

Module Code : ACCB5026 – Database Application Development

Week 01 : Database Concepts- recap

So far- from ACCA4023

- Understand the concept – DBMS
- Identify different types of databases
- Components of DBMS
- DBMS system Architecture
- Benefits of DBMS
- Implementation using MS Access

Database – What is it?



"A set of information held in a computer" - Oxford English Dictionary



"One or more large structured sets of persistent data, usually associated with software to update and query the data" - Free On-Line Dictionary of Computing



A database is a structured collection of data that is organized in a way to make it easily accessible, manageable, and updateable. It is designed to efficiently store, retrieve, and manage vast amounts of information in a systematic and structured manner. Databases are a fundamental part of modern computing and play a critical role in various applications and systems.

What is Data?

- Raw facts or figures with no context.

Example: 42, John, London, 2025-09-15

What is Information?

- Data that has been processed or organised to have meaning.

Example: 42, John, London, 2025-09-15

Example: "John is 42 years old and lives in London as of 15th September 2025."

What is a Table?

- A structured collection of data arranged in rows and columns.

StudentID	Name	Age	City
1	John	42	London
2	Mary	25	Cardiff
3	Ahmed	30	Birmingham

What is a Record?

- A single row in a table, representing one instance.

StudentID	Name	Age	City
1	John	42	London
2	Mary	25	Cardiff
3	Ahmed	30	Birmingham

What is a Database?

- A collection of related tables stored together.

StudentID	Name	Age	City
1	John	42	London
2	Mary	25	Cardiff
3	Ahmed	30	Birmingham

CourseID	Title	Credits
C101	Introduction to Databases	20
C102	Web Development Basics	15
C103	Python Programming	20
C104	Data Structures & Algorithms	25

What is a Database Management System?

- A DBMS (Database Management System) is software that helps you create, store, organise, and manage data in a database.

DBMS
makes it
easy to

Store data in tables

Control access so only authorised users can view or change data

Insert, update, delete, and search for data quickly

Maintain consistency and avoid duplication

Secure data against loss or unauthorised use

What is a Database Management System?

- A DBMS (Database Management System) is software that helps you create, store, organise, and manage data in a database.

Examples of
DBMS

MySQL
Oracle Database
Microsoft SQL Server
PostgreSQL
MongoDB (for NoSQL databases)

Recap Quiz

Database and Database Management System (DBMS)

Scenario: Sarah is working on a project that requires her to store and manage large amounts of structured data. She needs a solution to help her efficiently store, update, and retrieve data while maintaining data integrity.

Question: Which of the following should Sarah use to meet her requirements?

- A) File system
- B) DBMS
- C) Spreadsheet
- D) Text Editor

Recap Quiz

Database and Database Management System (DBMS)

Scenario: Sarah is working on a project that requires her to store and manage large amounts of structured data. She needs a solution to help her efficiently store, update, and retrieve data while maintaining data integrity.

Question: Which of the following should Sarah use to meet her requirements?

- A) File system
- B) **DBMS**
- C) Spreadsheet
- D) Text Editor

Recap Quiz

Database and Database Management System (DBMS)

What is a Database?

- a) A system that manages data and provides access to it
- b) A collection of organized data stored electronically
- c) A language used to query databases
- d) A user interface for managing files

Recap Quiz

Database and Database Management System (DBMS)

What is a Database?

- a) A system that manages data and provides access to it
- b) A collection of organized data stored electronically**
- c) A language used to query databases
- d) A user interface for managing files

Recap Quiz

Database and Database Management System (DBMS)

What is the main difference between a database and a DBMS?

- a) A database stores data, while DBMS manages and interacts with the data
- b) A database processes queries, and DBMS stores data
- c) A database is a software, and DBMS is a hardware component
- d) There is no difference between a database and a DBMS

Recap Quiz

Database and Database Management System (DBMS)

What is the main difference between a database and a DBMS?

a) A database stores data, while DBMS manages and interacts with the data

b) A database processes queries, and DBMS stores data

c) A database is a software, and DBMS is a hardware component

d) There is no difference between a database and a DBMS

Recap Quiz

Database and Database Management System (DBMS)

A database without a DBMS is _____.

