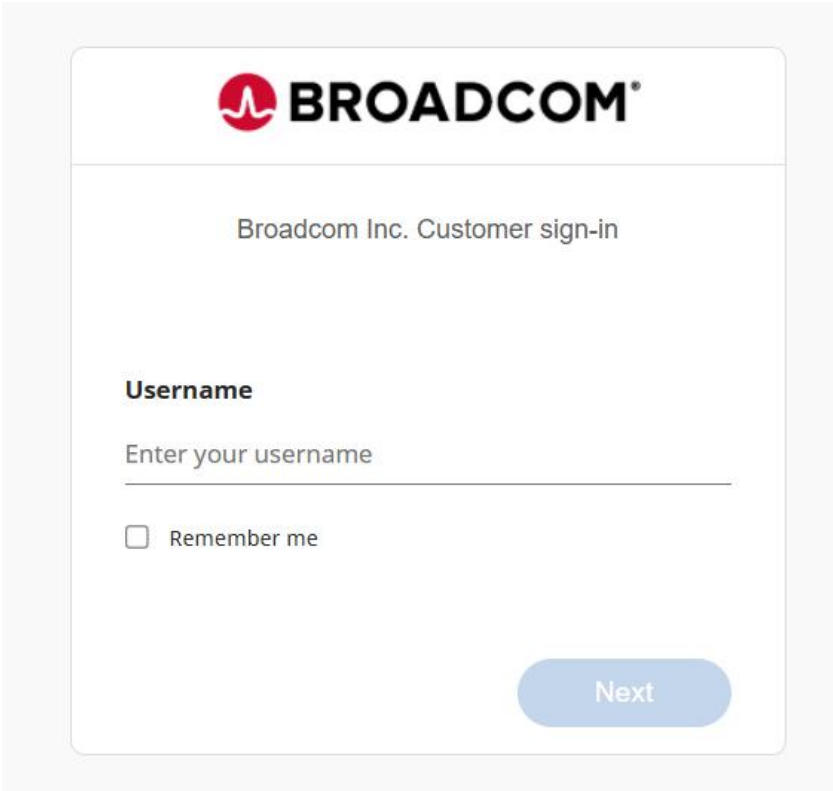


Server referinta

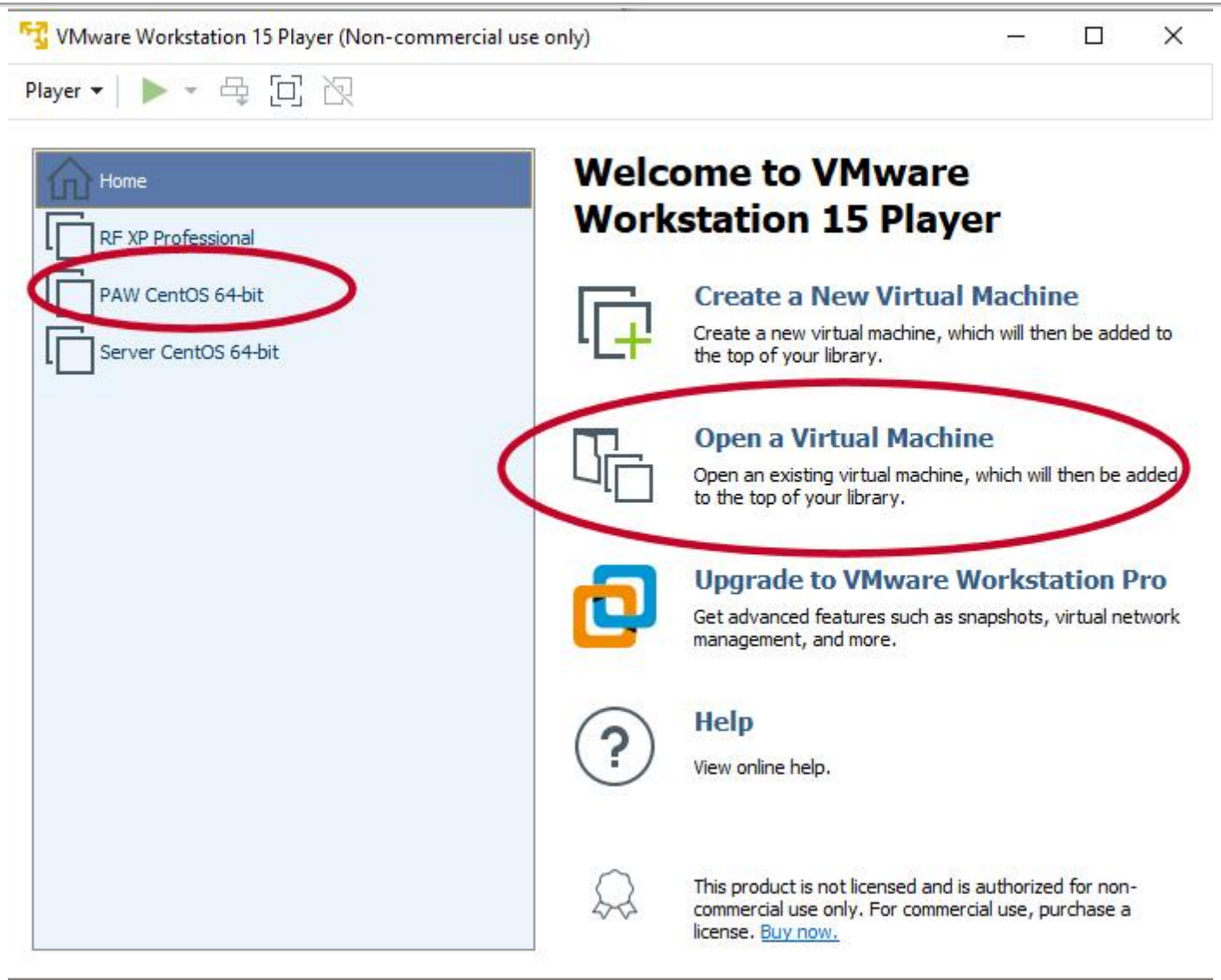
- Masina virtuala
- VMware Workstation Player
  - Gratuit (non-comercial)
  - https://www.vmware.com/products/workstation-player/workstation-player-evaluation.html
- Inlocuit de VMware Workstation Pro

Server referinta

- Masina virtuala
- VMware Workstation Pro (Broadcom)



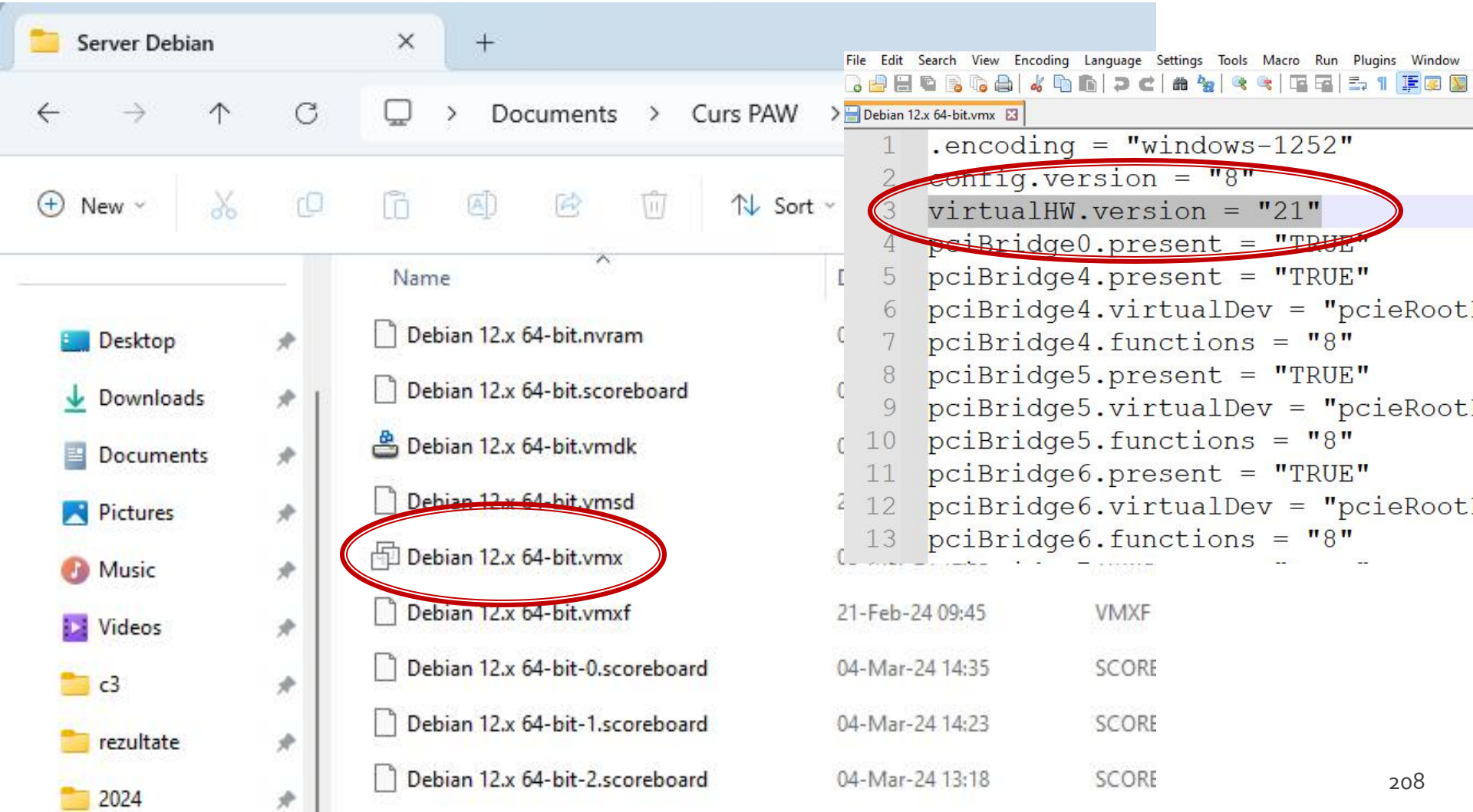
Server referinta



Server referinta

- Pentru rularea unui server pe o versiune VMware Player **anterioara**:
  - se localizeaza fisierul "*.vmx" a server-ului
  - se modifica virtualHW.version = "**21**" la o valoare mai mica (anterioara)
    - in 2.13 -> **18?**

Server referinta



Aplicatii suport

- WinSCP (client FTP, gratuit)
  - https://winscp.net/eng/download.php
- Notepad ++ (editor, avansat, gratuit)
  - https://notepad-plus-plus.org/downloads/
- Putty (remote access)
  - https://www.putty.org/
- MySQL Workbench (gratuit, cont Oracle)
  - https://www.mysql.com/products/workbench/
- Visual Studio Code (gratuit, Microsoft)
  - https://code.visualstudio.com/download

Aplicatii suport

- Variante portabile

Laboratory

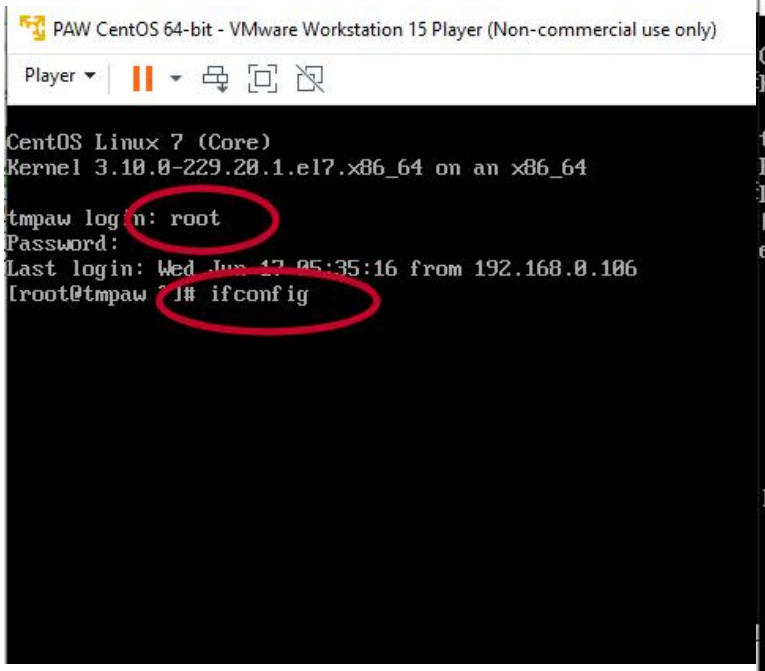
Laborator 1 (pdf, 1.48 MB, ro,)
Server Win2000 pentru VMWare Player - lab 1 (cloud) (link, 0 Bytes, en,)
Accesorii laborator (x32 - partial) (zip, 28.92 MB, en,)
Accesorii laborator (x64 - complet) (zip, 133.58 MB, en,)

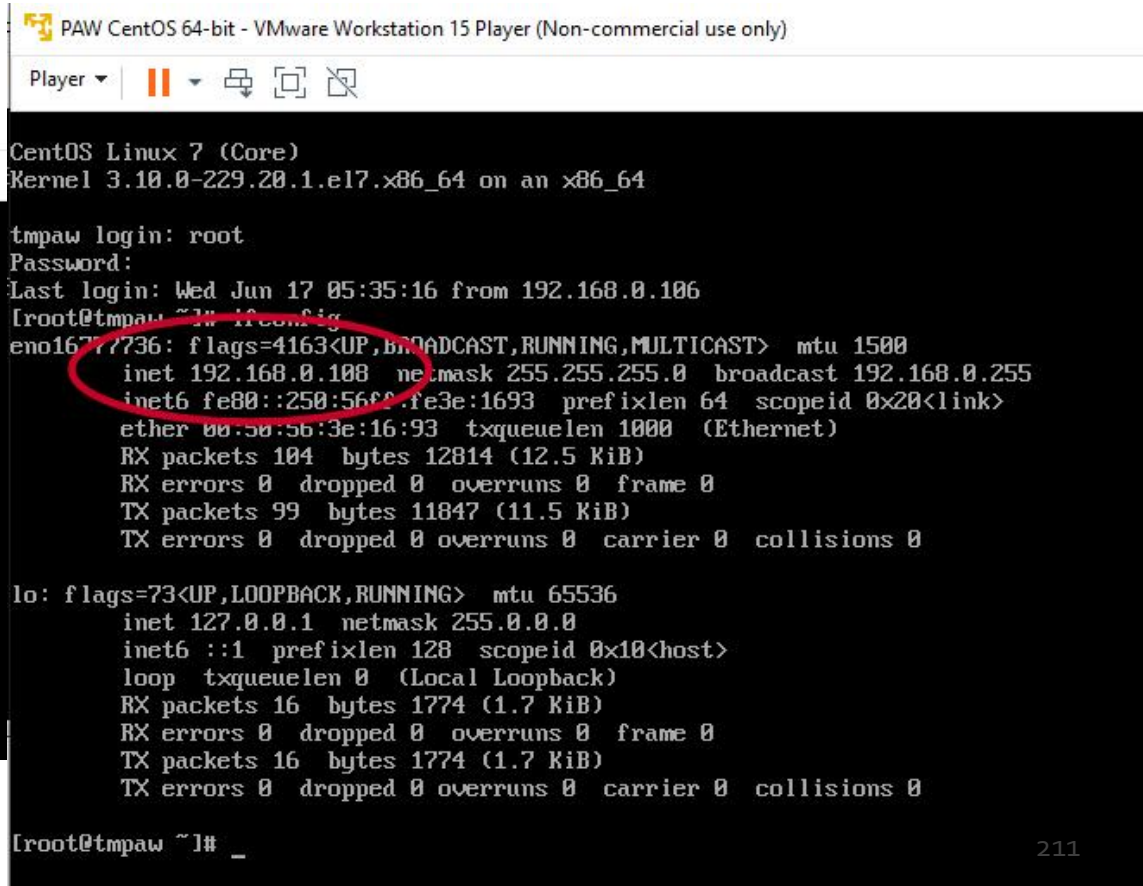
Project/Design

VMware Workstation Player (link, 0 Bytes, en,)
Server CentOS pentru VMWare Player (cloud) (link, 0 Bytes, en,)
Instalare Centos (pdf, 2.54 MB, en,)
Server Ubuntu pentru VMWare Player (cloud) (link, 0 Bytes, en,)
Instalare Ubuntu (pdf, 1.83 MB, en,)

Adresa IP

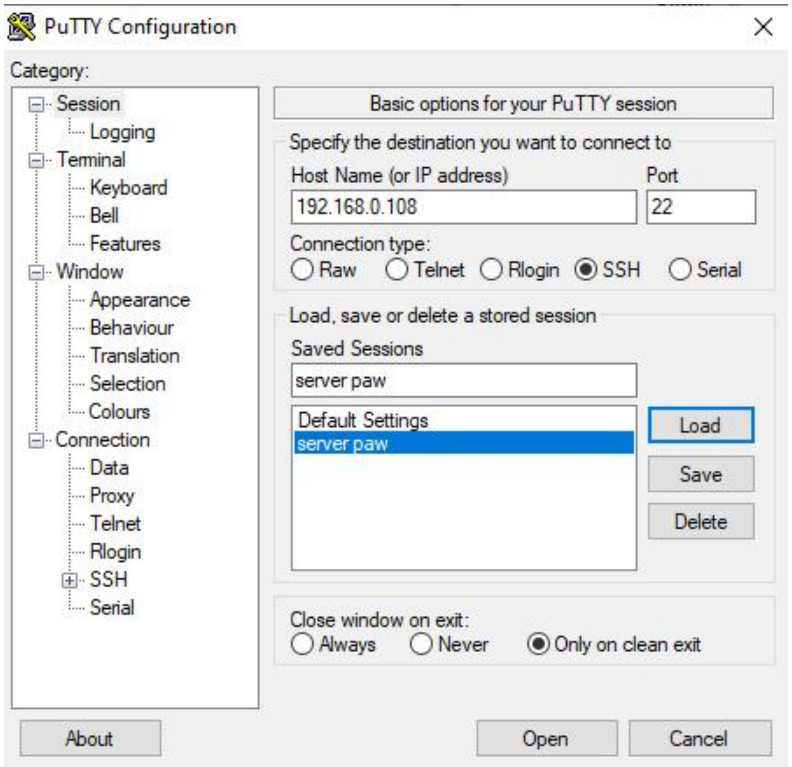
- login, ifconfig
- Ctrl + Alt + mouse

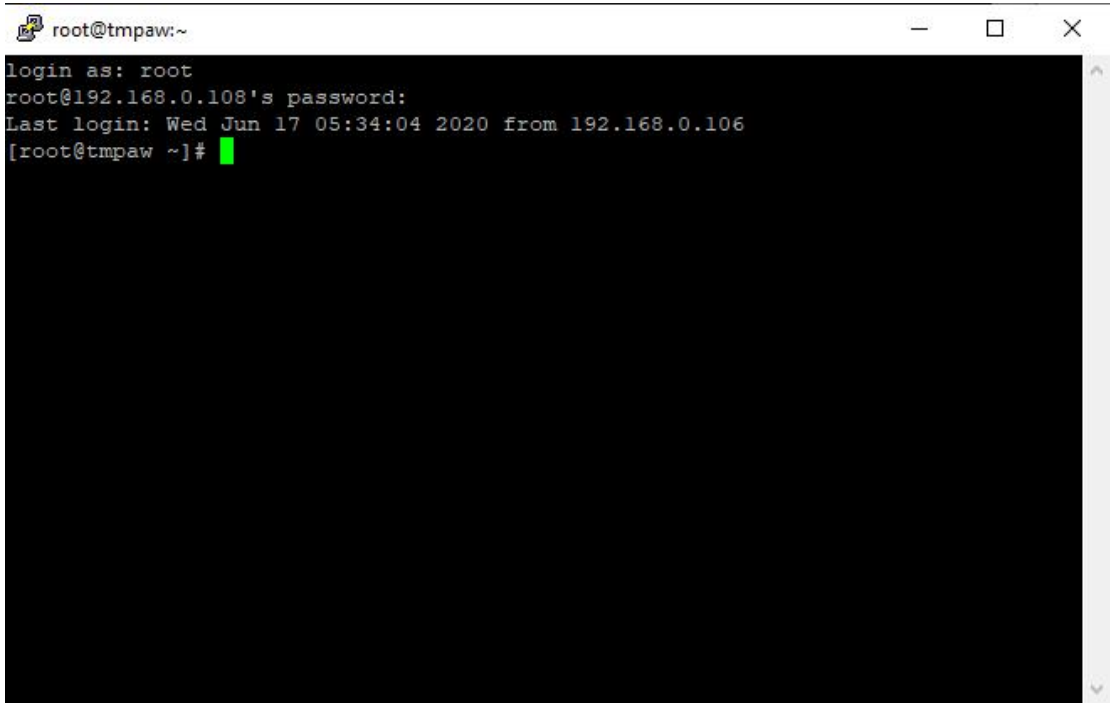




Putty

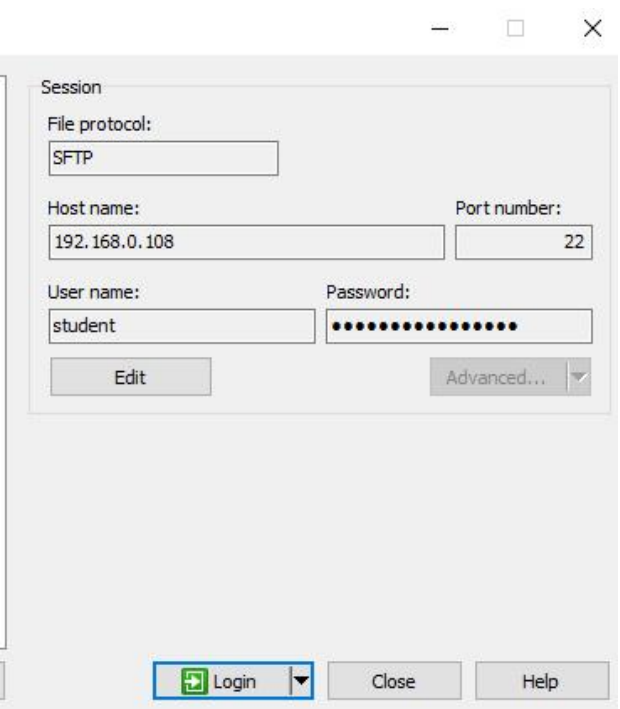
- putty.exe
- evitare captura mouse, copy/paste etc.