- a) Easy to manage
- b) Fully functional for all operations
- c) Simply a collection of data without much functionality
- d) Always secure

Recap Quiz

Database and Database Management System (DBMS)

A database without a DBMS is _____.

- a) Easy to manage
- b) Fully functional for all operations
- c) Simply a collection of data without much functionality**
- d) Always secure



	A	B	C
1	Name	Date	Age
2	David	11/27/2021	40
3	Sophia	8/9/2018	24
4	Alexander	1/22/2019	27
5	Maria	10/12/2022	34
6	Joshua	5/2/2021	38
7	Amanda	11/16/2021	26
8			

A simple table

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Q1: In the Students table, which of the following are **attributes(field)**?

- a) StudentID
- b) Alice
- c) Email
- d) 1234567890

A simple table

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Which of the following represents a **record (row)** in the Students table?

- a) (101, Alice, Brown, alice@email.com, 1234567890)
- b) StudentID
- c) Email

A simple table

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Q3: In the row for StudentID = 102, what is the field value for *LastName*?

A simple table

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Q3: In the row for StudentID = 102, what is the field value for *LastName*?

A simple table

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Q4: Give an example of **data** from the table

A simple table

Attributes or fields

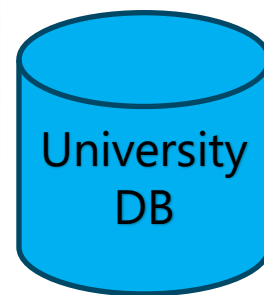
StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Data or field value or record or data set

Database – collection of tables

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Table 1: Students



CourseCode	CourseName
CSE101	Introduction to Computer Science
MAT201	Calculus II
ENG105	English Composition
PHY110	Physics Fundamentals

Table 2: Courses

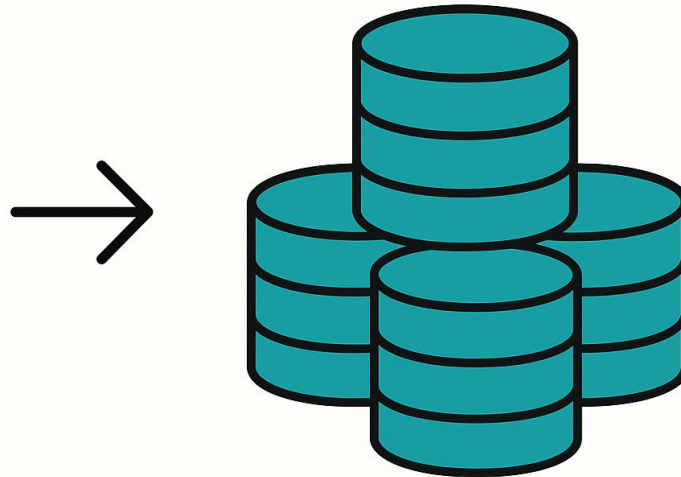
StudentID	CourseCode
101	CSE101
102	CSE101
101	MAT201
103	ENG105

Table 3: Enrolments

Database Management System

One DBMS/Server →
can host and manage
many databases.

Collection of Databases



Keys

Primary Key, Candidate Key

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Identify the attributes/columns/field names in the Students table that would uniquely identify each student?

Keys

Primary Key, Candidate Key

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

Identify the attributes/columns/field names in the Students table that would uniquely identify each student?

StudentID

StudentID, FirstName

Email

StudentID, FirstName, LastName

FirstName, Email

StudentID, PhoneNumber

LastName, Email

StudentID, FirstName, PhoneNumber

Keys

Primary Key, Candidate Key, Foreign Key, & Composite Key

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
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103	Charlie	Davis	charlie@email.com	5556667777

CourseCode	CourseName
CSE101	Introduction to Computer Science
MAT201	Calculus II
ENG105	English Composition
PHY110	Physics Fundamentals

StudentID	CourseCode
101	CSE101
102	CSE101
101	MAT201
103	ENG105

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

Scenario: A university database has a table named Students with columns StudentID, FirstName, LastName, and Email. The StudentID is a unique identifier assigned to each student.