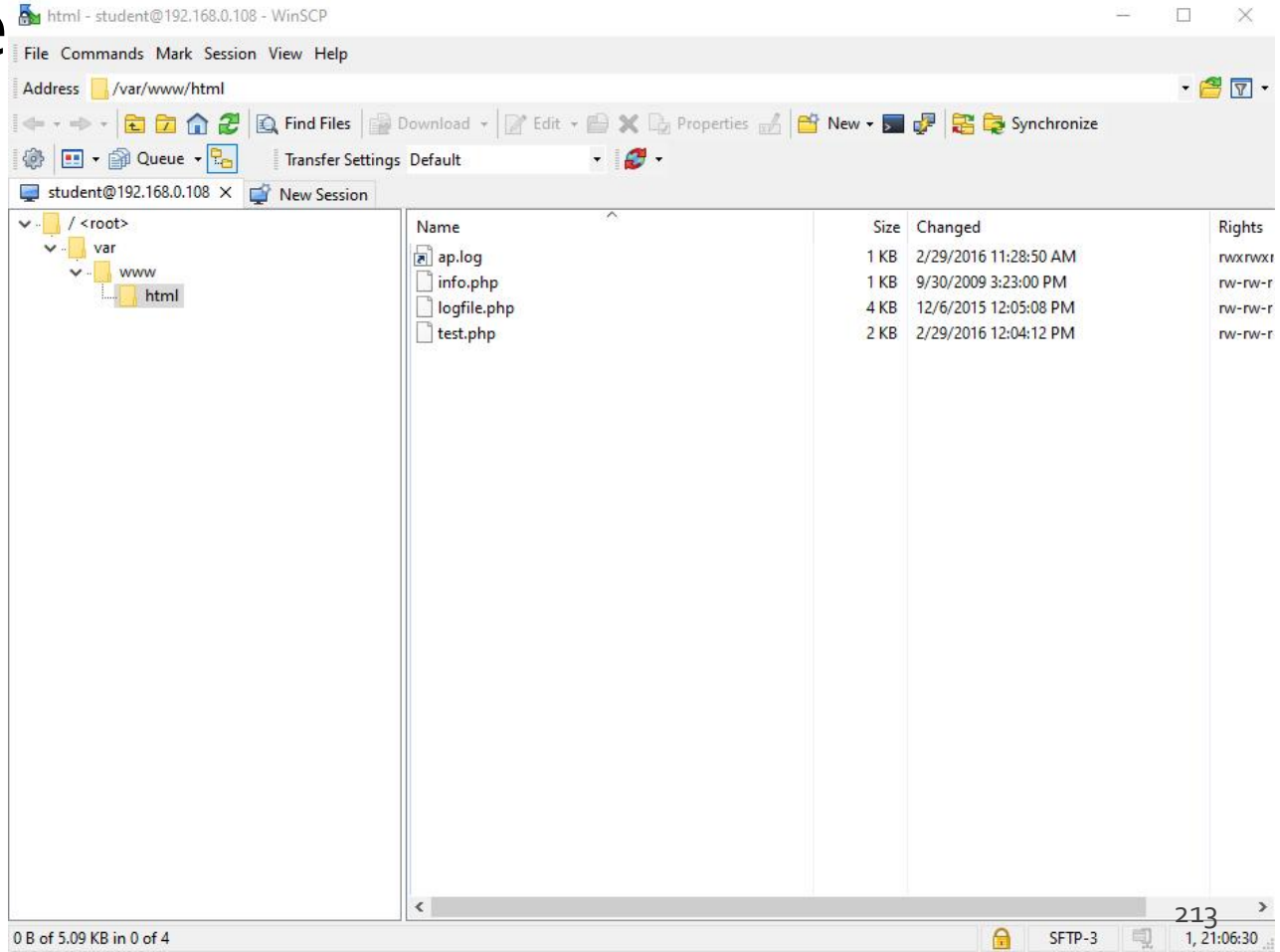




WinSCP

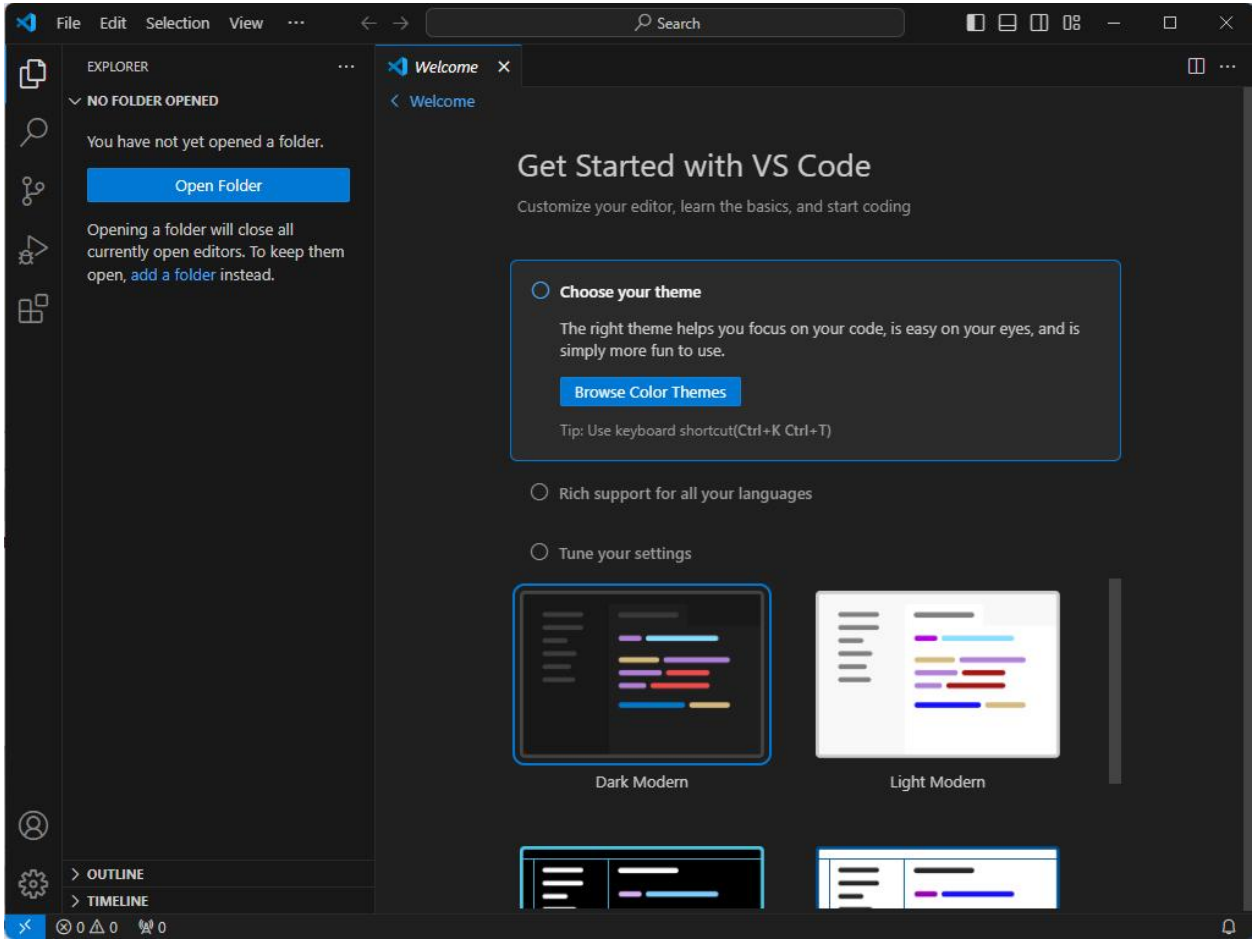
- client FTP
- upload fisiere





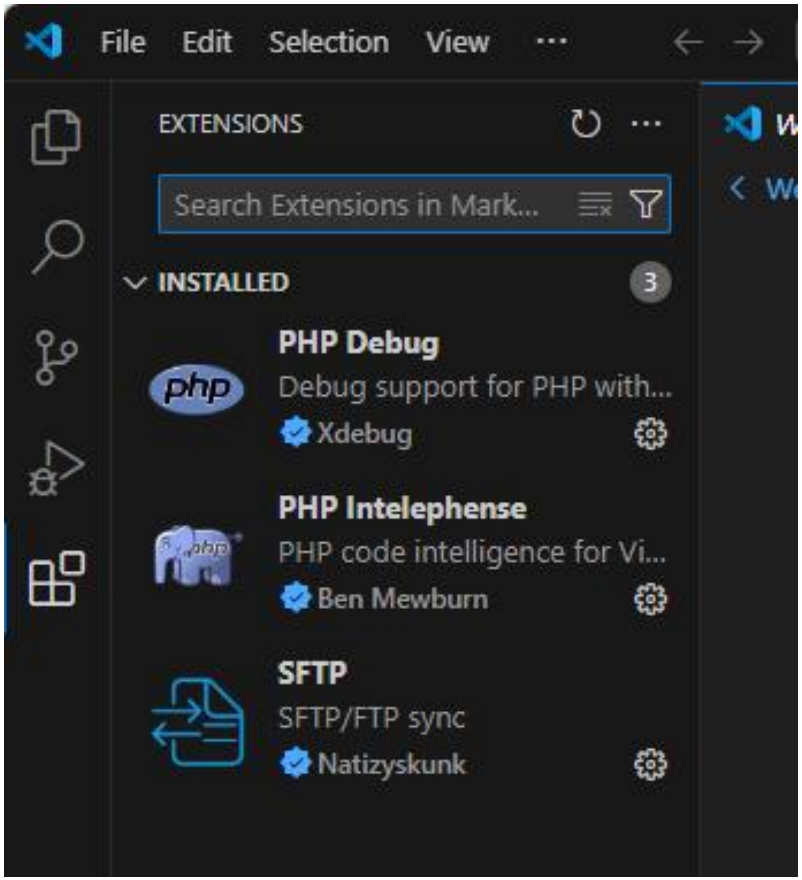
Visual Studio Code

- 1.87 Portabil (curent 1.97.2)

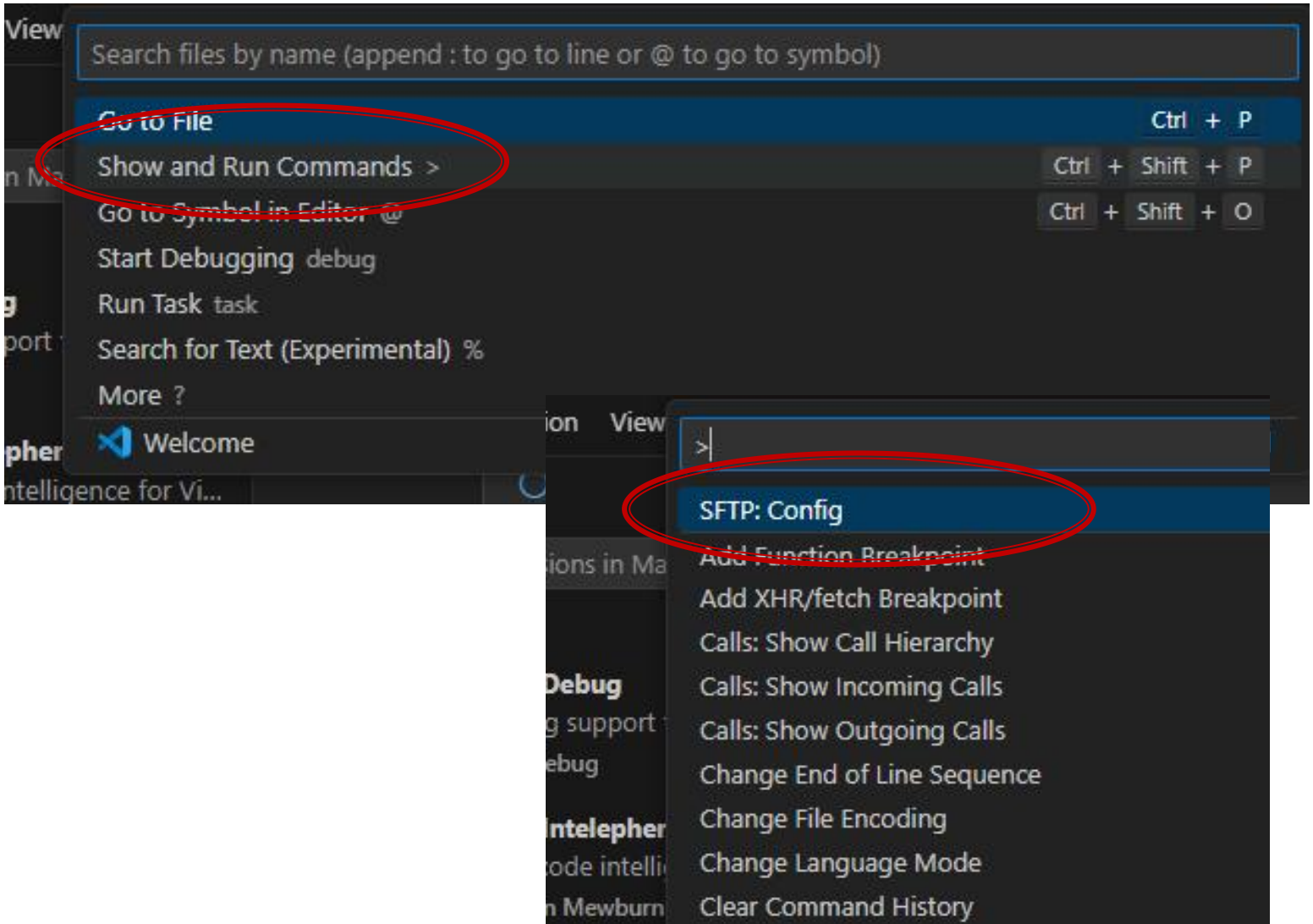


Visual Studio Code

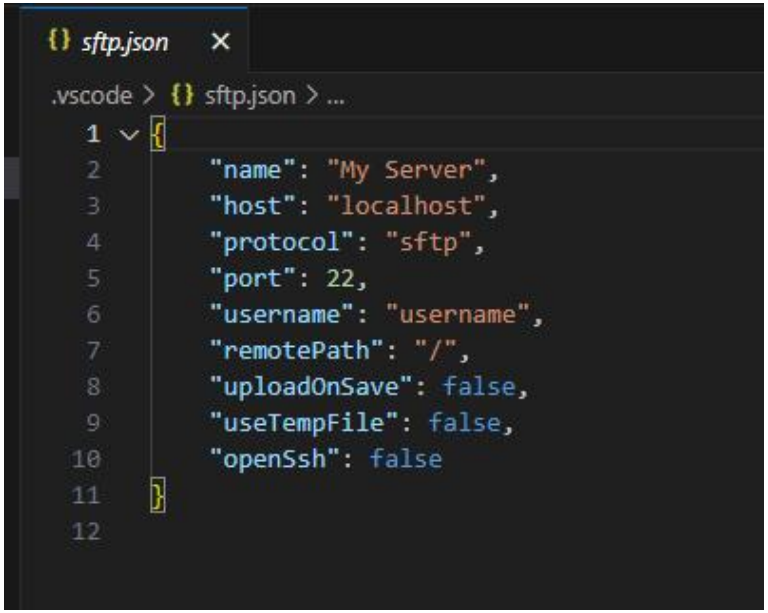
- Extensii instalate
  - PHP Intelephense
    - PHP 8 -> Debian
  - PHP Debug (inactiv momentan)
  - SFTP – salvare automata pe un server

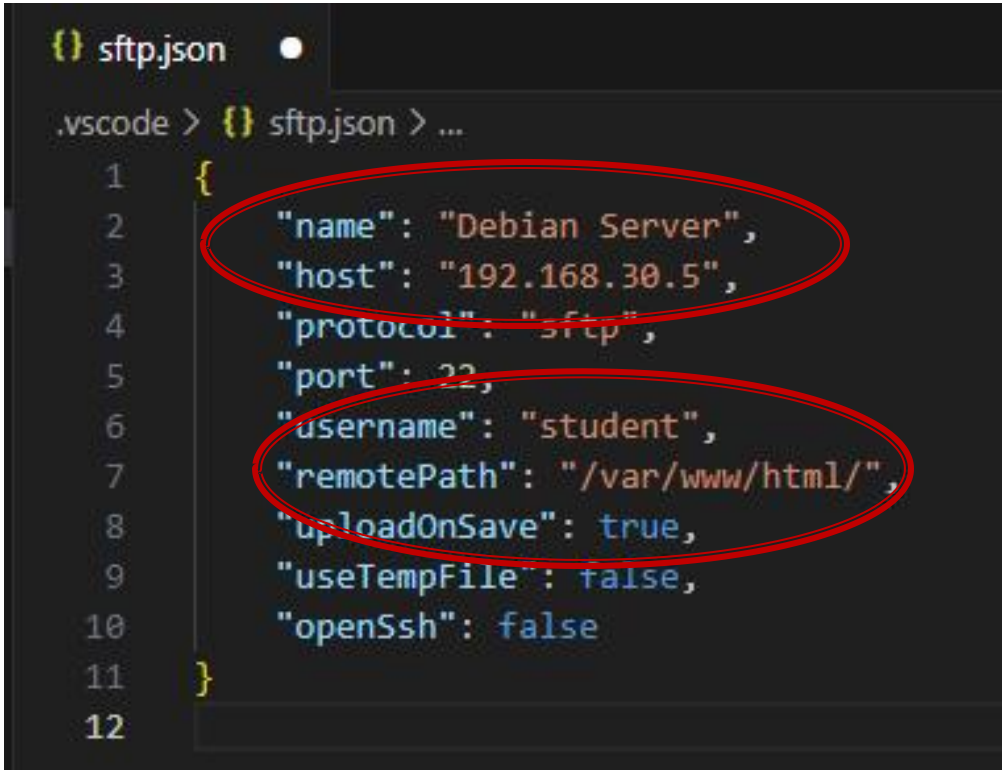


Visual Studio Code

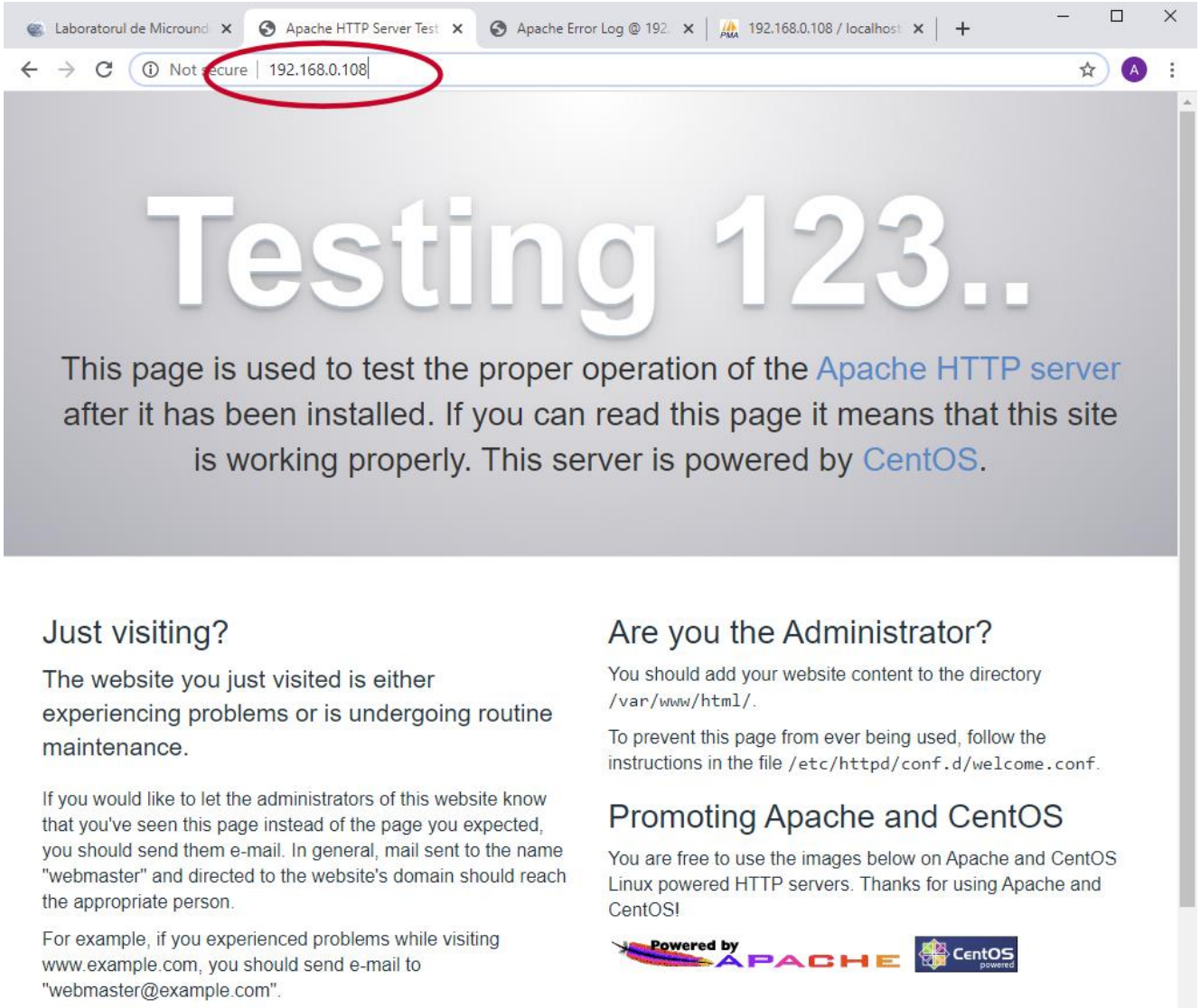


Visual Studio Code

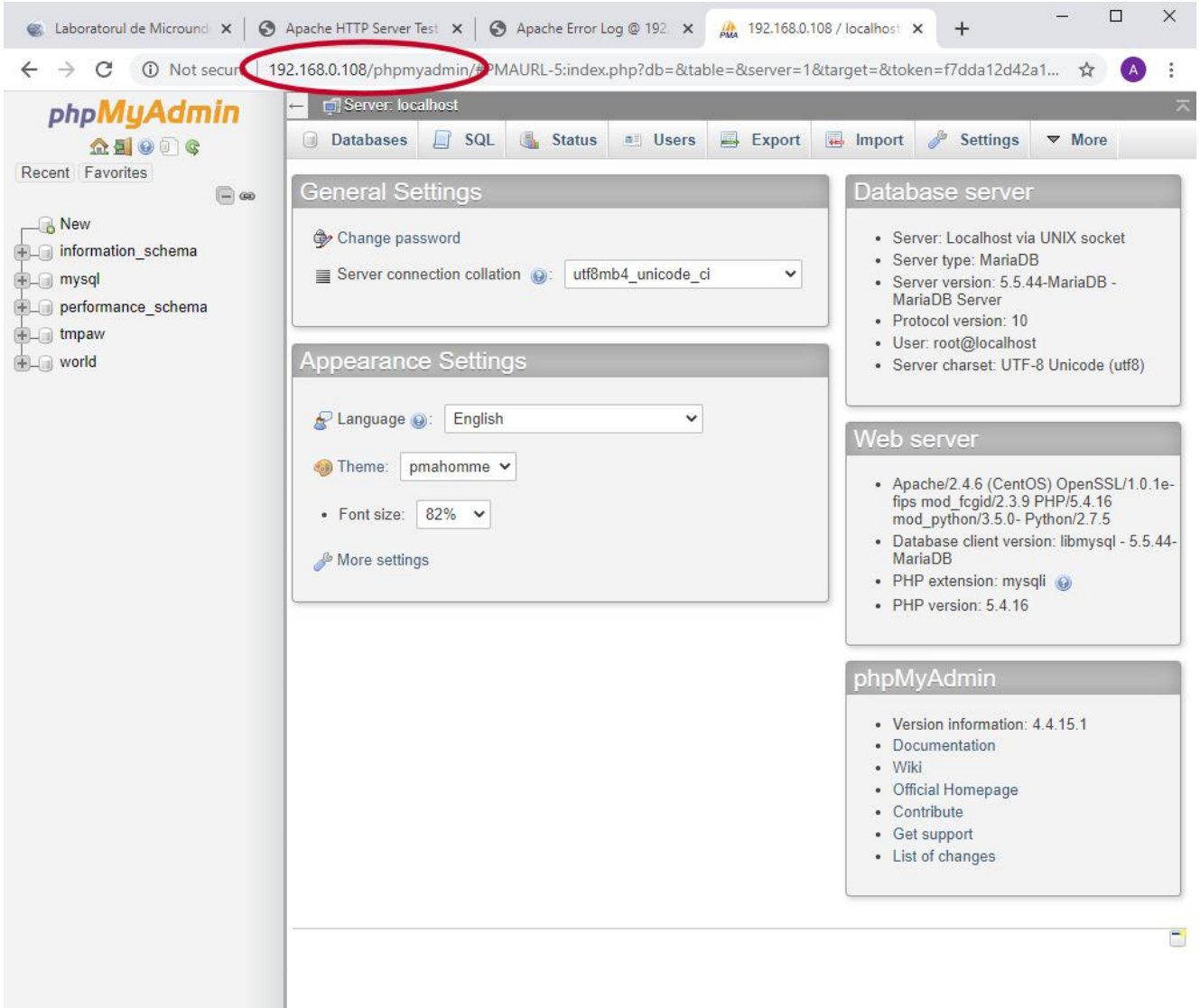




Browser


Laboratorul de Microunde
Apache HTTP Server Test
Apache Error Log @ 192.
192.168.0.108 / localhost
Not secure
192.168.0.108
Testing 123..
This page is used to test the proper operation of the Apache HTTP server after it has been installed. If you can read this page it means that this site is working properly. This server is powered by CentOS.
Just visiting?
The website you just visited is either experiencing problems or is undergoing routine maintenance.
If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.
For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".
Are you the Administrator?
You should add your website content to the directory /var/www/html/.
To prevent this page from ever being used, follow the instructions in the file /etc/httpd/conf.d/welcome.conf.
Promoting Apache and CentOS
You are free to use the images below on Apache and CentOS Linux powered HTTP servers. Thanks for using Apache and CentOS!
Powered by APACHE
CentOS powered

Server MySQL/MariaDB

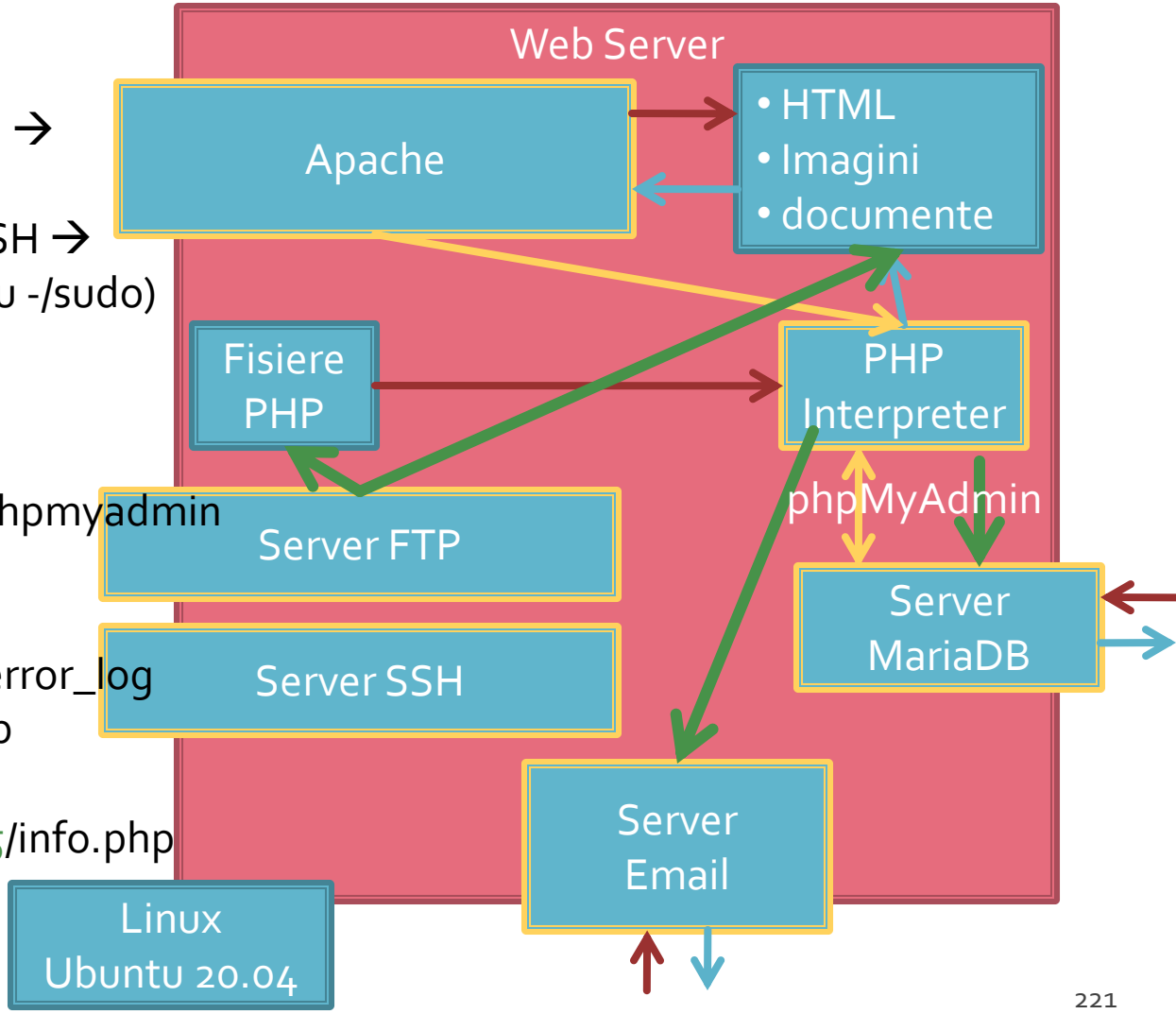


MySql – Server Ubuntu/Debian

Mini – Indrumar practic
Lucru cu bazele de date

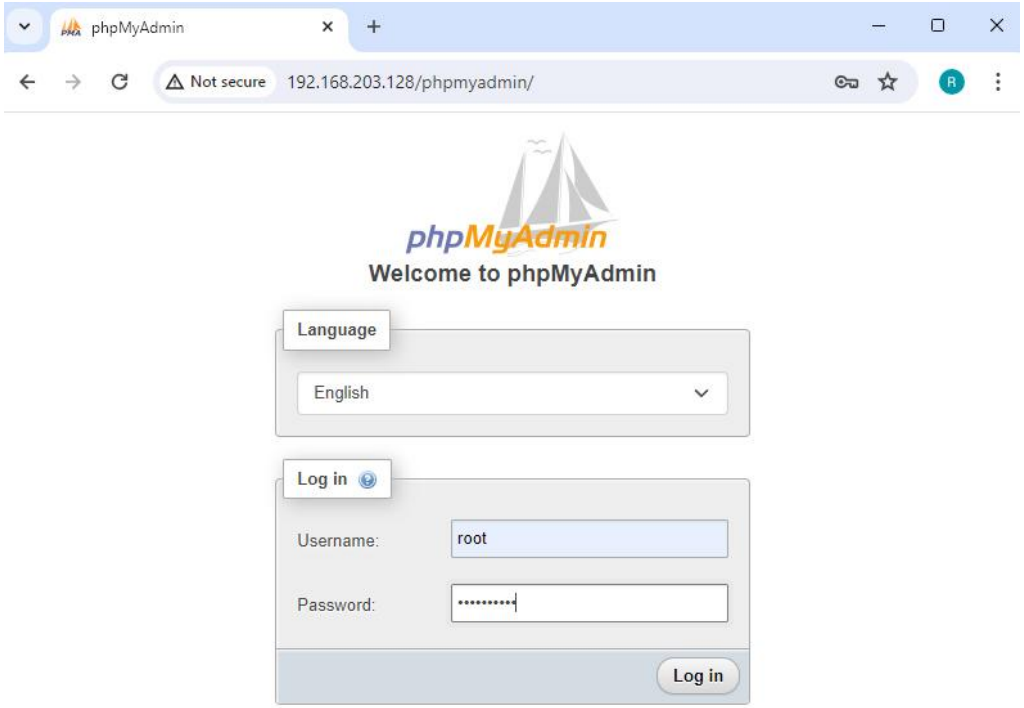
Utilizare LAMP Ubuntu/Debian

1. login → **paw**:masteretti
2. (su - + **root**:masteretti) ifconfig → 192.168.30.5
3. putty.exe → 192.168.30.5 → SSH → **paw**:masteretti (remote login + su -/sudo)
4. [alte comenzi linux dorite]
5. FTP → Winscp → SFTP → student:masterrc@192.168.30.5
6. MySql → http://192.168.30.5/phpmyadmin → **root**:masteretti
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

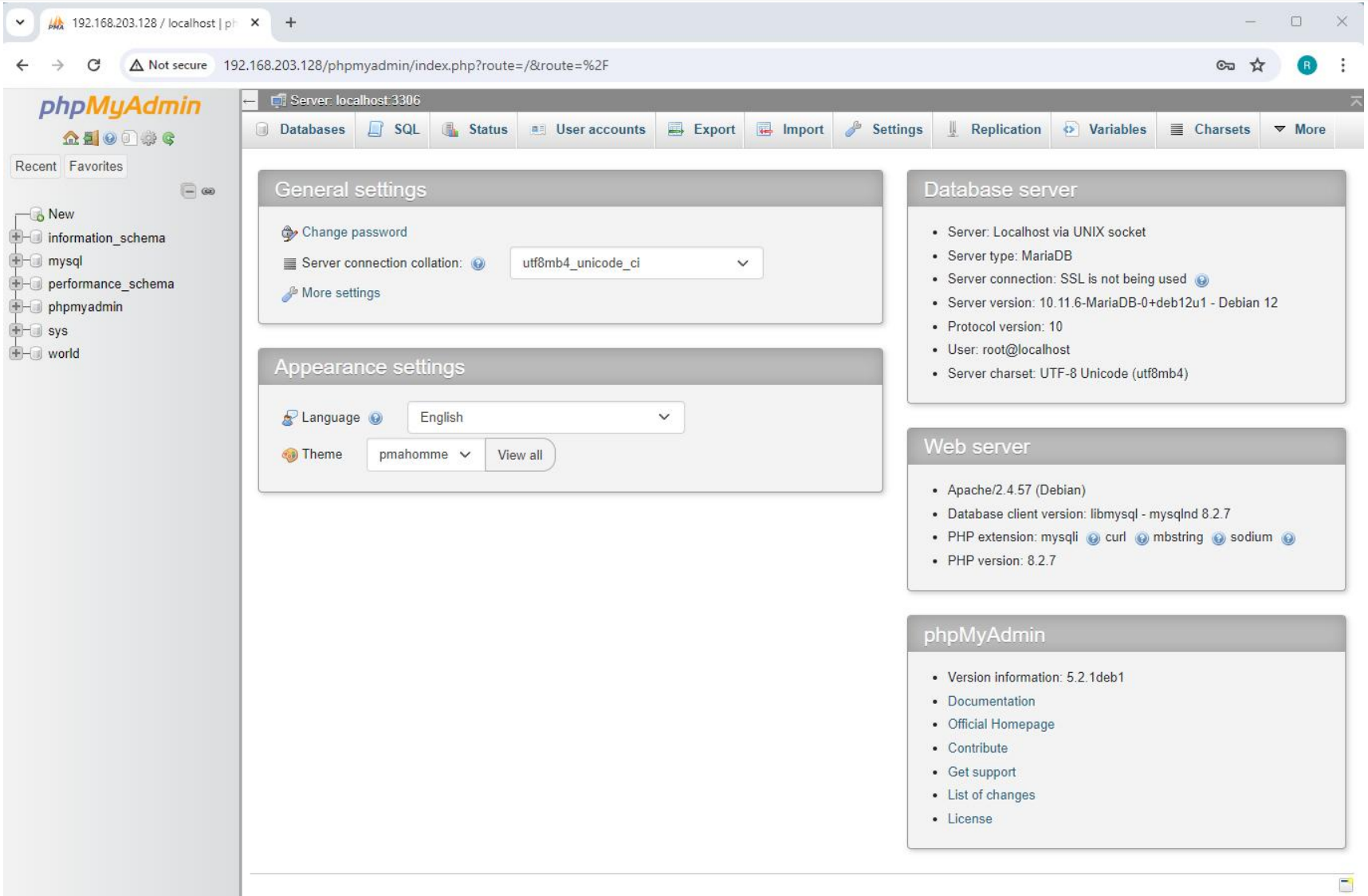


PhpMyAdmin

- http://192.168.203.128/phpmyadmin
  - root
  - parola administrator **MySql/MariaDB** (masteretti)

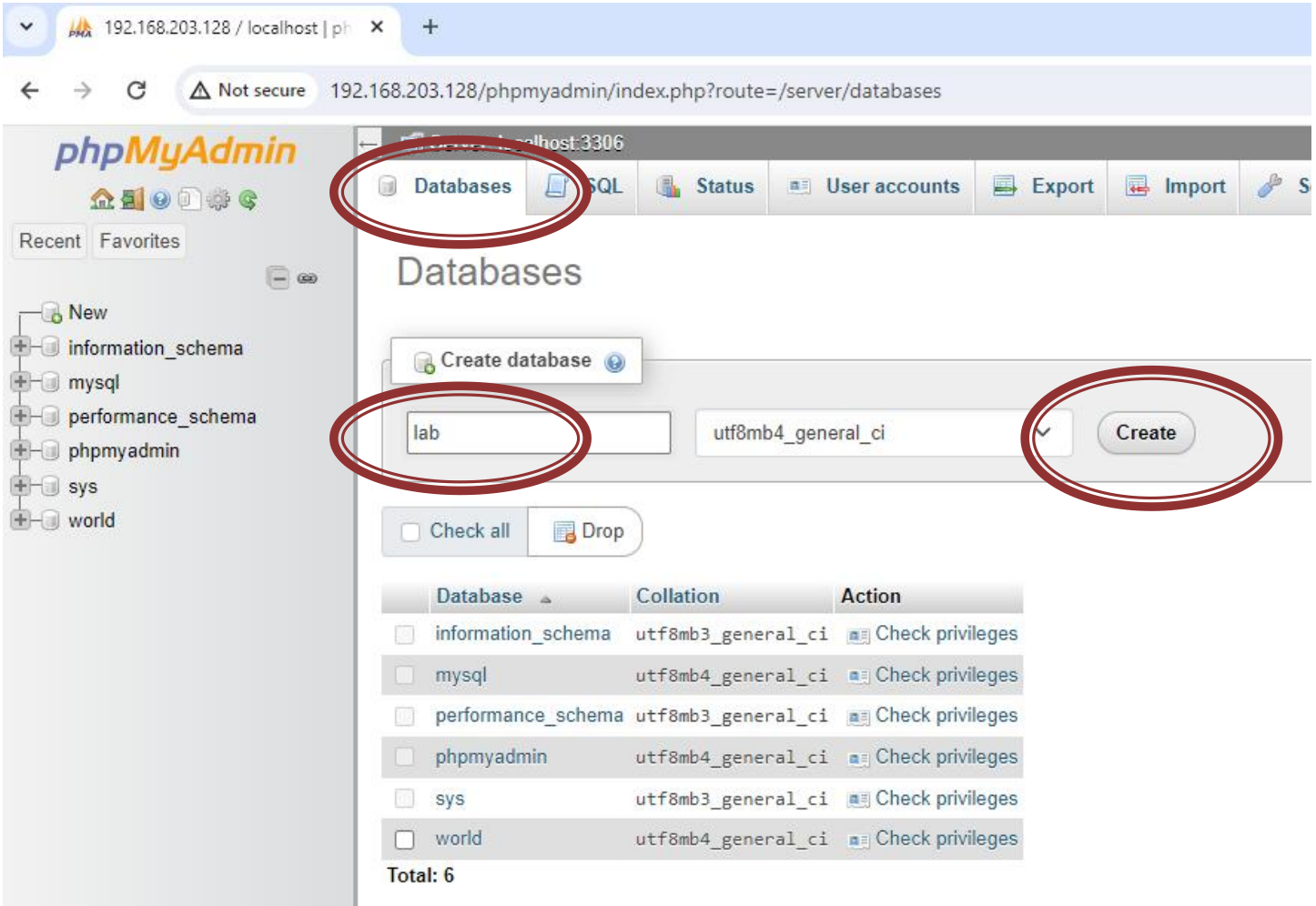


PhpMyAdmin


192.168.203.128 / localhost | ph
Not secure
192.168.203.128/phpmyadmin/index.php?route=/&route=%2F
phpMyAdmin
Recent
Favorites
New
information_schema
mysql
performance_schema
phpmyadmin
sys
world
Server: localhost:3306
Databases
SQL
Status
User accounts
Export
Import
Settings
Replication
Variables
Charsets
More
General settings
Change password
Server connection collation:
utf8mb4_unicode_ci
More settings
Appearance settings
Language
English
Theme
pmahomme
View all
Database server
Server: Localhost via UNIX socket
Server type: MariaDB
Server connection: SSL is not being used
Server version: 10.11.6-MariaDB-0+deb12u1 - Debian 12
Protocol version: 10
User: root@localhost
Server charset: UTF-8 Unicode (utf8mb4)
Web server
Apache/2.4.57 (Debian)
Database client version: libmysql - mysqlnd 8.2.7
PHP extension: mysqli curl mbstring sodium
PHP version: 8.2.7
phpMyAdmin
Version information: 5.2.1deb1
Documentation
Official Homepage
Contribute
Get support
List of changes
License

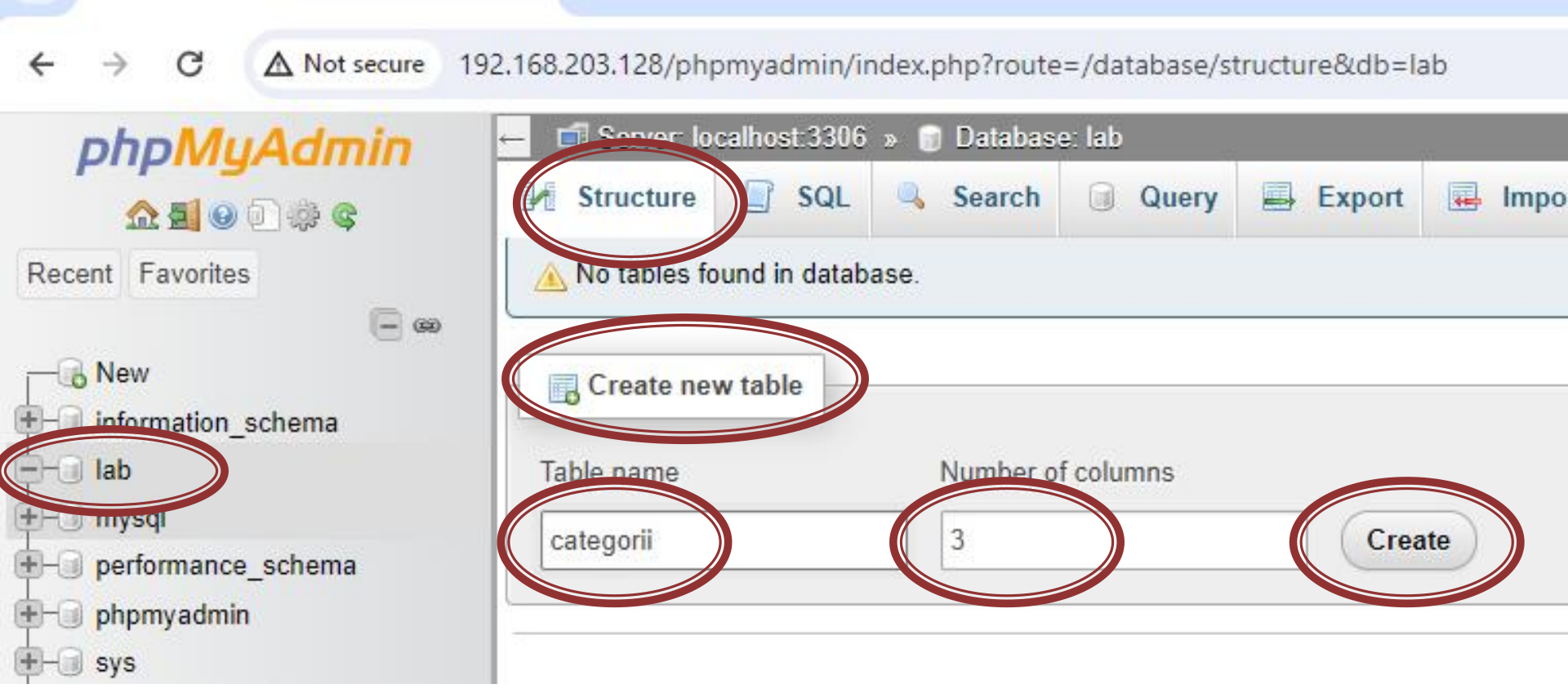
Creare Baza de Date

- Databases →"nume" →Create



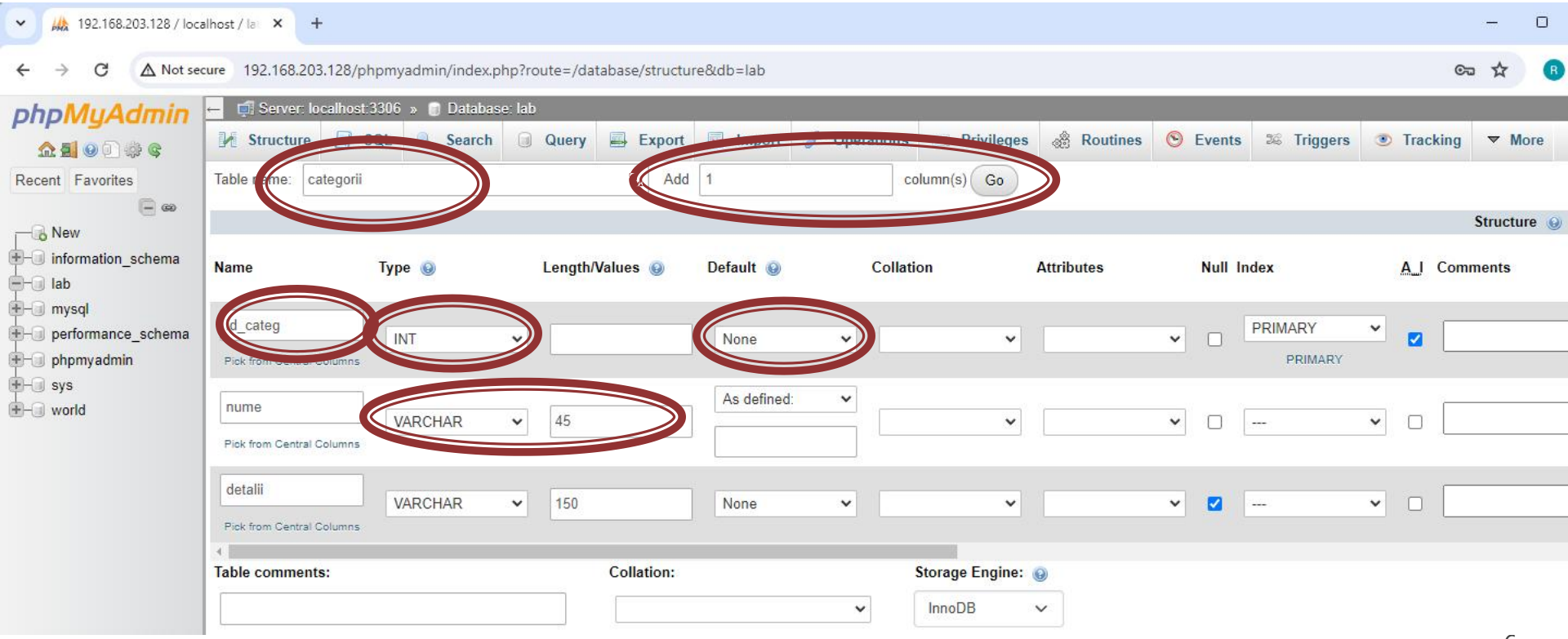
Creare tabele in baza de date

- Baza de date (in lista) → Structure → div Create new table → nume/coloane → Create



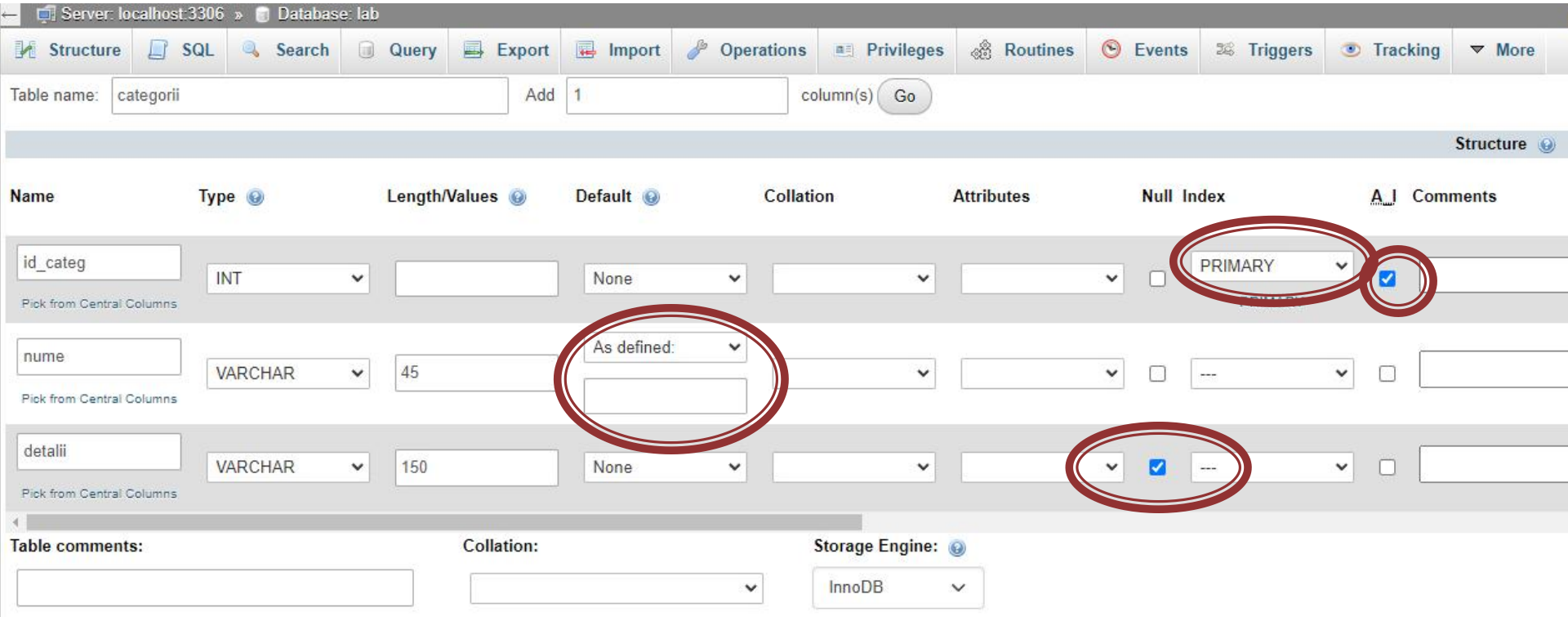
Introducere coloane, tabel categorii

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



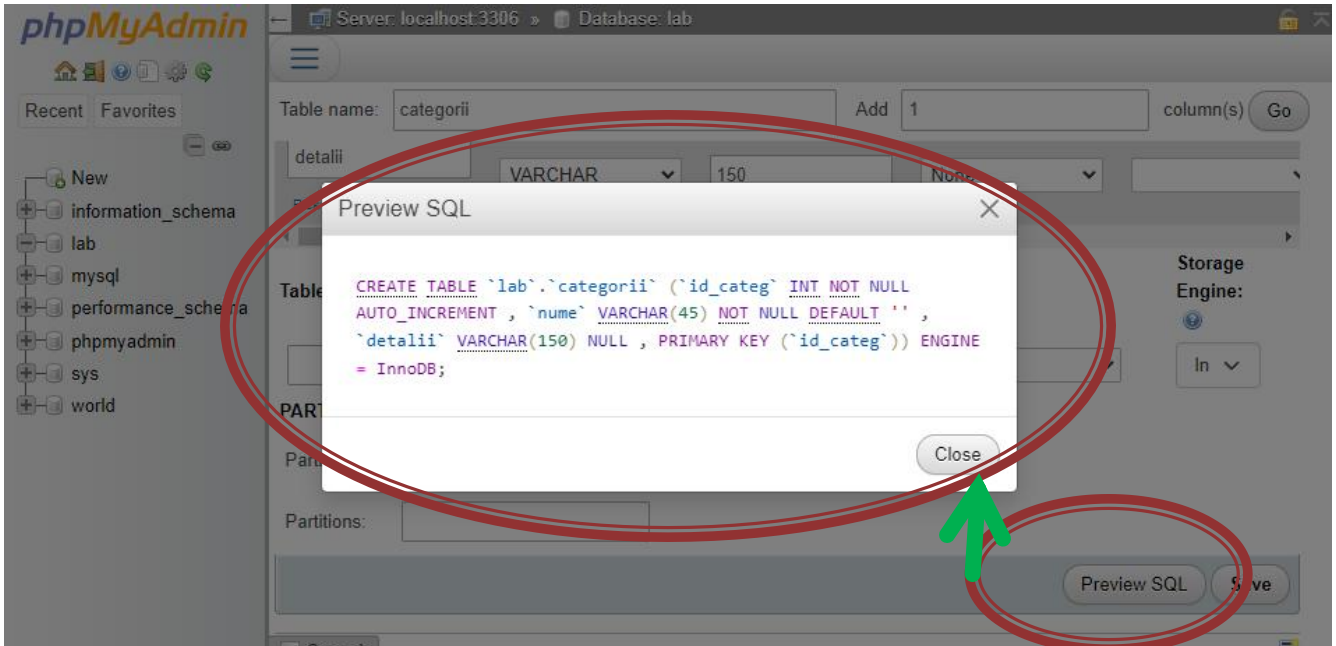
Introducere coloane

- (eventual) NOT NULL / Index / Auto Increment



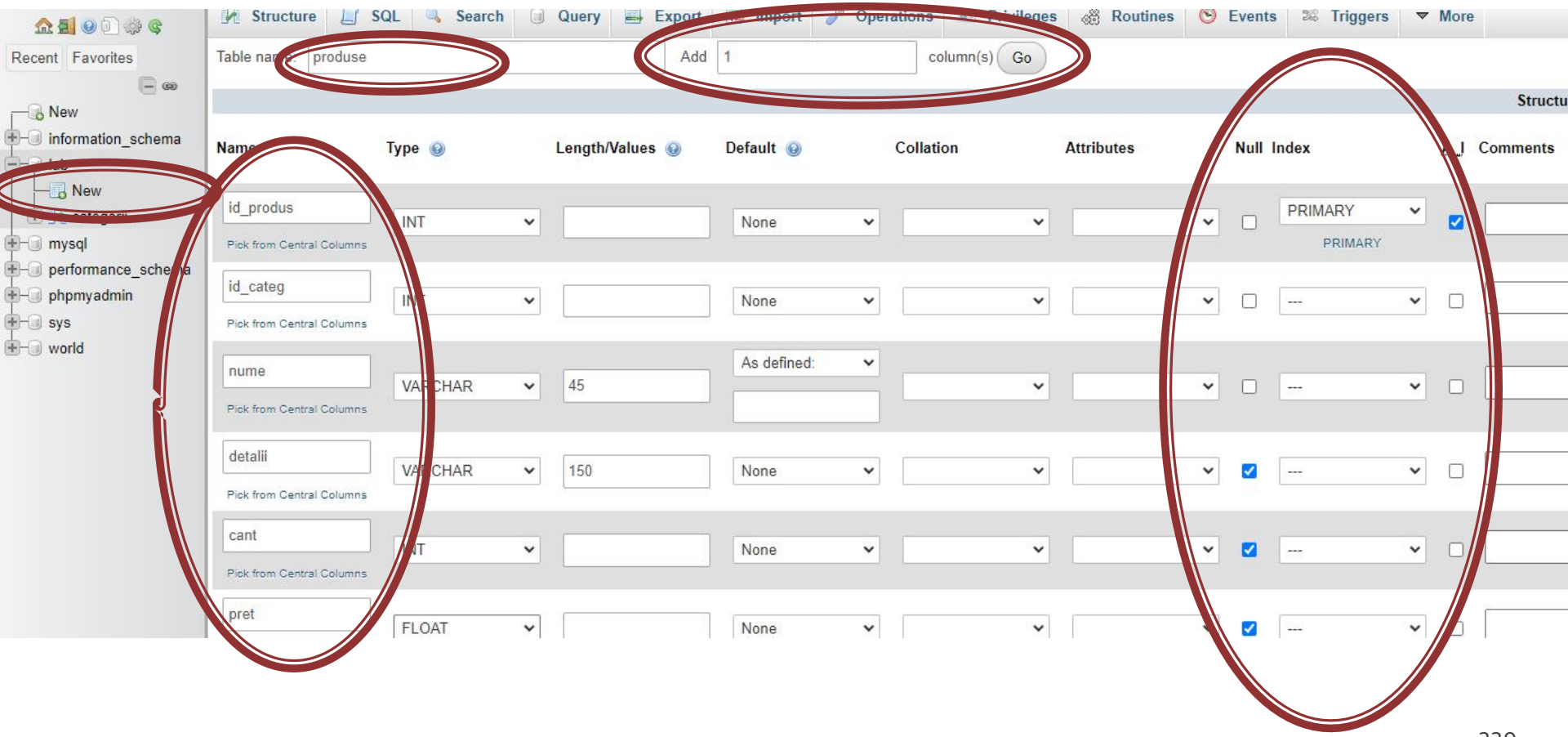
Preview SQL

- 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



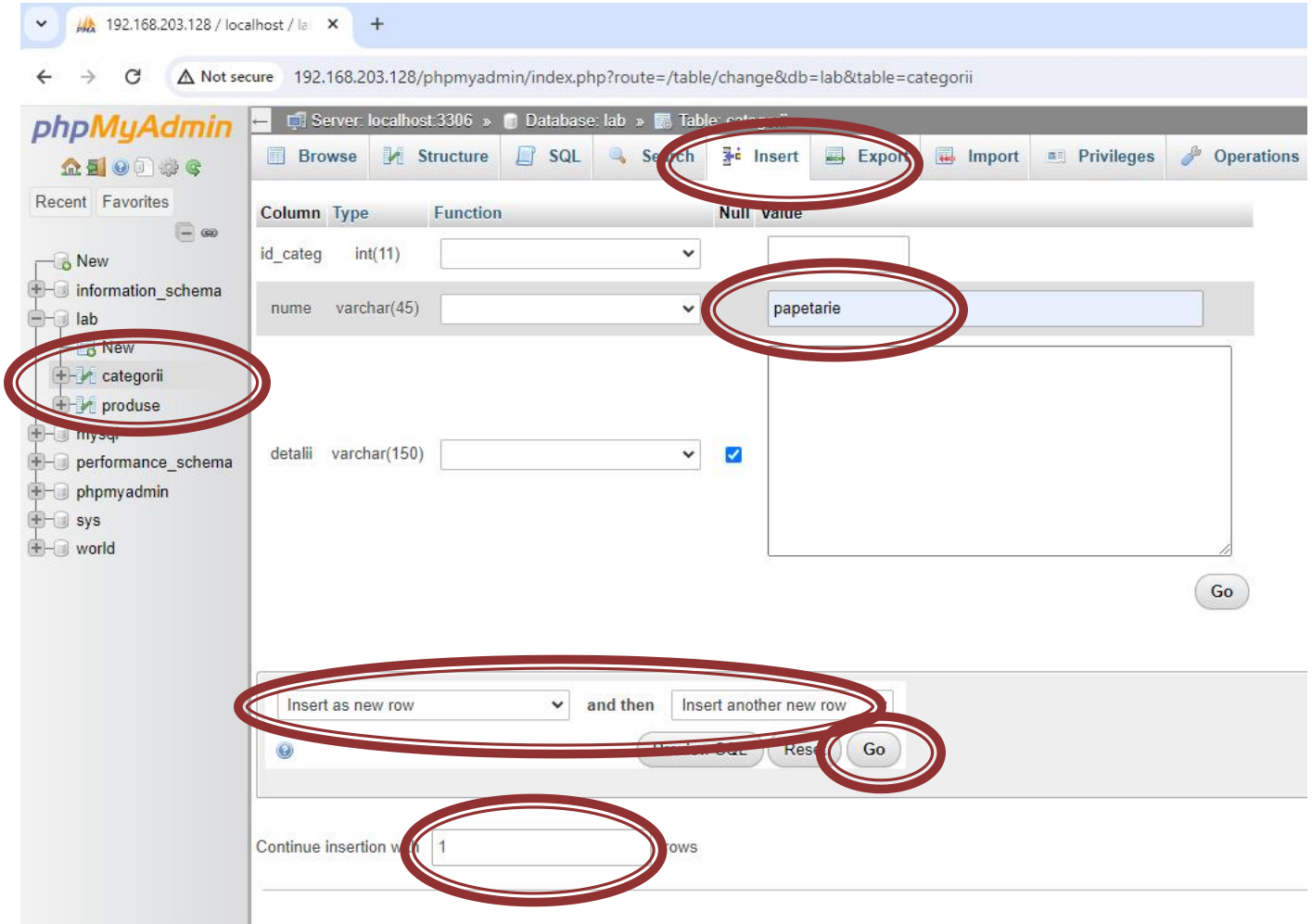
Introducere coloane, tabel produse

- New → Nume → Add Columns → …



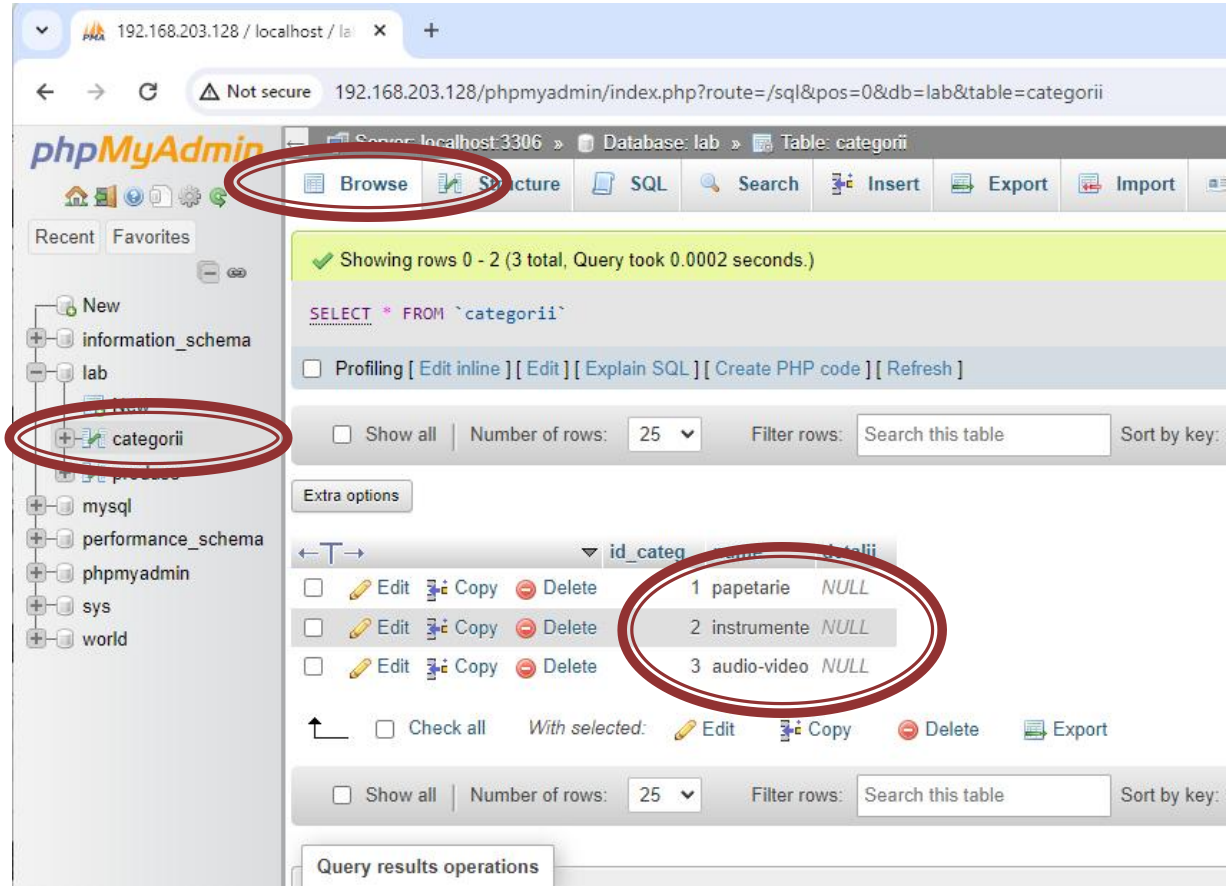
Introducere date initiale (interfata)

- Tabel → Insert → Completare → Go



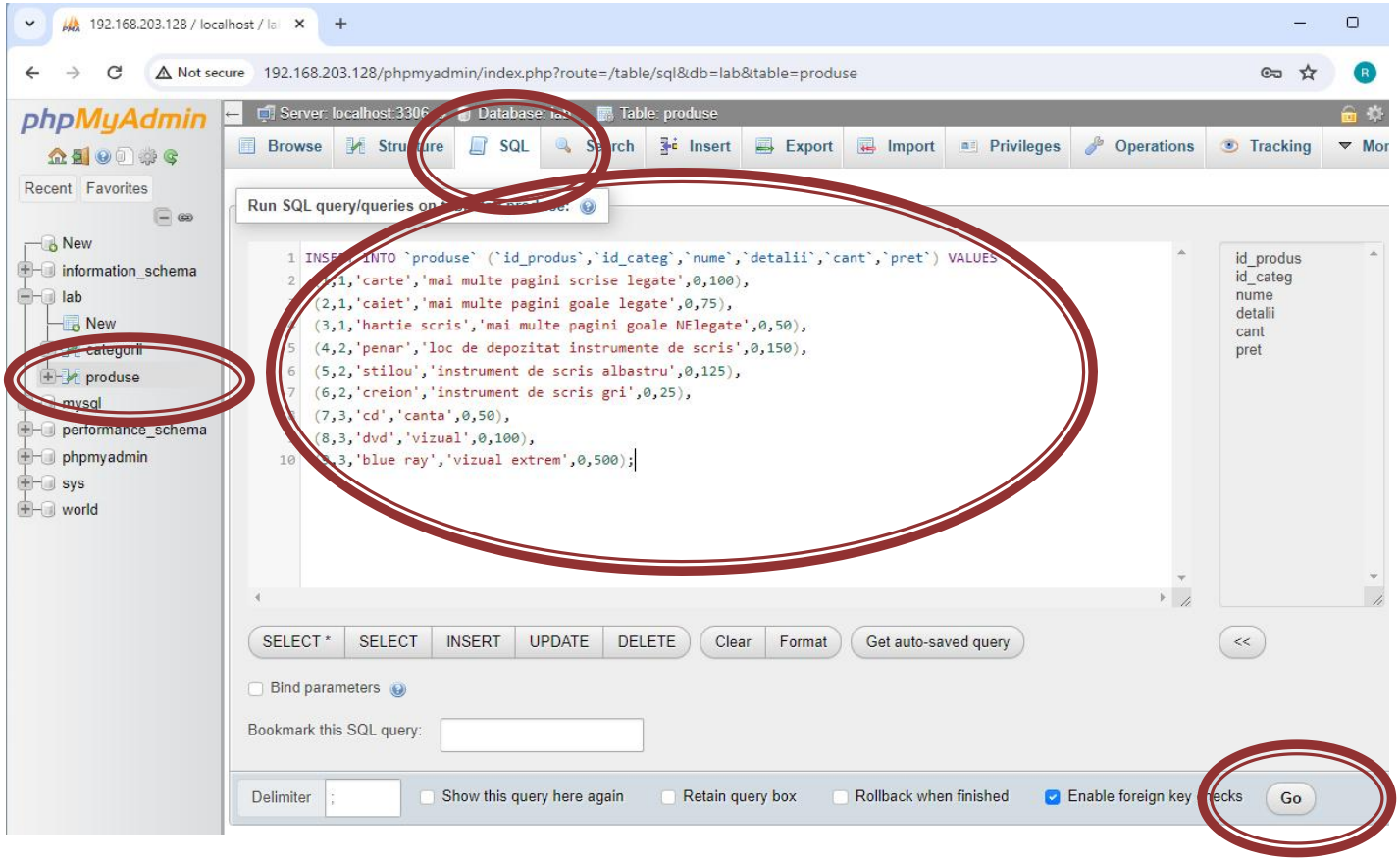
Vizualizare date existente

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

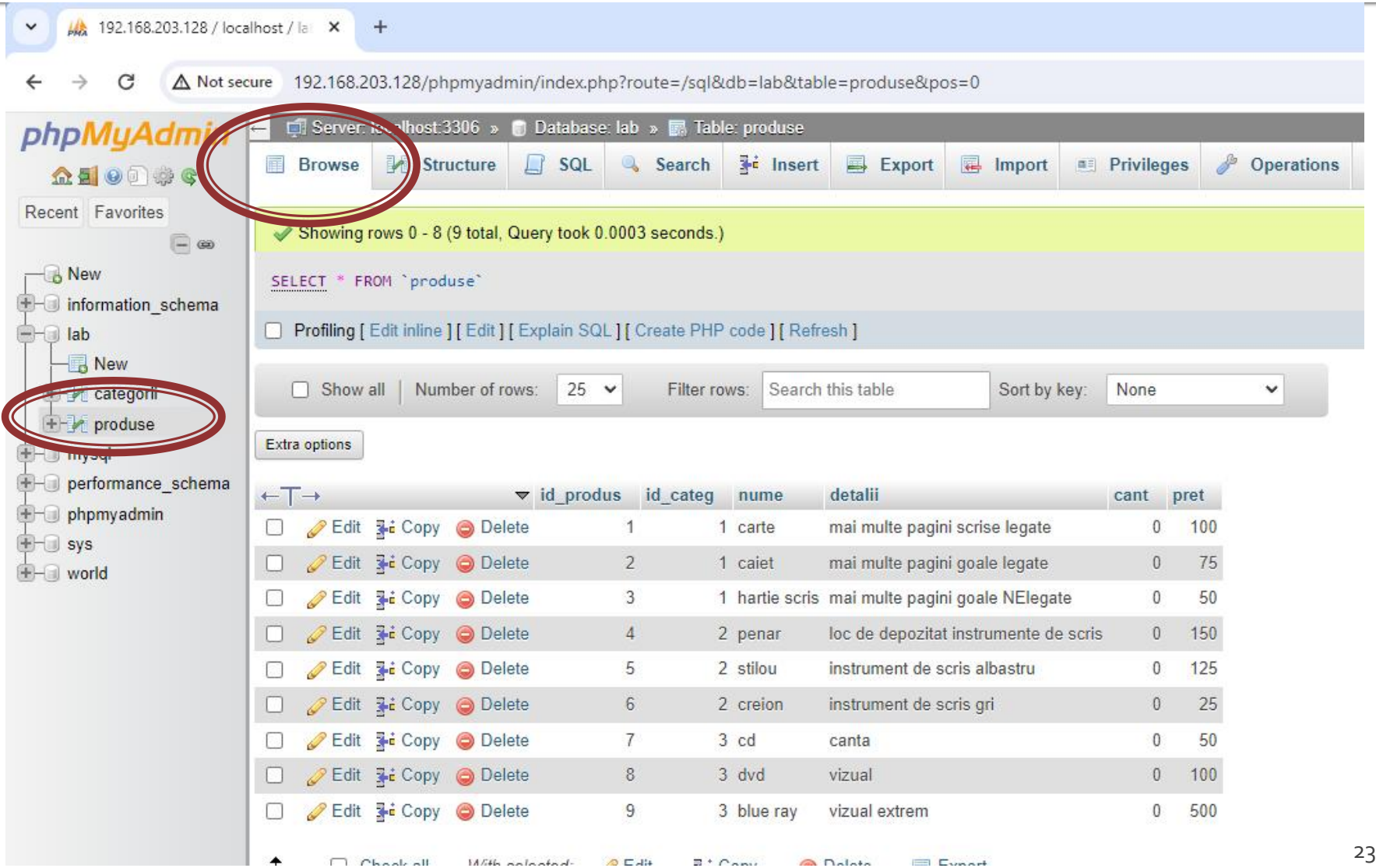


Introducere date initiale (SQL)

- Tabel → SQL → completare → Go



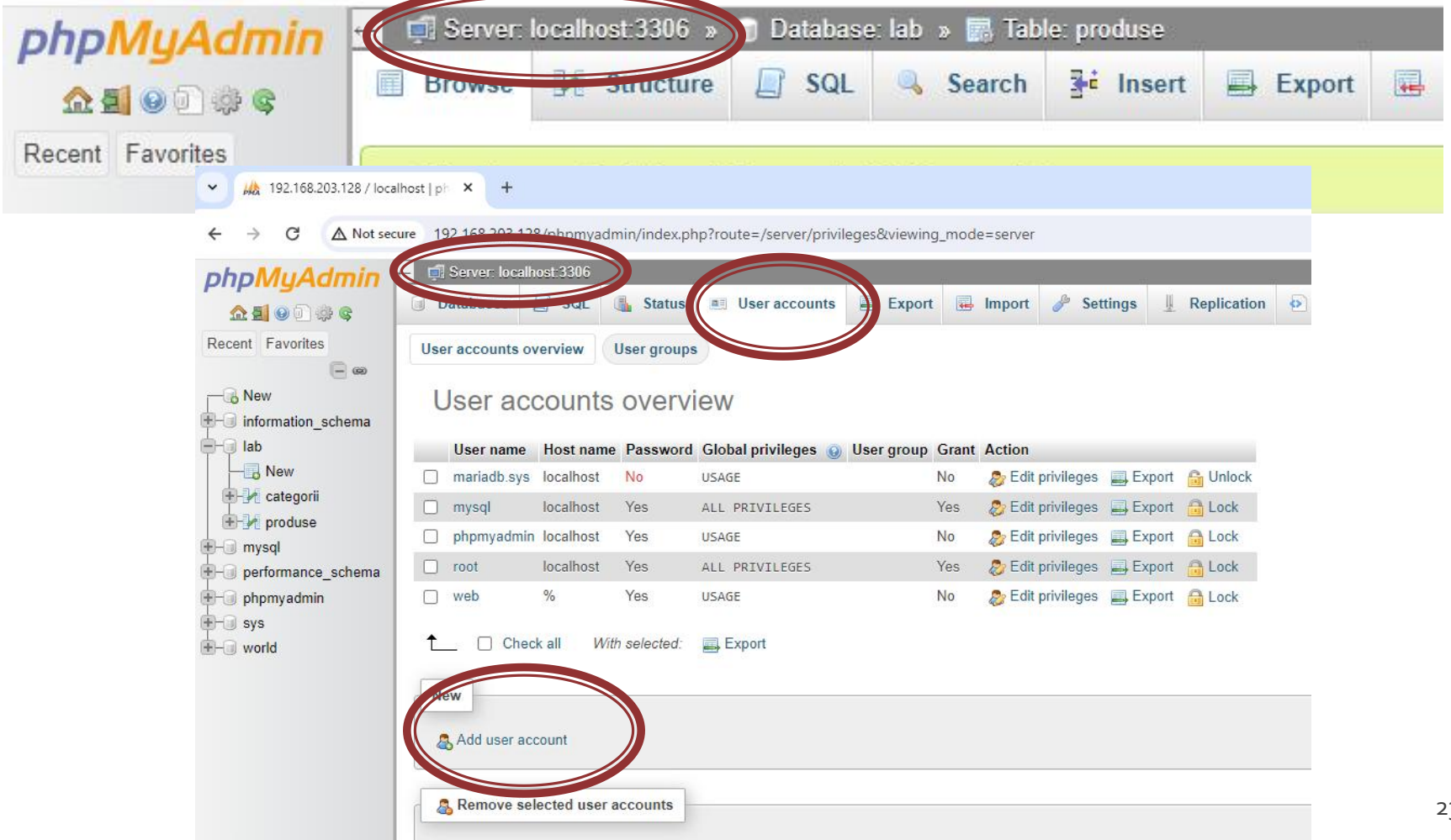
Tabel produse



	id_produs	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

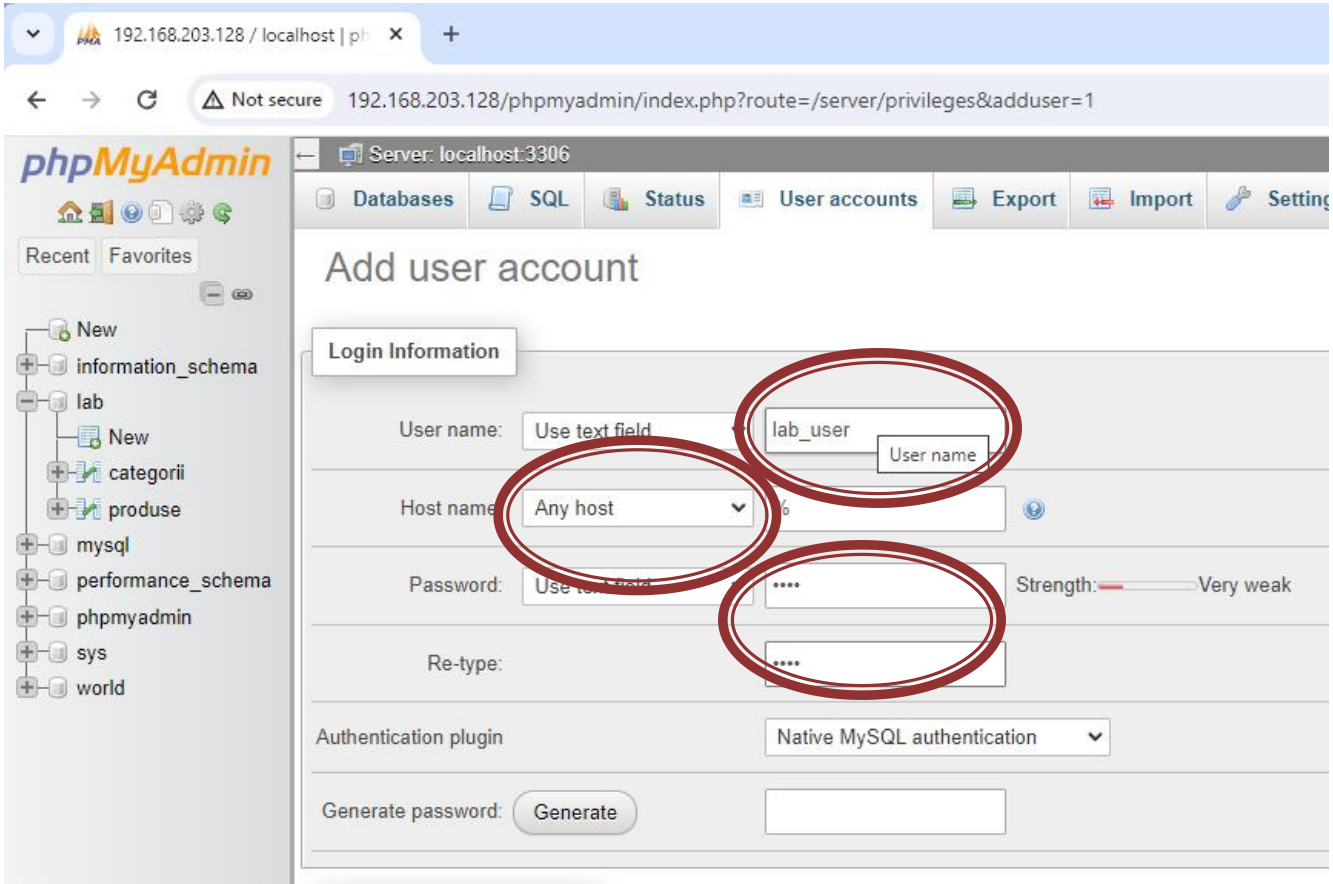
Adaugare utilizator

- Server → User accounts → Add user account



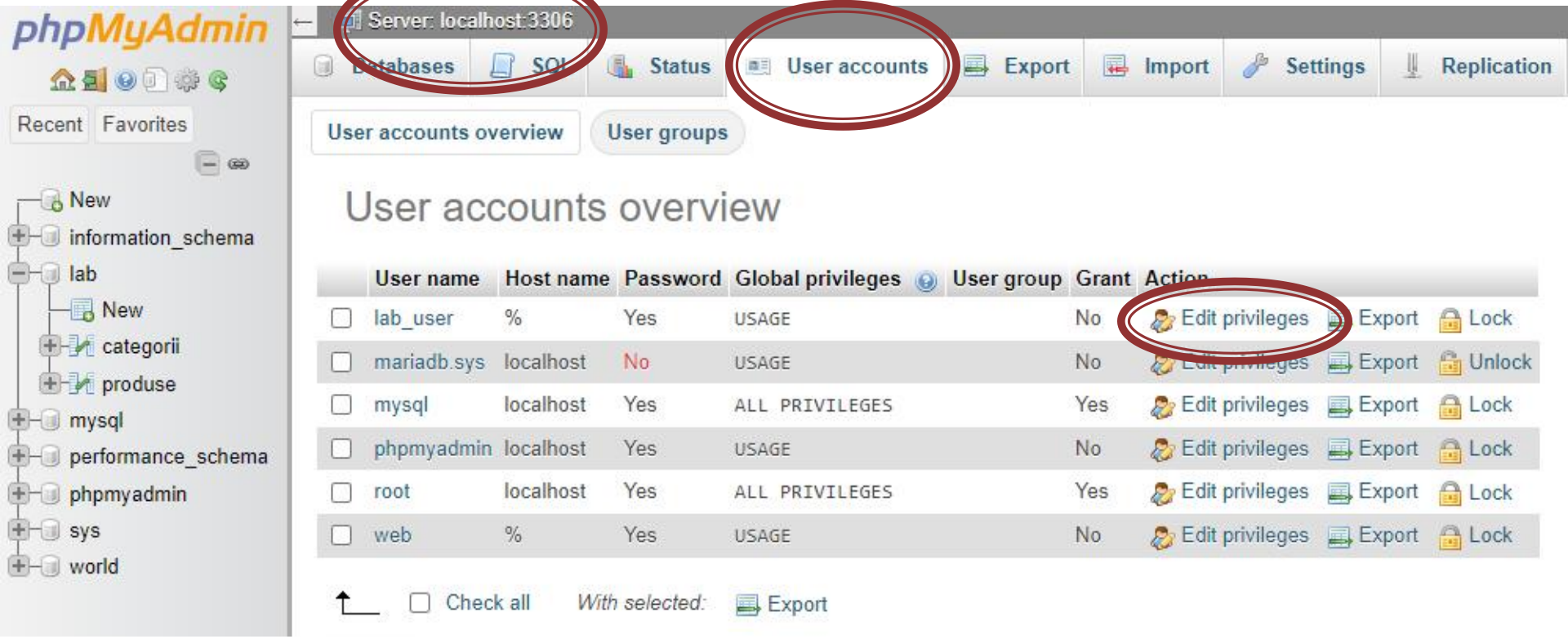
Adaugare utilizator

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



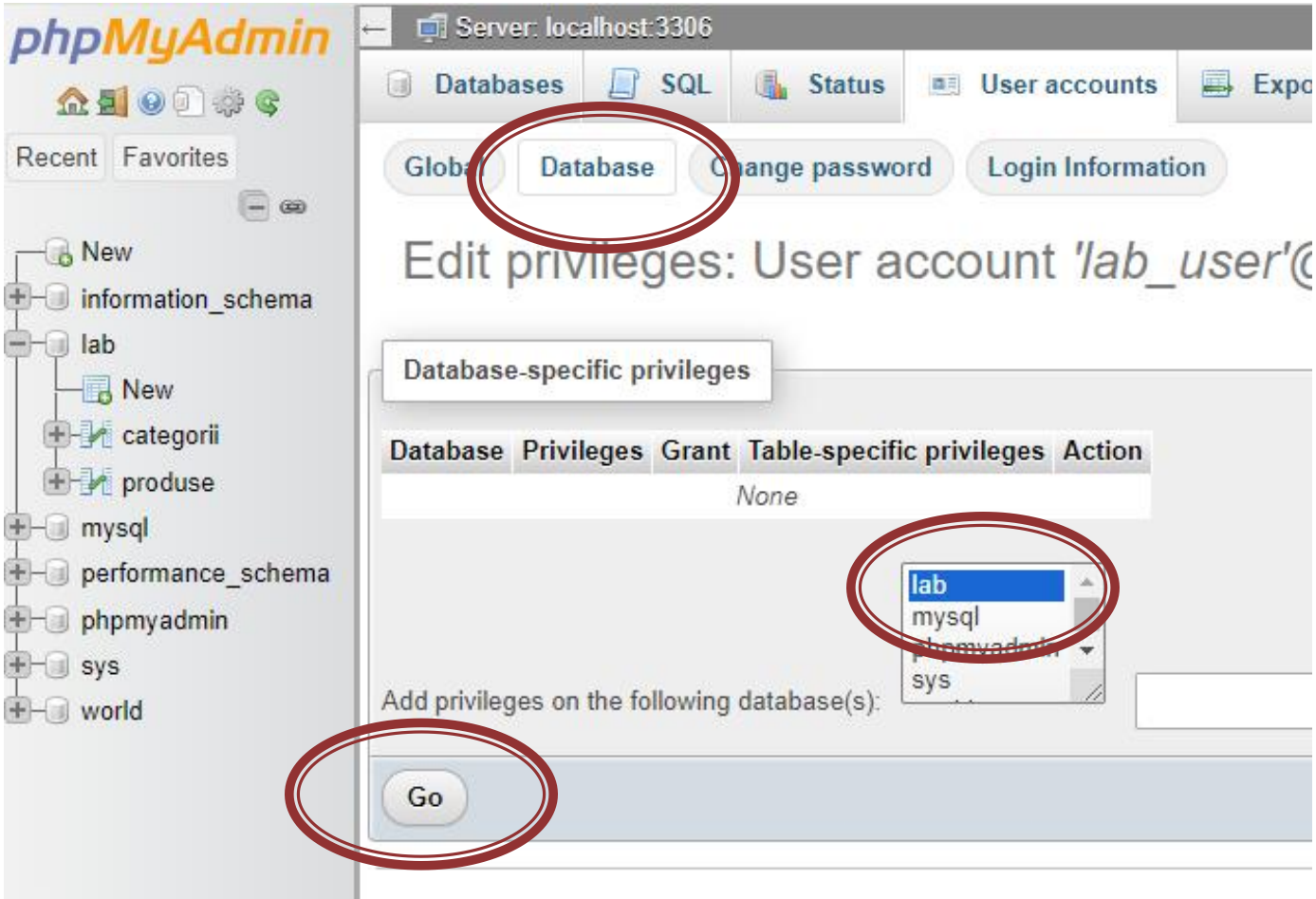
Drepturi de acces

- Server → User accounts → Edit Privileges



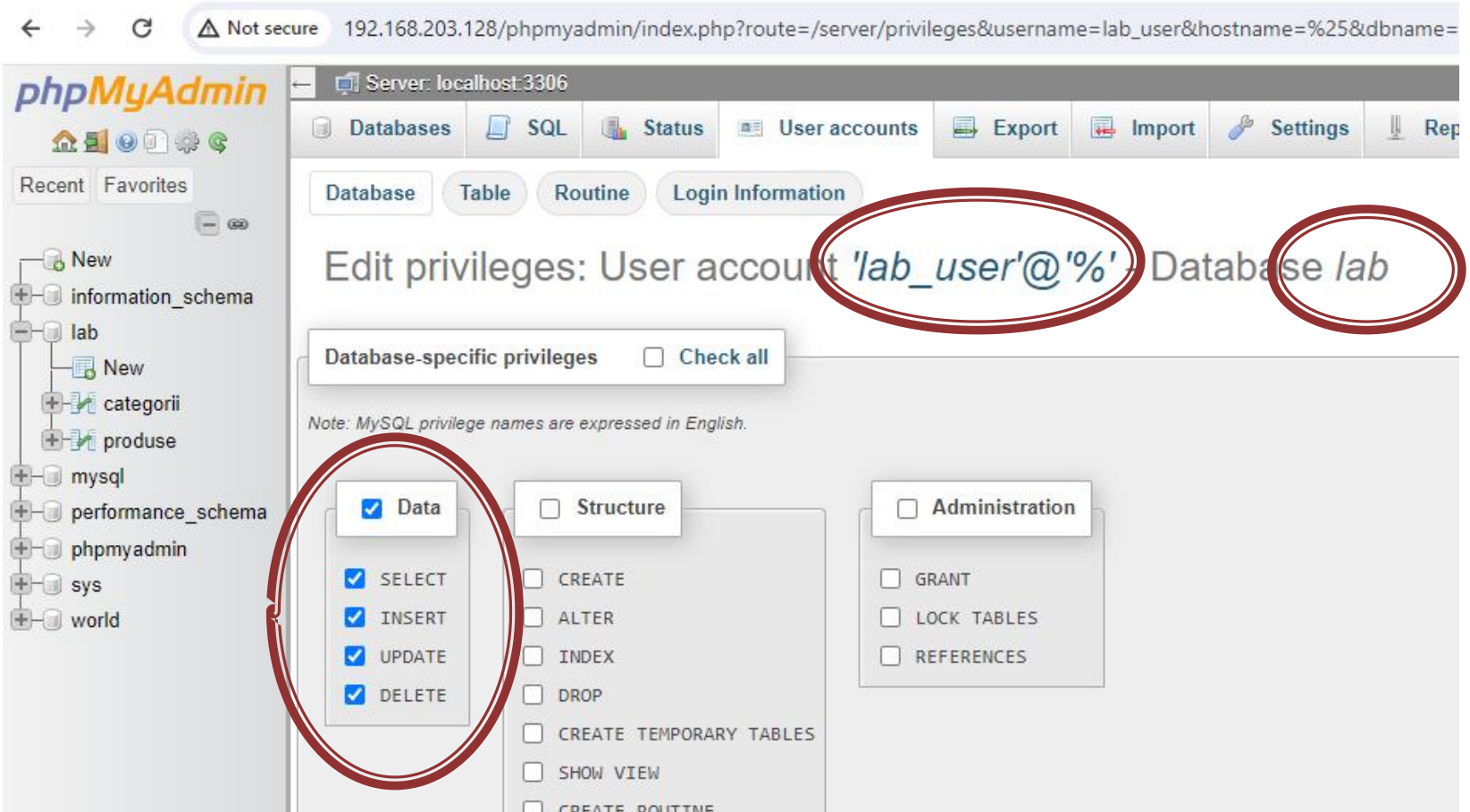
Drepturi de acces

- Database → nume → Go



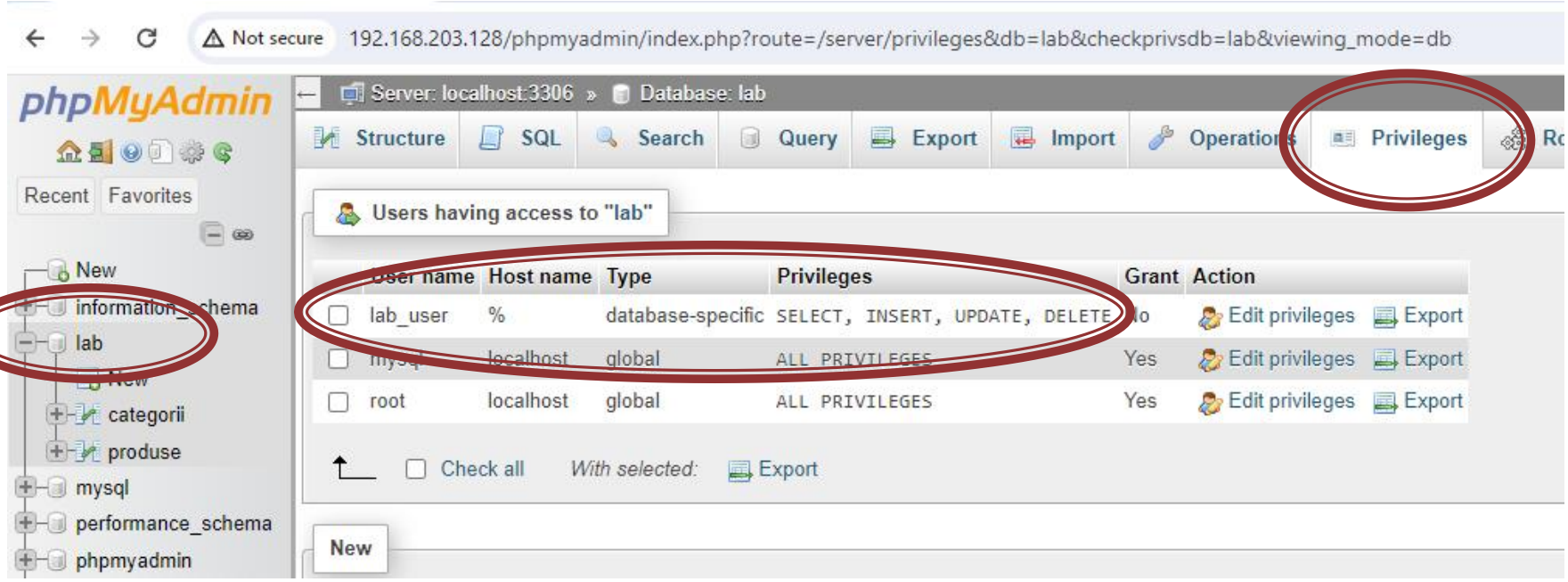
Drepturi de acces

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



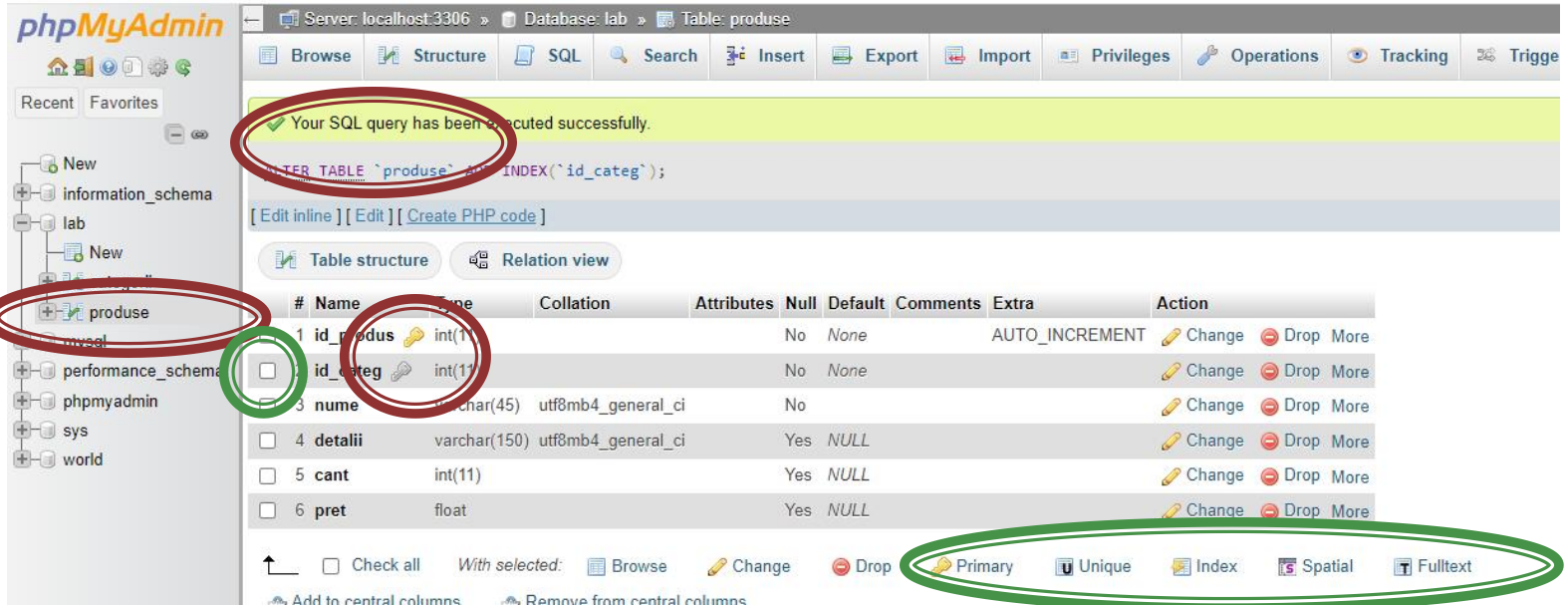
Drepturi de acces, verificare

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



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



Verificare/Stergere index

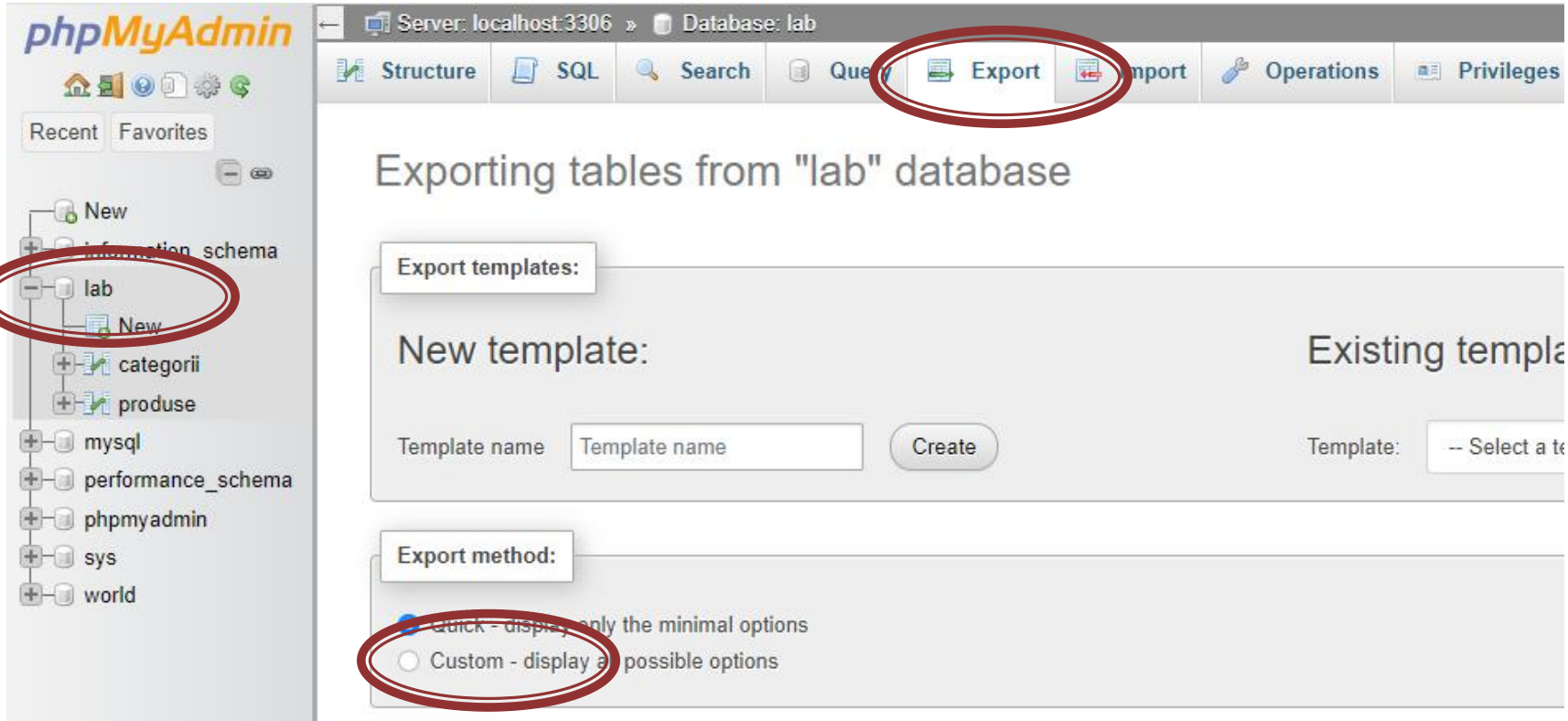
- Zona Indexes, vizualizare/control lista de indecsi

Backup, Restore

- Ca si in cazul Windows 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 lab;
  - USE lab;
- La utilizarea PhpMyAdmin trebuie sa se creeze manual baza de date inaintea restaurarii

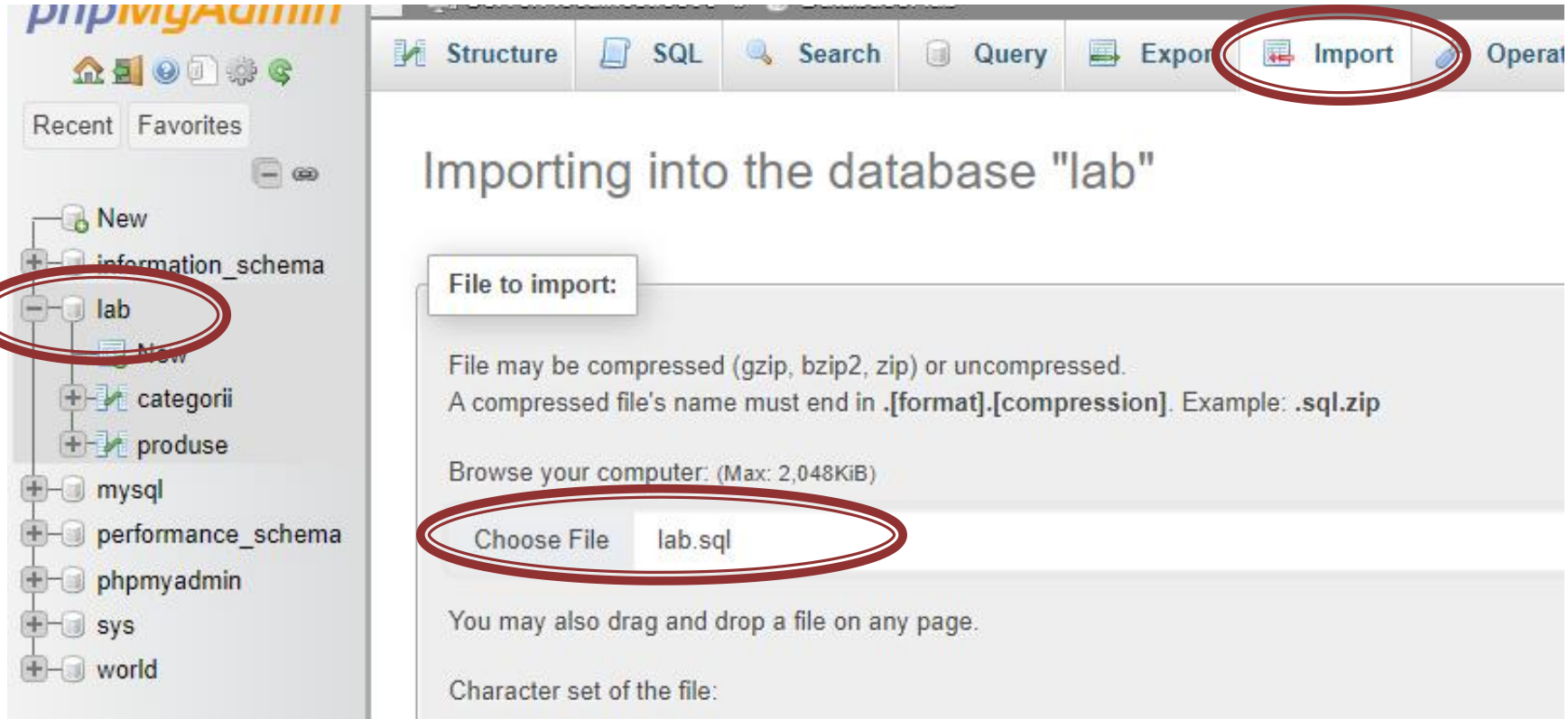
Backup

- Nume (tabel sau baza de date) → Export
  - Custom: exista optiunea Add CREATE DATABASE / USE statement



Restore

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

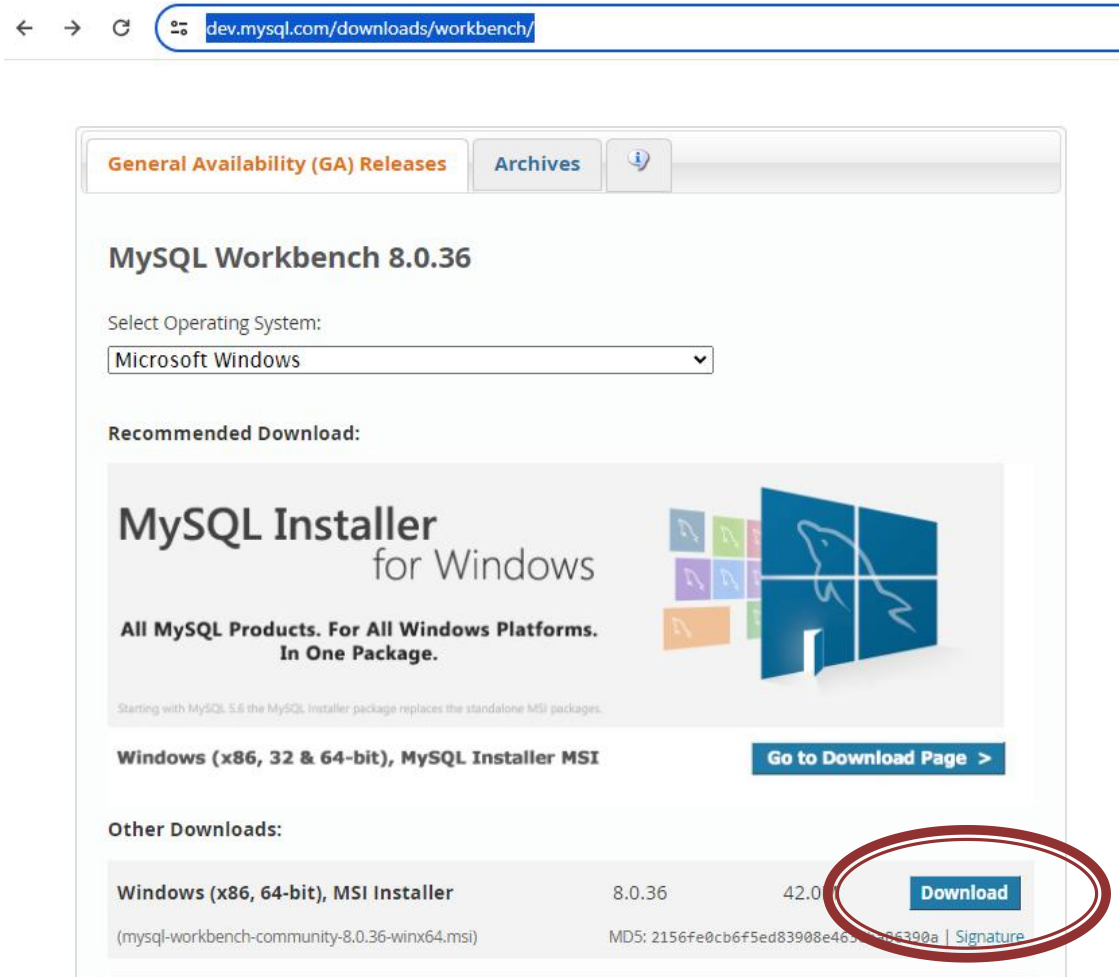


MySQL Workbench

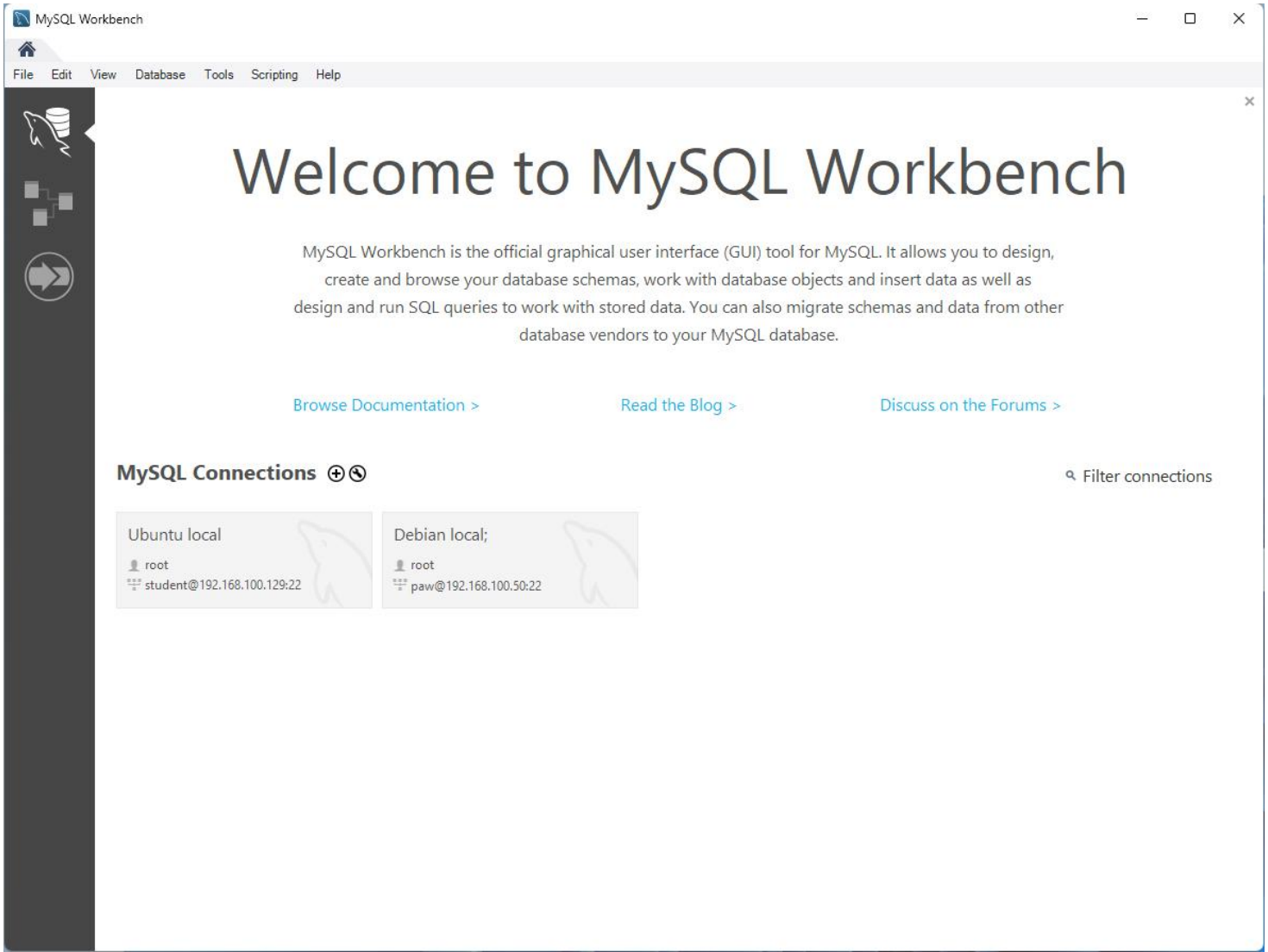
Mini – Indrumar practic
Lucru cu bazele de date

MySQL Workbench CE

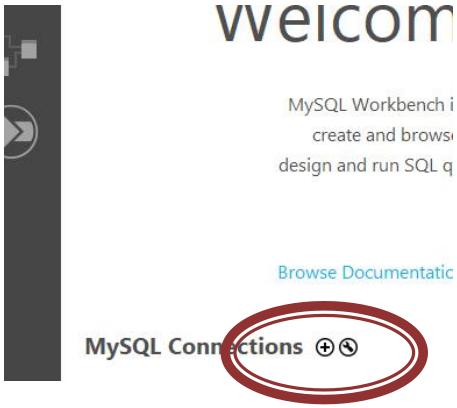
- https://dev.mysql.com/downloads/workbench/

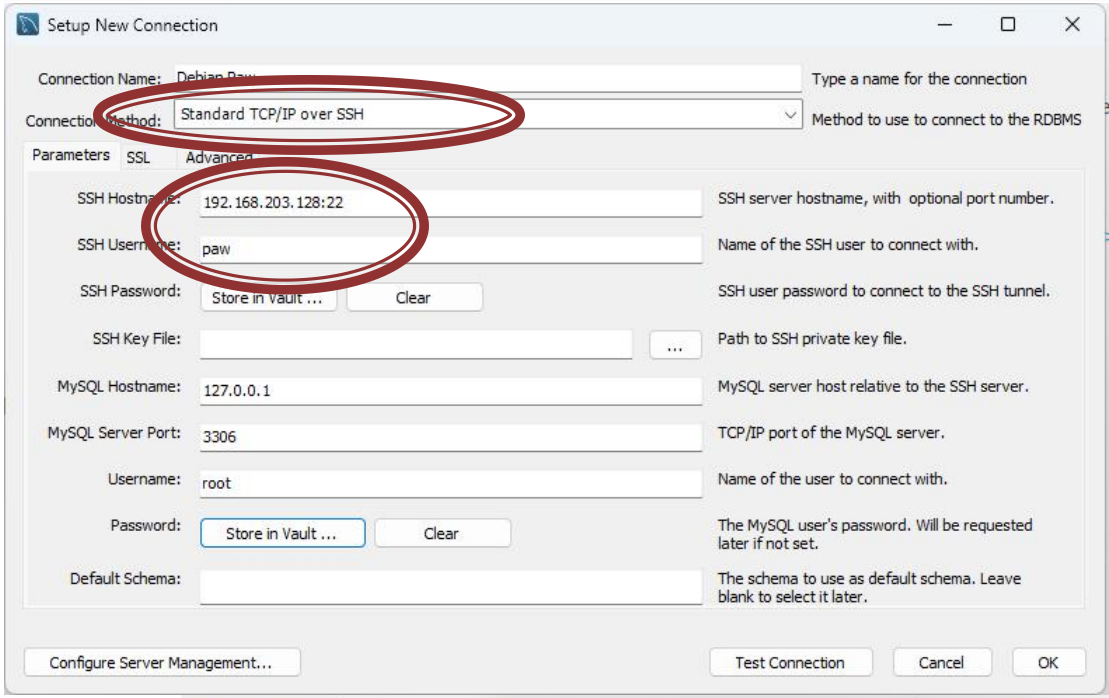


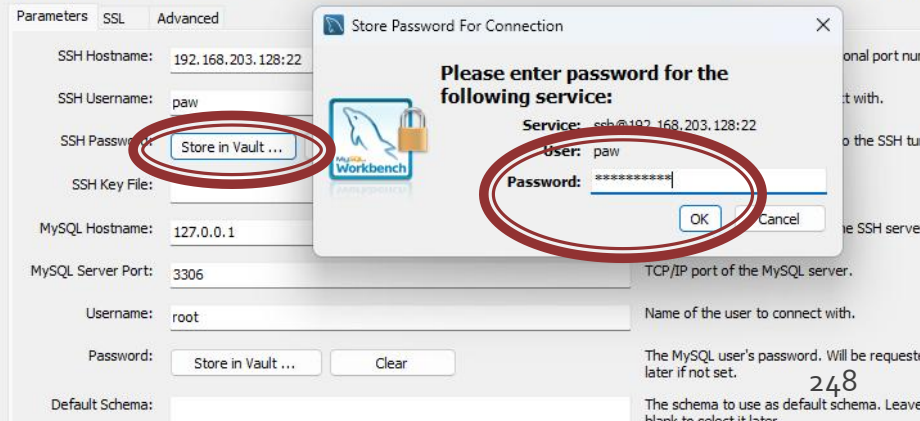
MySQL Workbench CE



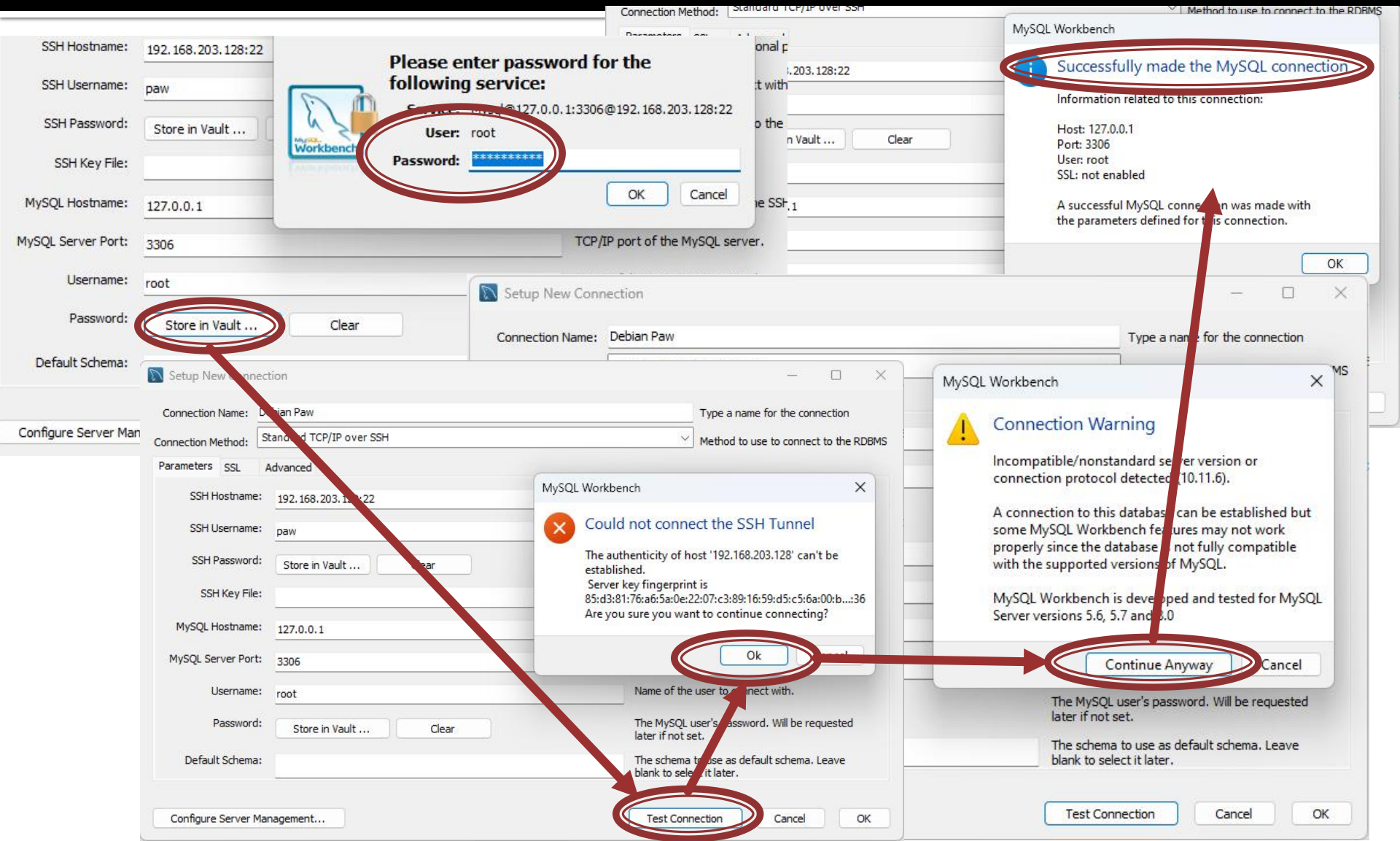
Conexiune


MySQL Connections

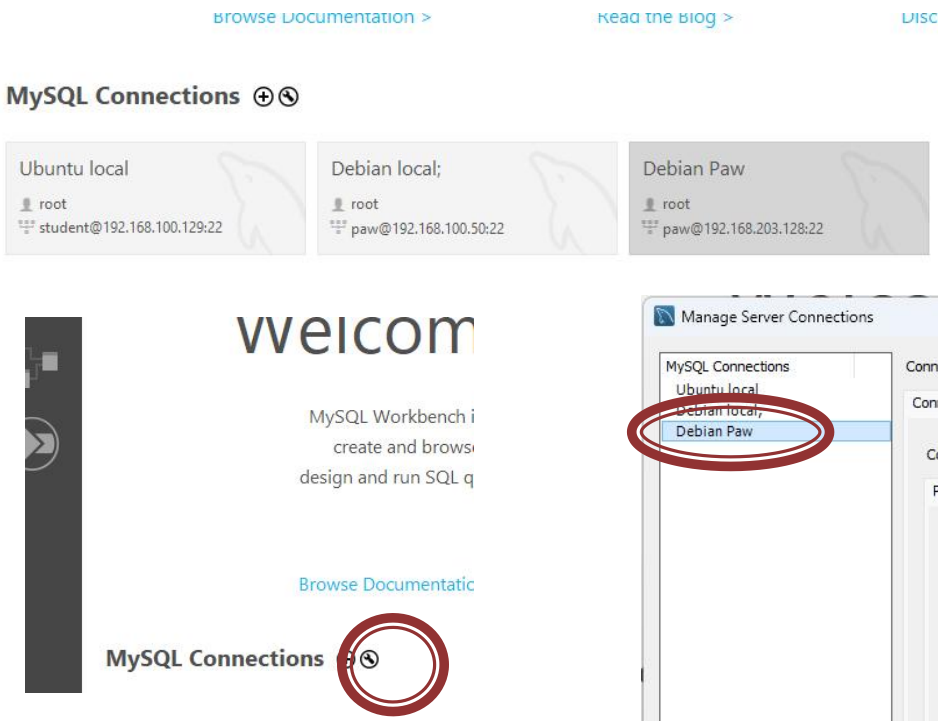

Setup New Connection
Connection Name:
Type a name for the connection
Connection Method:
Standard TCP/IP over SSH
Method to use to connect to the RDBMS
Parameters
SSL
Advanced
SSH Hostname:
192.168.203.128:22
SSH server hostname, with optional port number.
SSH Username:
paw
Name of the SSH user to connect with.
SSH Password:
Store in Vault ...
Clear
SSH user password to connect to the SSH tunnel.
SSH Key File:
Path to SSH private key file.
MySQL Hostname:
127.0.0.1
MySQL server host relative to the SSH server.
MySQL Server Port:
3306
TCP/IP port of the MySQL server.
Username:
root
Name of the user to connect with.
Password:
Store in Vault ...
Clear
The MySQL user's password. Will be requested later if not set.
Default Schema:
The schema to use as default schema. Leave blank to select it later.
Configure Server Management...
Test Connection
Cancel
OK

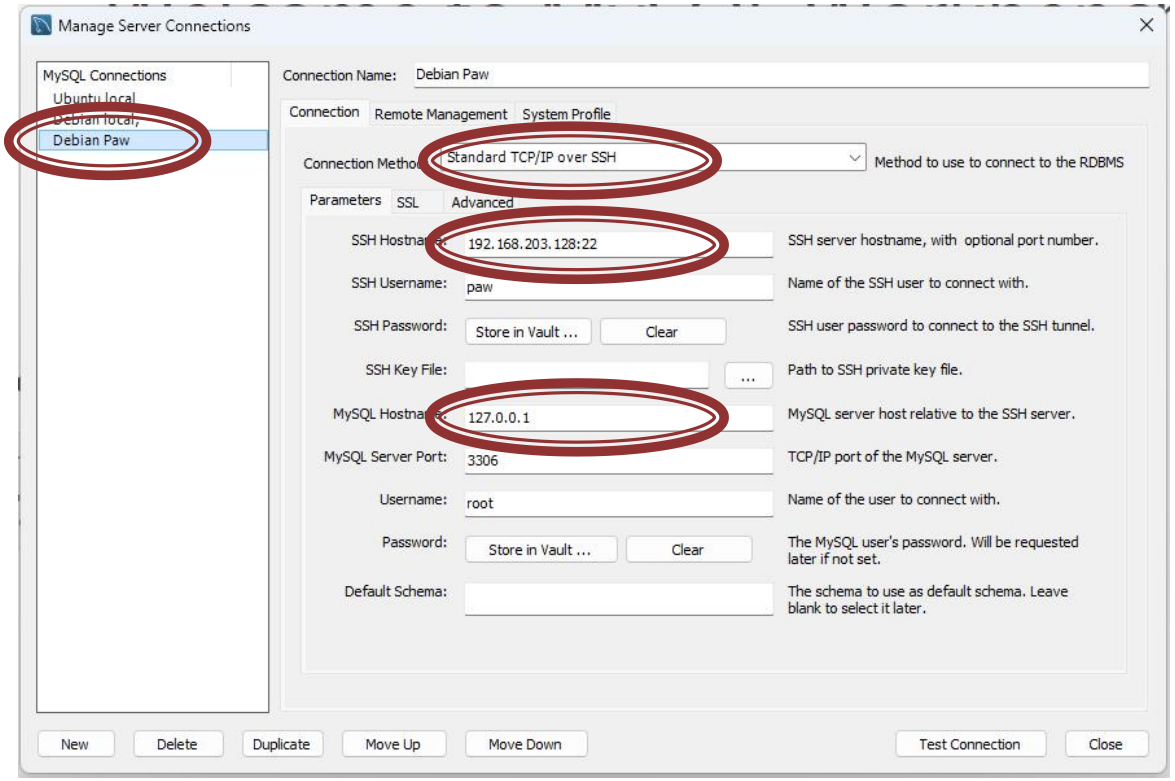

Parameters
SSL
Advanced
SSH Hostname:
192.168.203.128:22
SSH Username:
paw
SSH Password:
Store in Vault ...
SSH Key File:
MySQL Hostname:
127.0.0.1
MySQL Server Port:
3306
Username:
root
Password:
Store in Vault ...
Clear
Default Schema:
Store Password For Connection
Please enter password for the following service:
Service:
User:
paw
Password:
OK
Cancel
TCP/IP port of the MySQL server.
Name of the user to connect with.

Conexiune

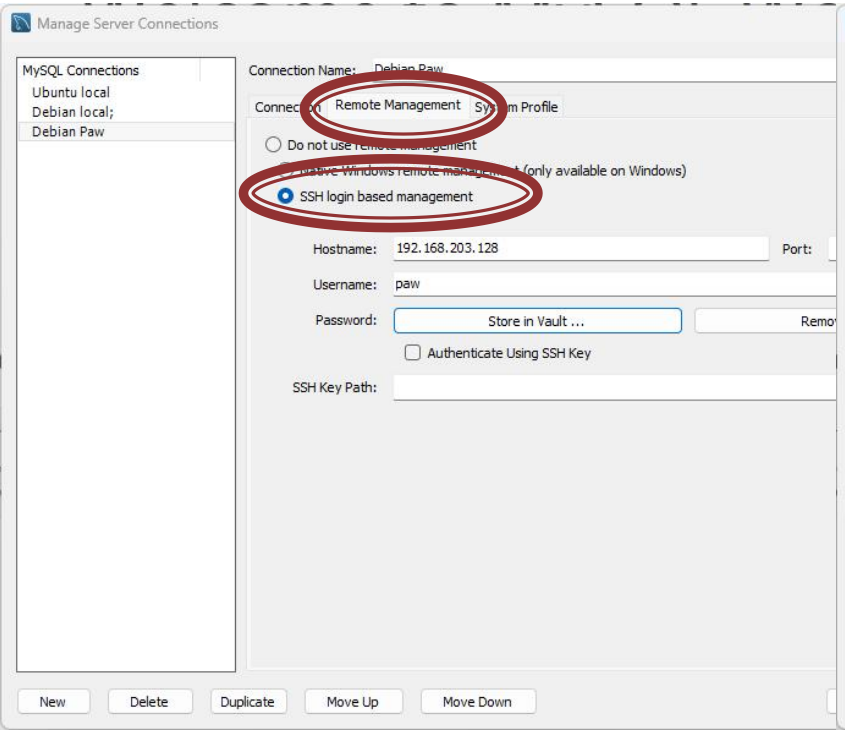

SSH Hostname: 192.168.203.128:22
SSH Username: paw
SSH Password: Store in Vault ...
SSH Key File:
MySQL Hostname: 127.0.0.1
MySQL Server Port: 3306
Username: root
Password: Store in Vault ... Clear
Default Schema:
Please enter password for the following service:
User: root
Password: **********
OK Cancel
MySQL Workbench
Successfully made the MySQL connection
Information related to this connection:
Host: 127.0.0.1
Port: 3306
User: root
SSL: not enabled
A successful MySQL connection was made with the parameters defined for this connection.
OK
Setup New Connection
Connection Name: Debian Paw
Type a name for the connection
Connection Method: Standard TCP/IP over SSH
Method to use to connect to the RDBMS
Parameters SSL Advanced
Configure Server Management...
Test Connection Cancel OK
MySQL Workbench
Could not connect the SSH Tunnel
The authenticity of host '192.168.203.128' can't be established.
Server key fingerprint is 85:d3:81:76:a6:5a:0e:22:07:c3:89:16:59:d5:c5:6a:00:b...:36
Are you sure you want to continue connecting?
Ok
MySQL Workbench
Connection Warning
Incompatible/nonstandard server version or connection protocol detected (10.11.6).
A connection to this database can be established but some MySQL Workbench features may not work properly since the database is not fully compatible with the supported versions of MySQL.
MySQL Workbench is developed and tested for MySQL Server versions 5.6, 5.7 and 8.0
Continue Anyway Cancel
The MySQL user's password. Will be requested later if not set.
The schema to use as default schema. Leave blank to select it later.
Test Connection Cancel OK

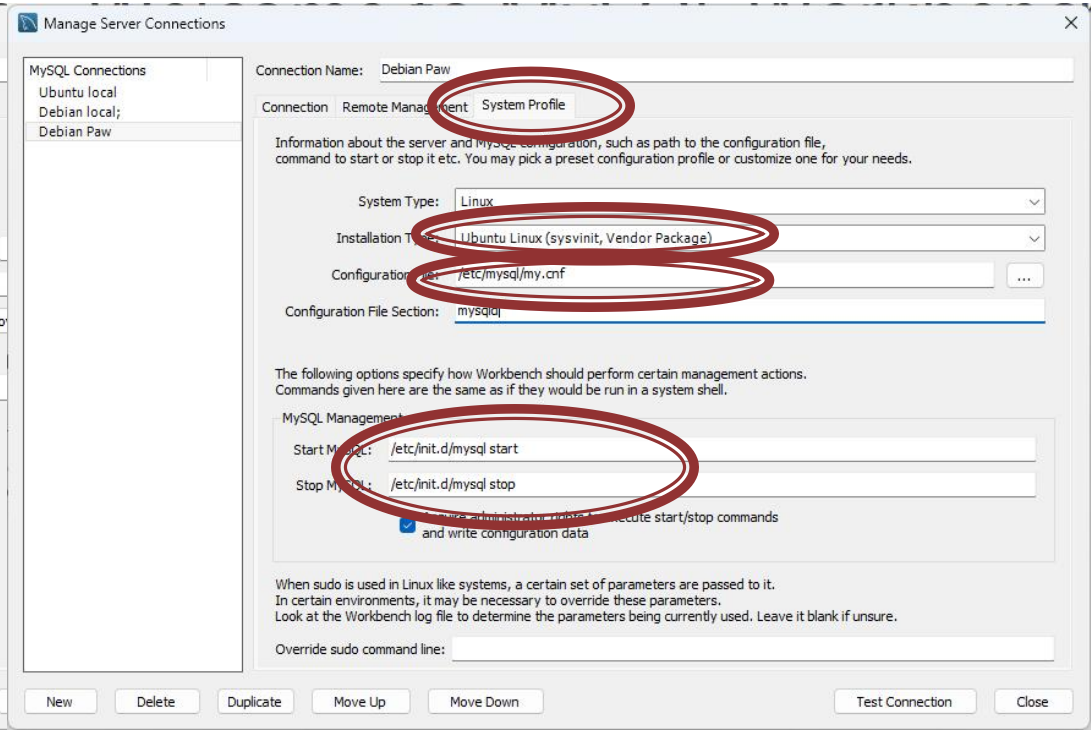
Configurare



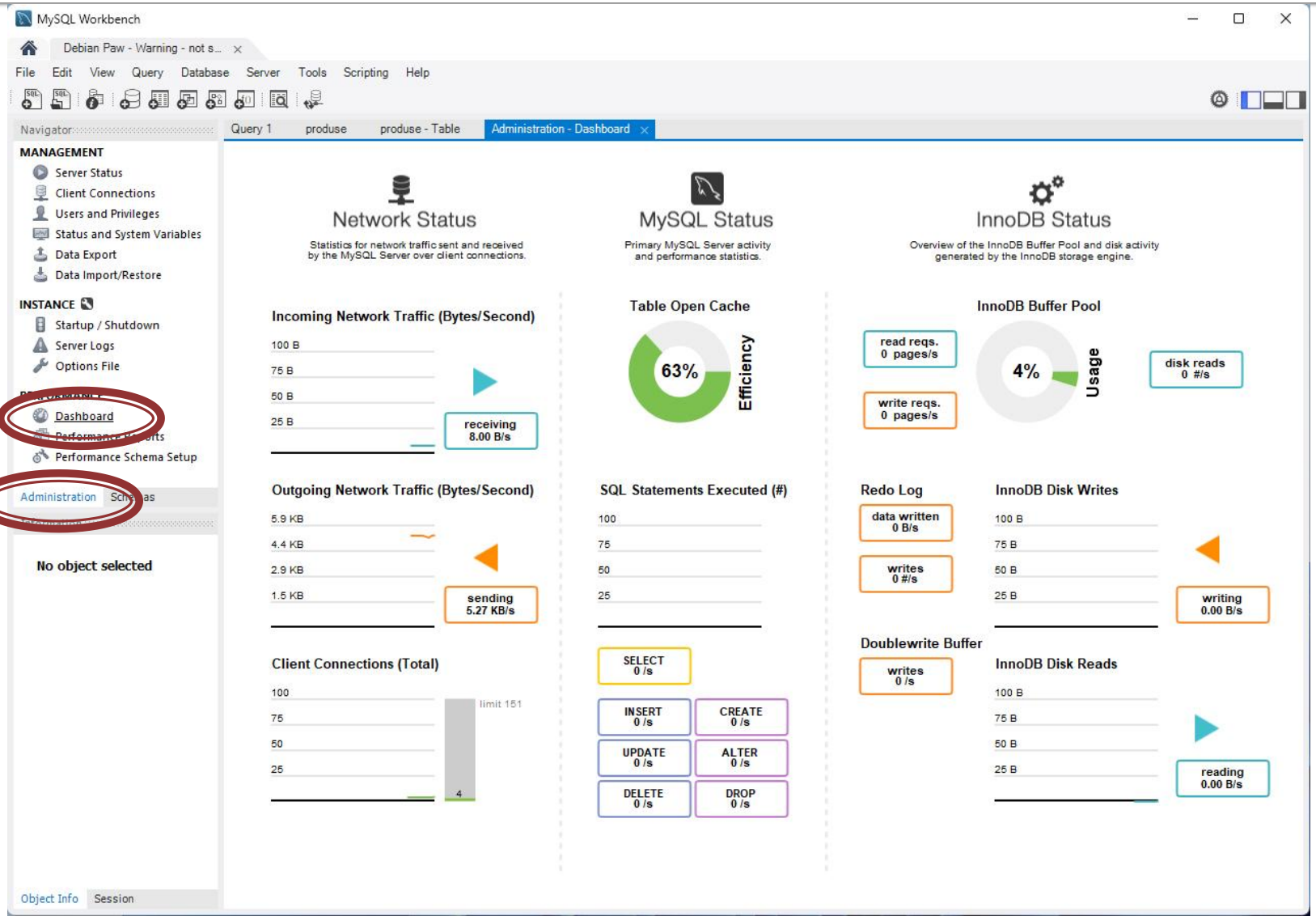


Configurare

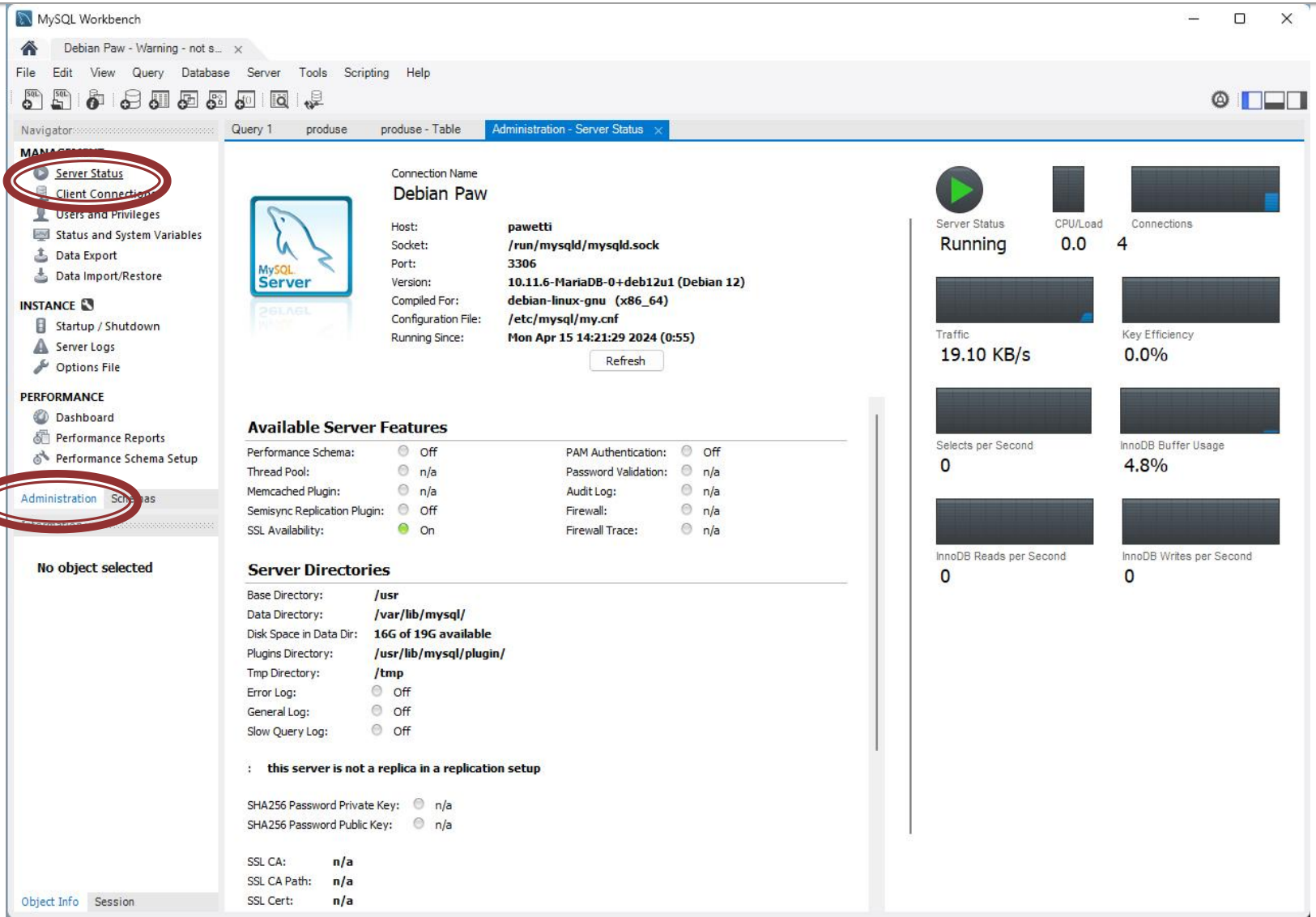




Administrare/Control

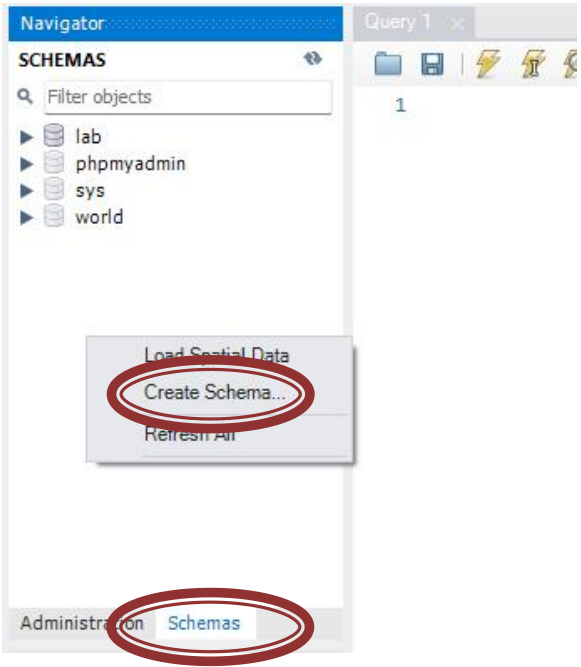


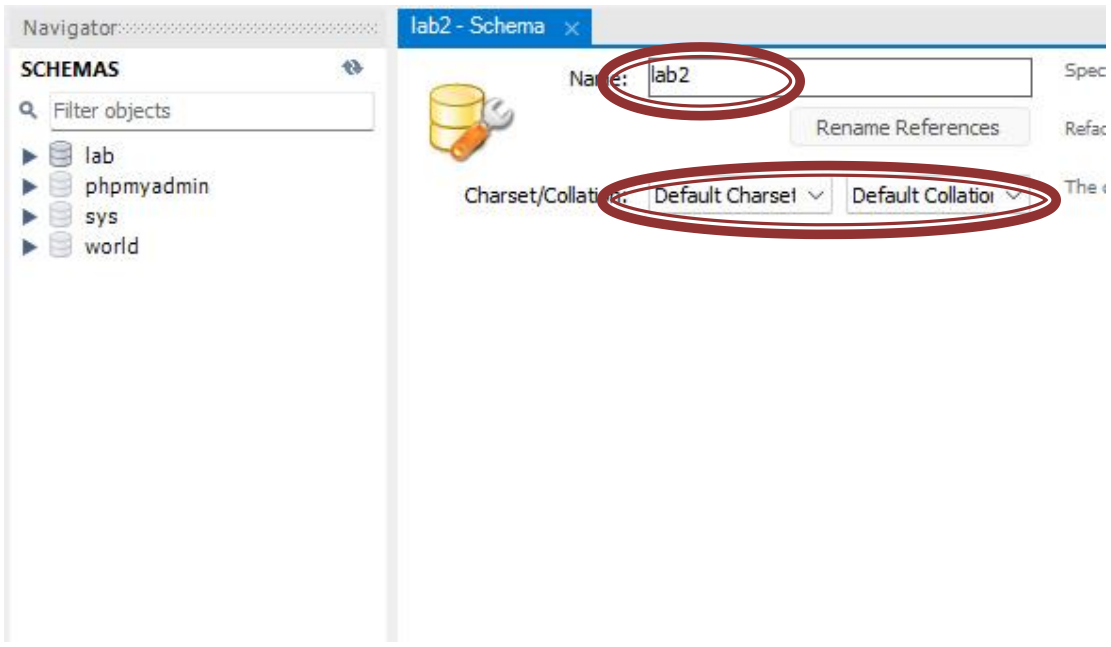
Administrare/Control



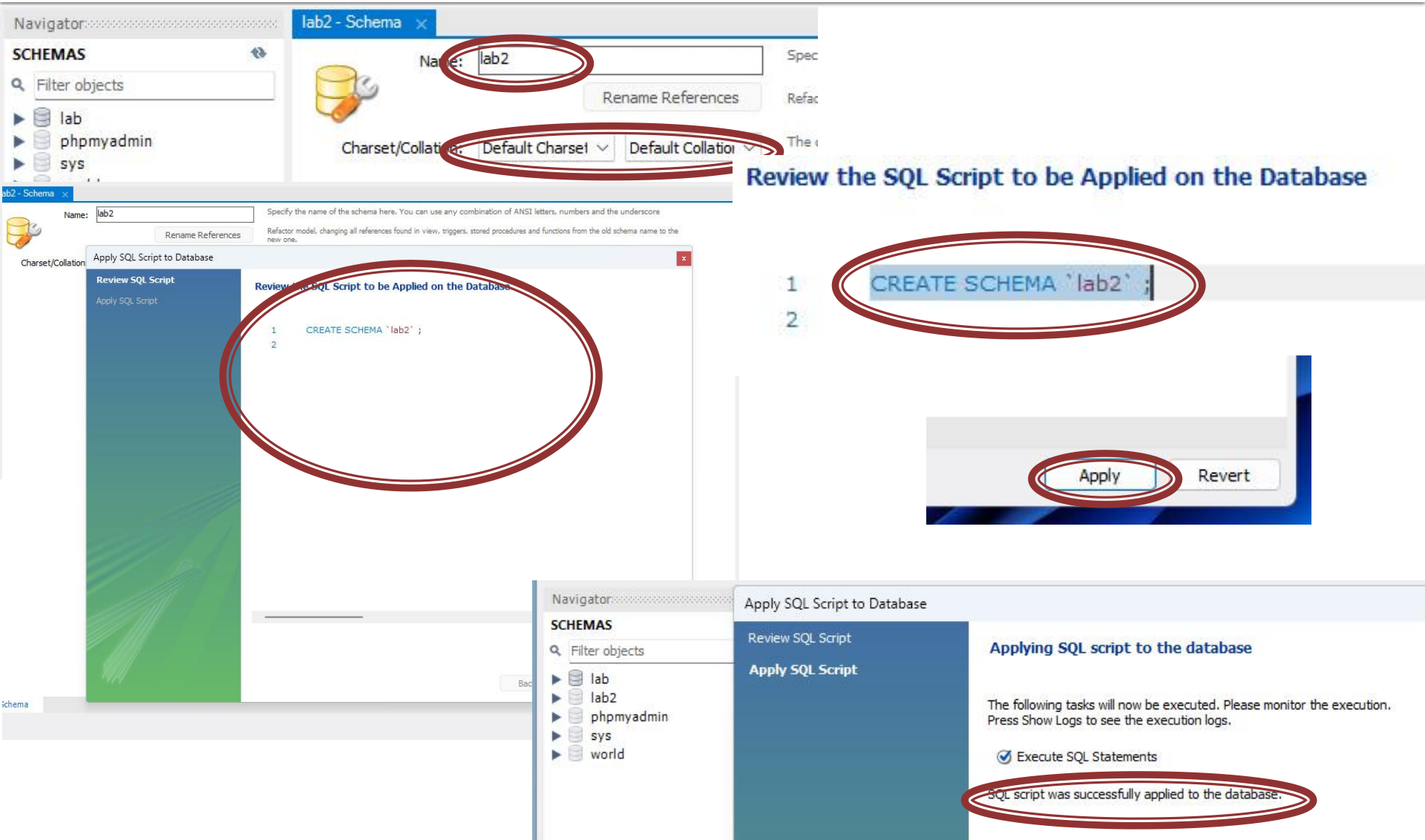
Realizarea bazei de date

- se creaza o noua baza de date:
  - in lista “Schemas” – Right click – Create New Schema
- se activeaza ca baza de date curenta noua “schema” – Dublu click pe numele ales



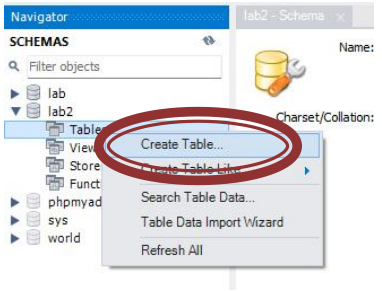


Realizarea bazei de date

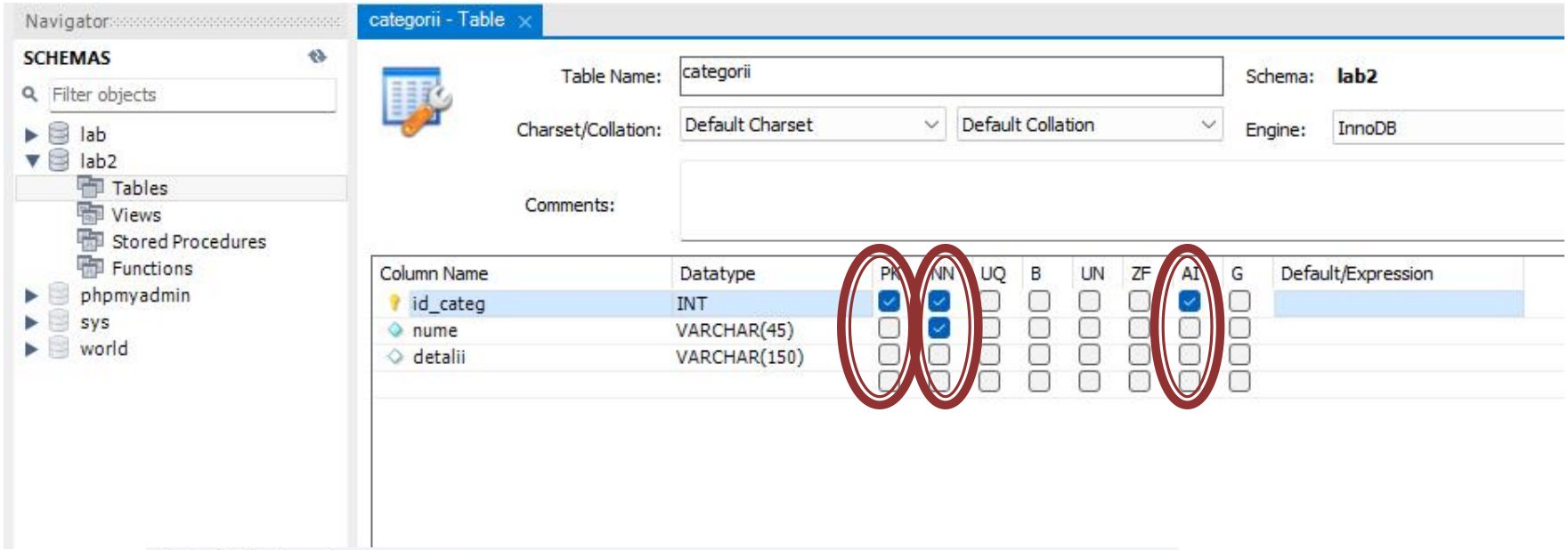


Introducere tabele

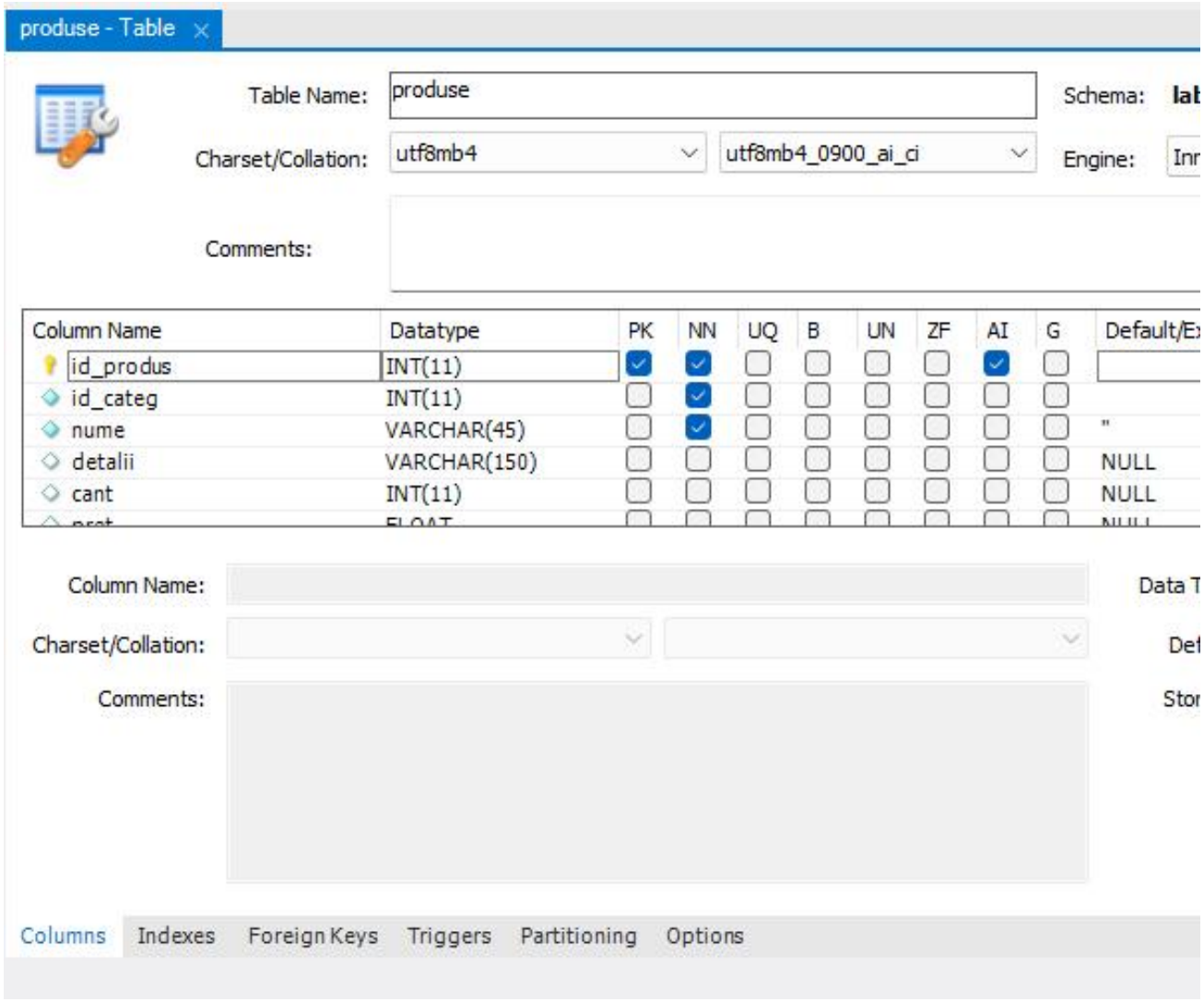
- Introducere tabel – Click sageata langa numele bazei de date – Tables – Right Click – Create Table
- se defineste structura tabelului
  - nume coloane
  - tip de date
  - NOT NULL – daca se accepta ca acea coloana sa ramana fara date (NULL) sau nu
  - AUTOINC – daca acea coloana va fi de tip intreg si va fi incrementata automat de server (util pentru crearea cheilor primare)
  - Default value – valoarea implicita care va fi inserata daca la introducerea unei linii noi nu se mentioneaza valoare pentru acea coloana (legat de optiunea NOT NULL)



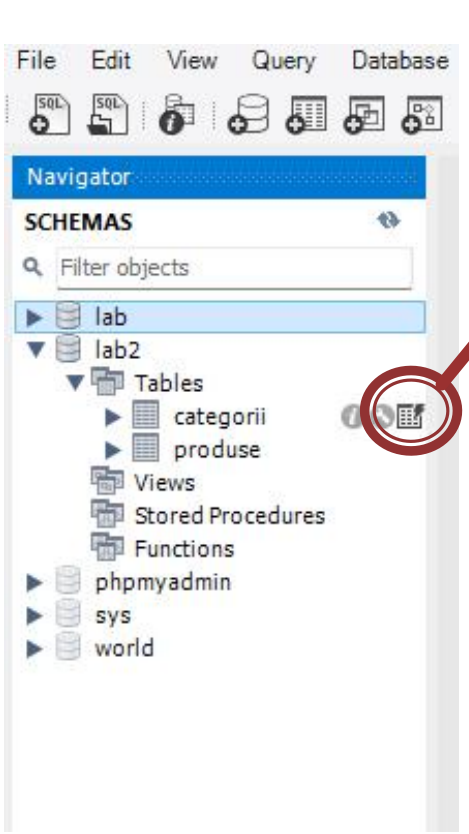
Tabel Categorii

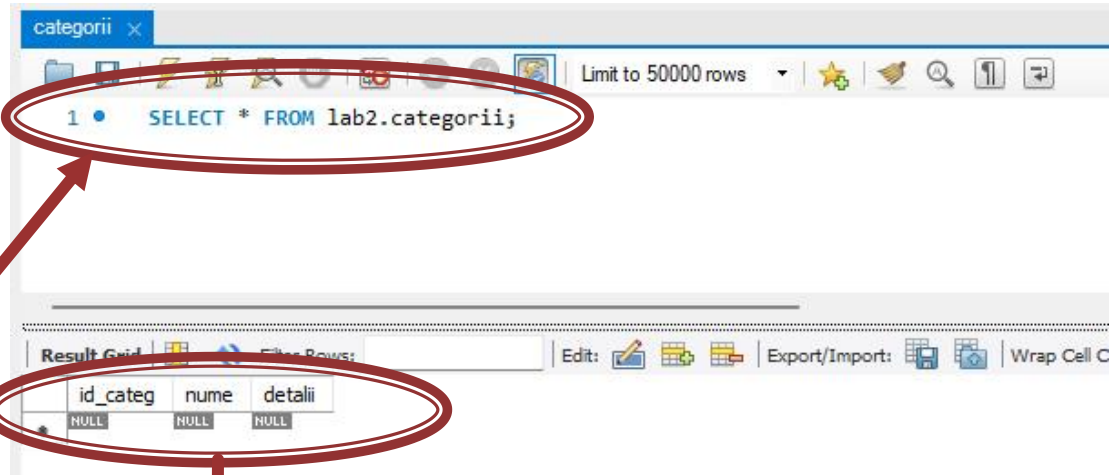


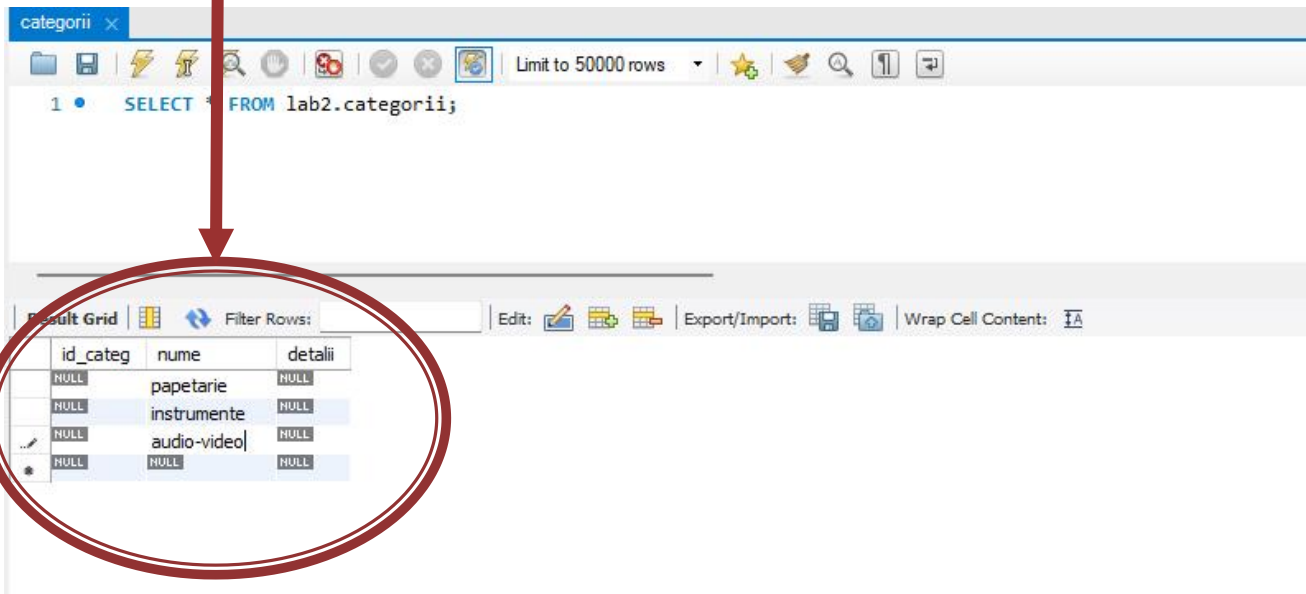
Tabel Produse



Introducere date initiale

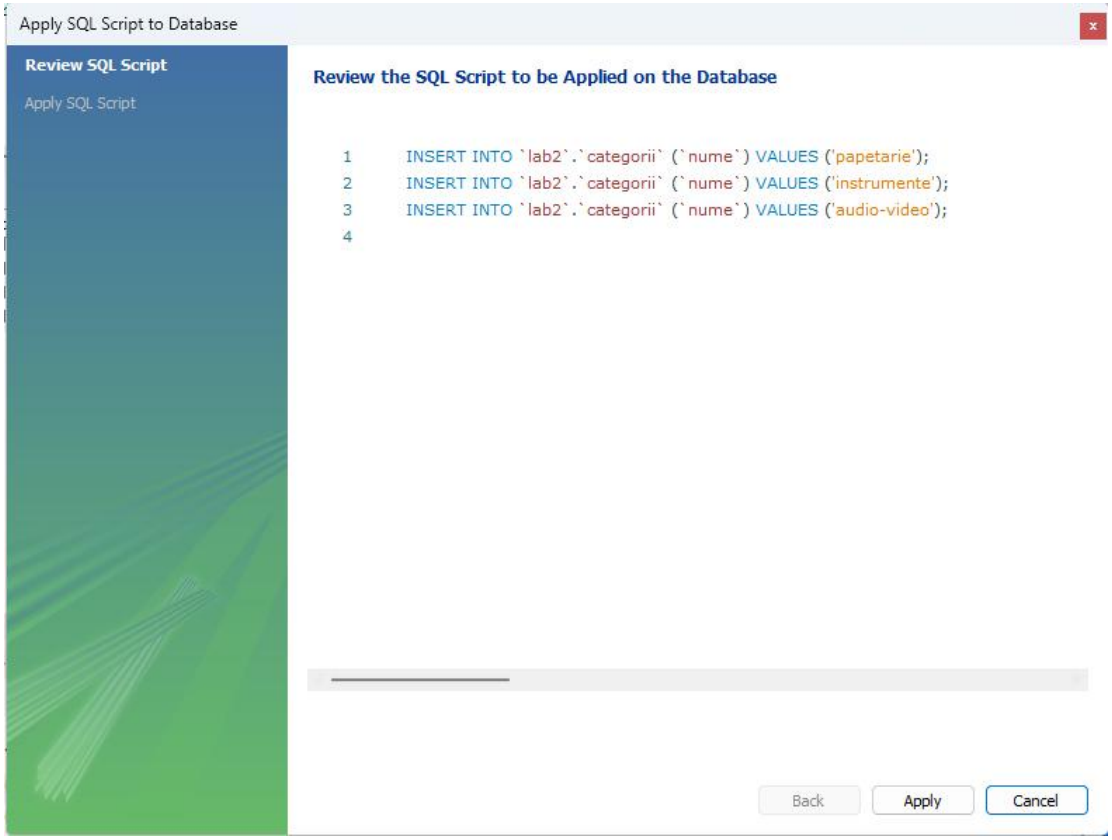




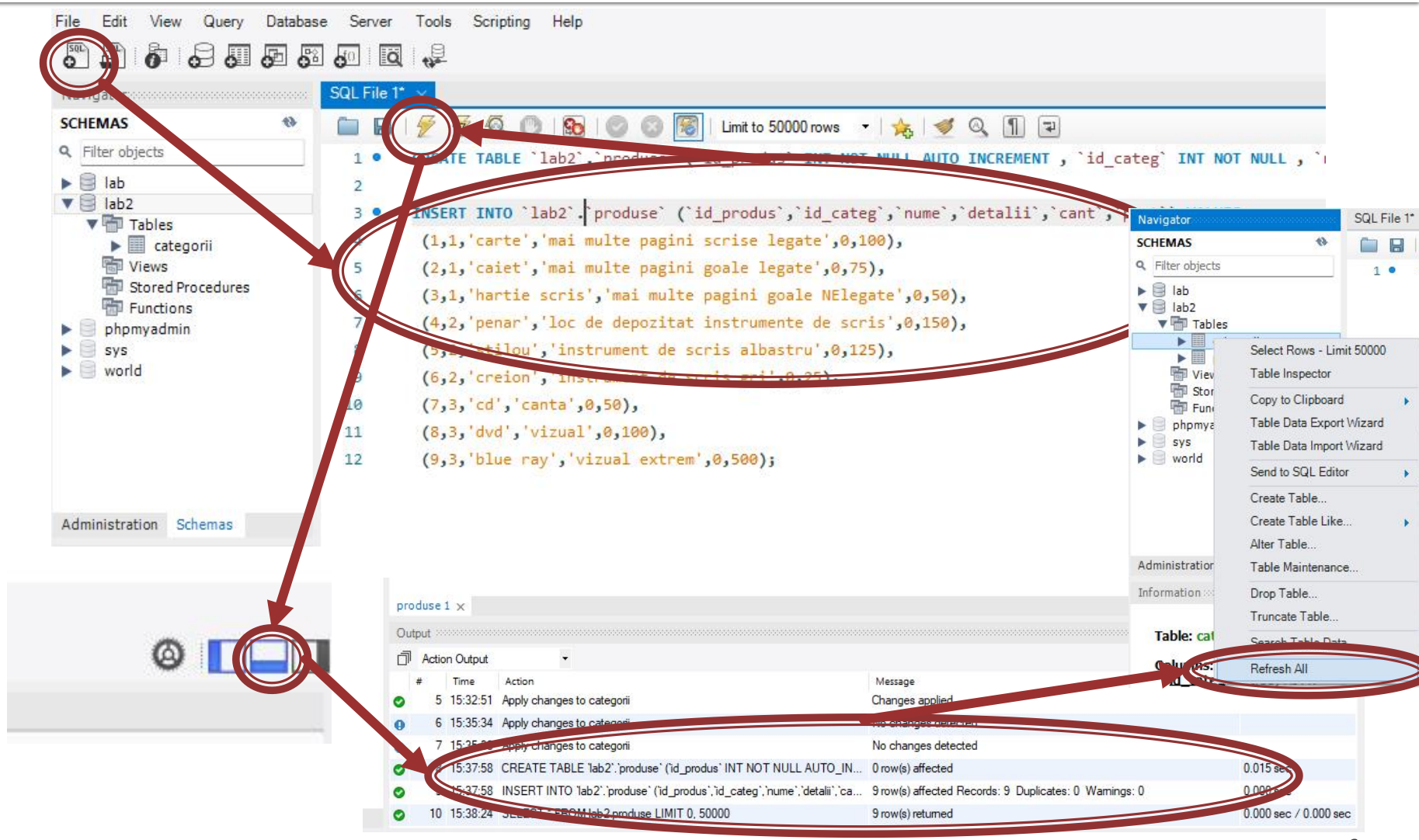


Introducere date initiale

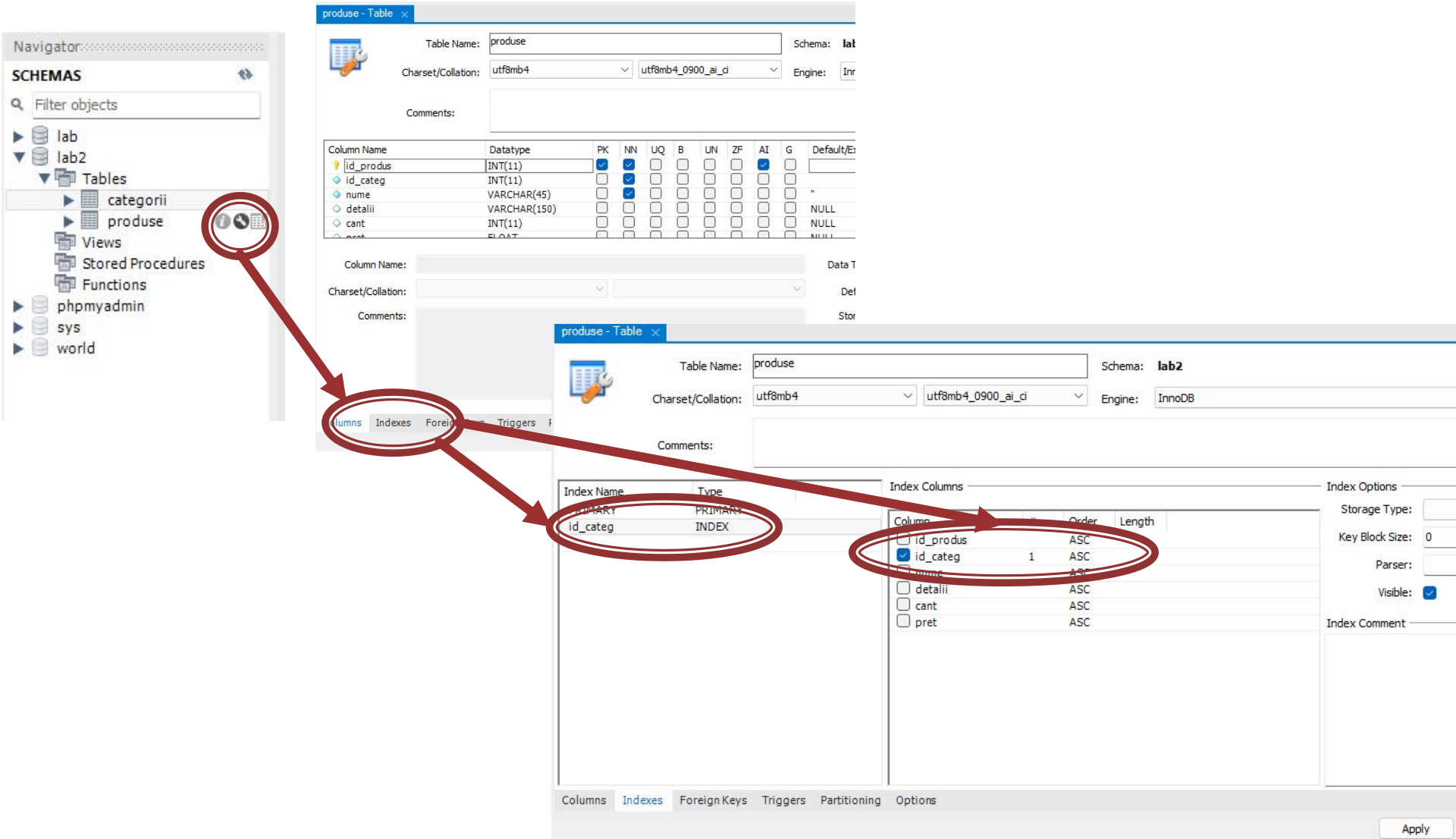
- Completare in rezultat + Buton Apply



Introducere date prin script

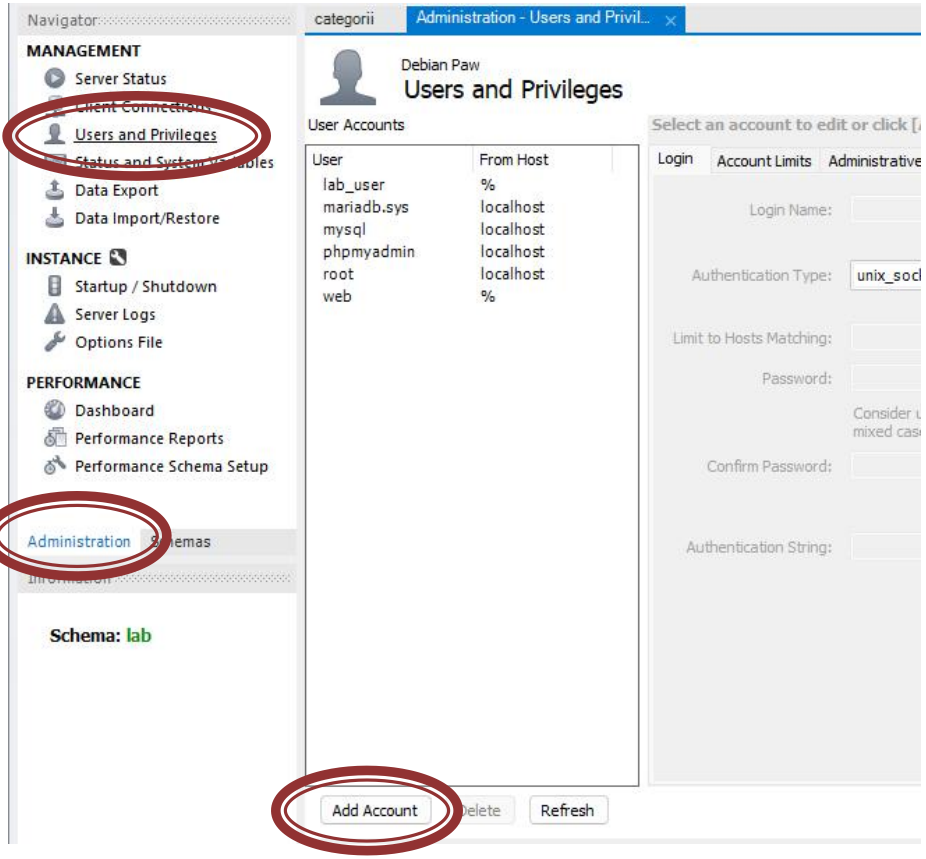


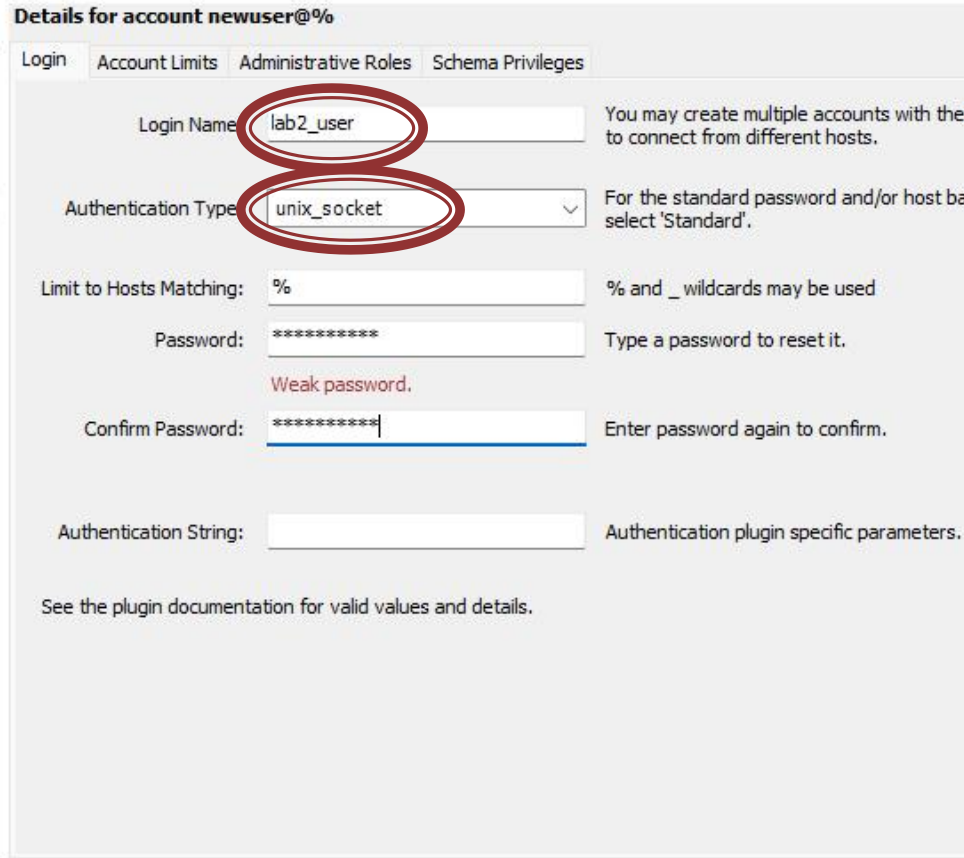
Index in tabelul produse



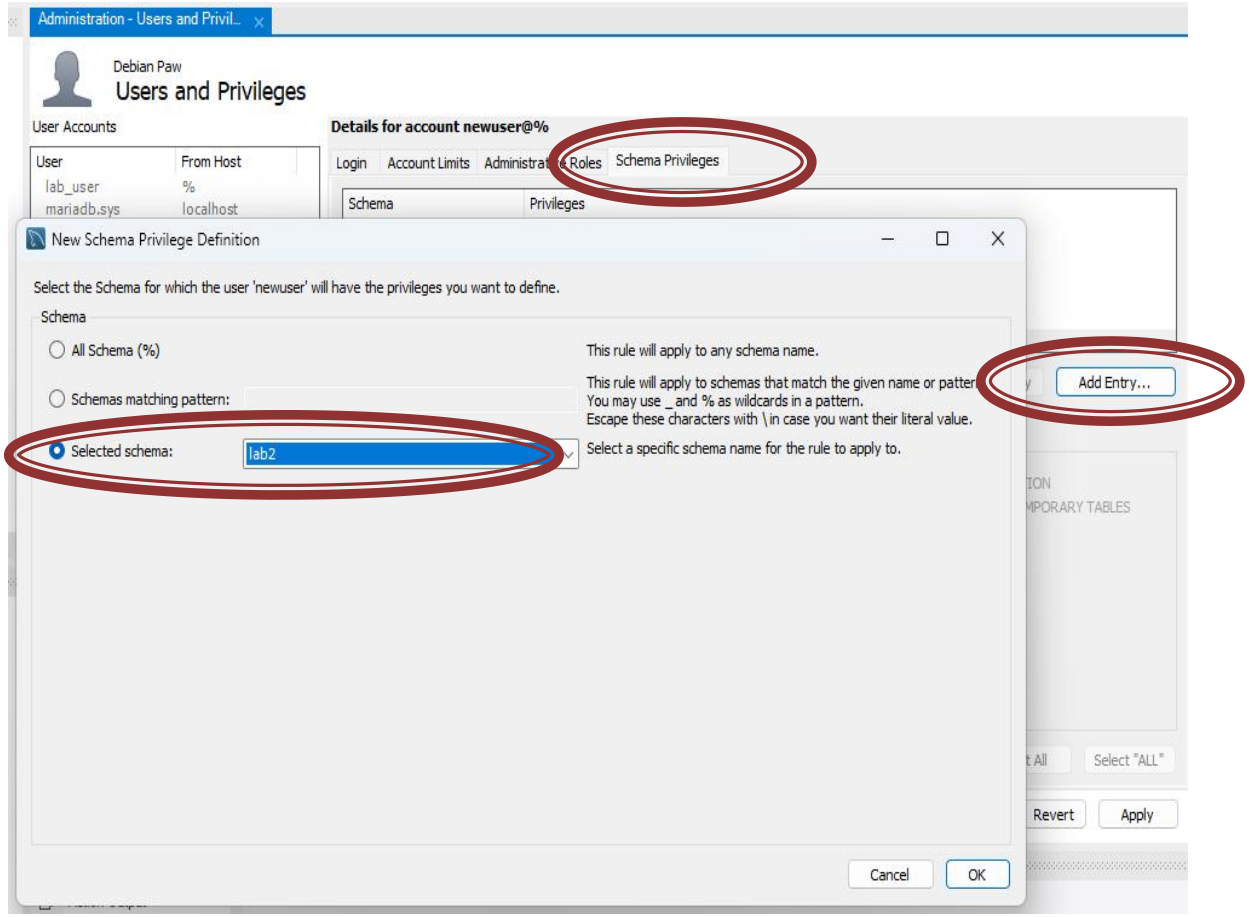
User si drepturi de acces

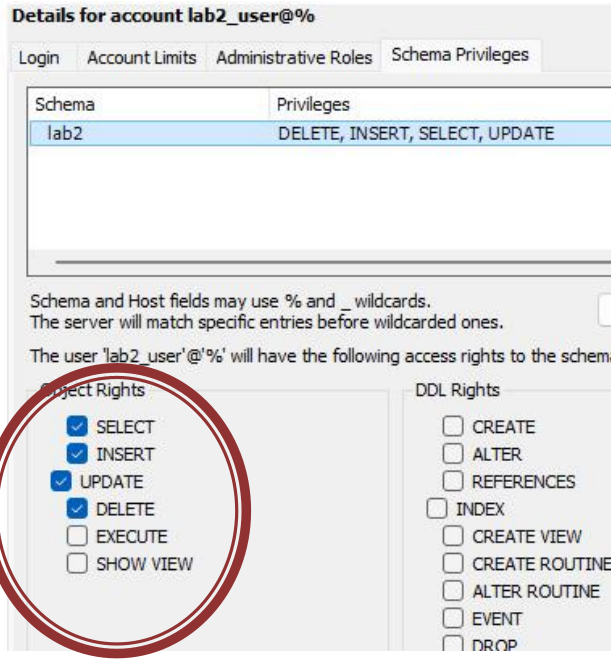
- Probleme de compatibilitate



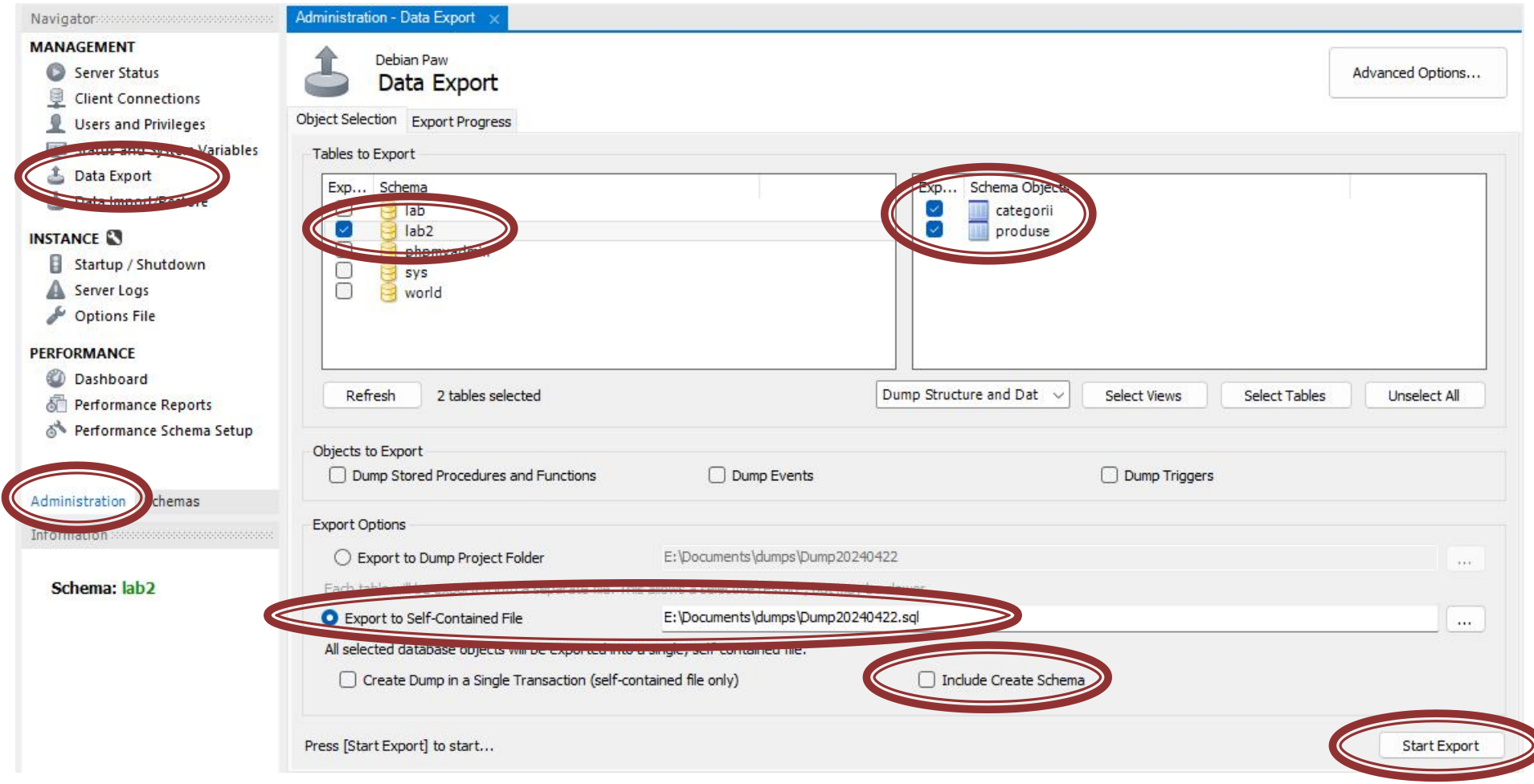


Privilegii


Administration - Users and Privil...
Debian Paw
Users and Privileges
User Accounts
User
From Host
lab_user
%
mariadb.sys
localhost
Details for account newuser@%
Login
Account Limits
Administrative Roles
Schema Privileges
Schema
Privileges
New Schema Privilege Definition
Select the Schema for which the user 'newuser' will have the privileges you want to define.
Schema
All Schema (%)
This rule will apply to any schema name.
Schemas matching pattern:
This rule will apply to schemas that match the given name or patter
You may use _ and % as wildcards in a pattern.
Escape these characters with \ in case you want their literal value.
Add Entry...
Selected schema:
lab2
Select a specific schema name for the rule to apply to.
Revert
Apply
Cancel
OK


Details for account lab2_user@%
Login
Account Limits
Administrative Roles
Schema Privileges
Schema
Privileges
lab2
DELETE, INSERT, SELECT, UPDATE
Schema and Host fields may use % and _ wildcards.
The server will match specific entries before wildcarded ones.
The user 'lab2_user'@'%' will have the following access rights to the schem
Object Rights
SELECT
INSERT
UPDATE
DELETE
EXECUTE
SHOW VIEW
DDL Rights
CREATE
ALTER
REFERENCES
INDEX
CREATE VIEW
CREATE ROUTINE
ALTER ROUTINE
EVENT
DROP

Backup


Navigator
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Server Status
Client Connections
Users and Privileges
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Server Logs
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Dashboard
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Schema: lab2
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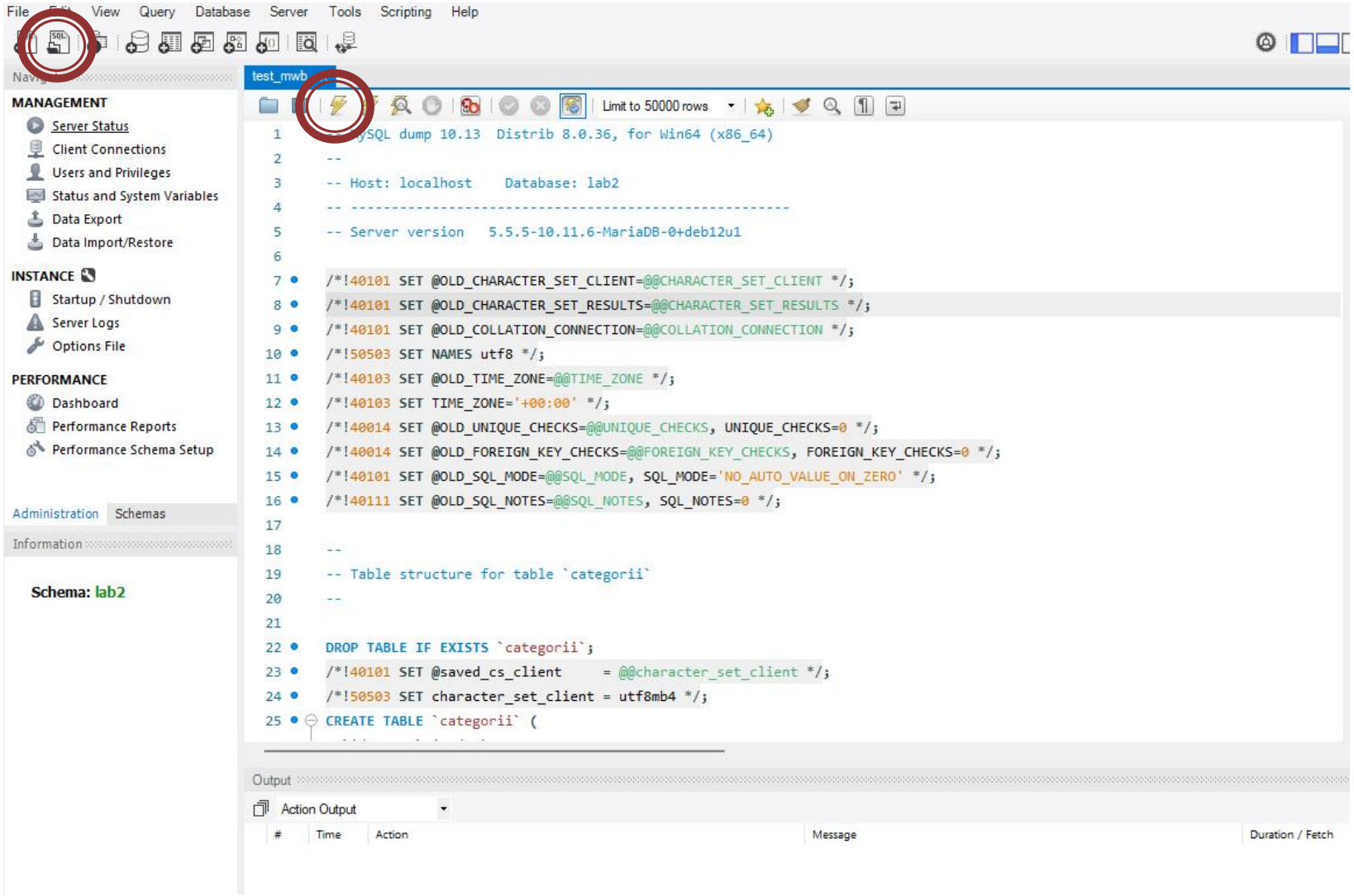
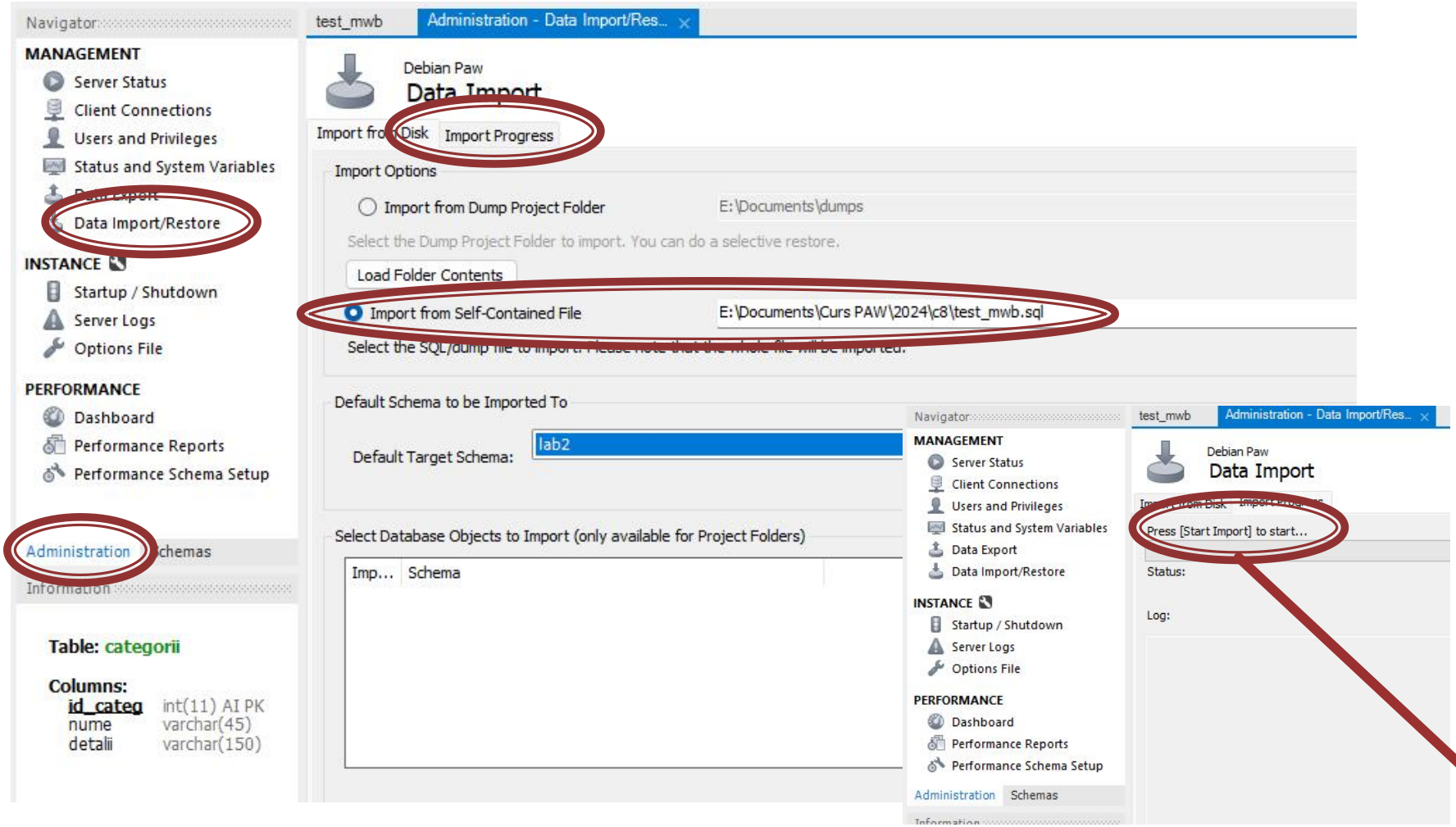
Tables to Export
Exp...
Schema
lab
lab2
sys
world
Exp...
Schema Objects
categorii
produse
Refresh
2 tables selected
Dump Structure and Dat
Select Views
Select Tables
Unselect All
Objects to Export
Dump Stored Procedures and Functions
Dump Events
Dump Triggers
Export Options
Export to Dump Project Folder
E:\Documents\dumps\Dump20240422
Export to Self-Contained File
E:\Documents\dumps\Dump20240422.sql
Create Dump in a Single Transaction (self-contained file only)
Include Create Schema
Press [Start Export] to start...
Start Export

Restore – rulare script



Restore - interfata



Script SQL Backup - utilitate

- Poate fi folosit ca un model extrem de bun pentru comenzile necesare pentru crearea programatica (din PHP de exemplu) a bazei de date

```
CREATE DATABASE IF NOT EXISTS tmpaw;
USE tmpaw;

 DROP TABLE IF EXISTS `categorii`;
CREATE TABLE `categorii` (
  `id_categ` int(10) unsigned NOT NULL auto_increment,
  `nume` varchar(45) NOT NULL,
  `detalii` varchar(150) default NULL,
  PRIMARY KEY  (`id_categ`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

INSERT INTO `categorii` (`id_categ`,`nume`,`detalii`) VALUES
 (1,'papetarie',NULL),
 (2,'instrumente',NULL),
 (3,'audio-video',NULL);
```

Contact

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