Question: Which of the following can be considered a Primary Key for the Students table?

A) FirstName

B) Email

C) StudentID

D) Combination of FirstName and LastName

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

Scenario: In the Employees table, there are columns: EmployeeID, SSN, FirstName, LastName, and Email. Both EmployeeID and SSN are unique for every employee.

Question: Which of the following is not a Candidate Key for the Employees table?

- A) EmployeeID
- B) SSN
- C) Salary
- D) Both A and B

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

Scenario: In the Employees table, there are columns: EmployeeID, SSN, FirstName, LastName, and Email. Both EmployeeID and SSN are unique for every employee.

Question: Which of the following is not a Candidate Key for the Employees table?

A) EmployeeID

B) SSN

C) Salary

D) Both A and B

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

A library database has a Books table with columns BookID, ISBN, Title, and Author. The BookID is an automatically generated unique identifier, and ISBN is the unique identifier for each published book.

What can be said about the keys in this table?

- A) Both BookID and ISBN are primary keys.
- B) Only ISBN can be the primary key, as it's unique for each book.
- C) Both BookID and ISBN are candidate keys, but only one can be chosen as the primary key.
- D) Title should be the primary key because it's the most important piece of information.

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

A library database has a Books table with columns BookID, ISBN, Title, and Author. The BookID is an automatically generated unique identifier, and ISBN is the unique identifier for each published book.

What can be said about the keys in this table?

A) Both BookID and ISBN are primary keys.

B) Only ISBN can be the primary key, as it's unique for each book.

C) Both BookID and ISBN are candidate keys, but only one can be chosen as the primary key.

D) Title should be the primary key because it's the most important piece of information.

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

In a school database, the Students table has columns StudentID, FirstName, LastName, Email, and NationalID. The StudentID is a unique identifier auto-generated by the system, and the NationalID is unique for each student as well. Which of the following is the best choice for the primary key?

- A) FirstName and LastName combined.
- B) Email because it's unique.
- C) Either StudentID or NationalID can be selected as the primary key.
- D) FirstName should be the primary key.

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

In a school database, the Students table has columns StudentID, FirstName, LastName, Email, and NationalID. The StudentID is a unique identifier auto-generated by the system, and the NationalID is unique for each student as well. Which of the following is the best choice for the primary key?

A) FirstName and LastName combined.

B) Email because it's unique.

C) Either StudentID or NationalID can be selected as the primary key.

D) FirstName should be the primary key.

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

Scenario: A university database has two tables: Students and Courses. The Students table has StudentID as its Primary Key, and the Courses table has CourseID as its Primary Key. There's a third table called Enrolments which records which students are enrolled in which courses.

Question: In the Enrolments table, which of the following should be used as a Foreign Key?

- A) StudentID
- B) CourseID
- C) Both A and B
- D) Neither A nor B

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

Scenario: A university database has two tables: Students and Courses. The Students table has StudentID as its Primary Key, and the Courses table has CourseID as its Primary Key. There's a third table called Enrolments which records which students are enrolled in which courses.

Question: In the Enrolments table, which of the following should be used as a Foreign Key?

- A) StudentID
- B) CourseID
- C) Both A and B**
- D) Neither A nor B

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

Scenario: A table ProjectAssignments has columns: EmployeeID, ProjectID, and AssignmentDate. One employee can be assigned to multiple projects, and each project can have multiple employees.

Question: Which of the following is the best Composite Key for the ProjectAssignments table?

- A) EmployeeID
- B) ProjectID
- C) Combination of EmployeeID and ProjectID
- D) AssignmentDate

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

Scenario: A table ProjectAssignments has columns: EmployeeID, ProjectID, and AssignmentDate. One employee can be assigned to multiple projects, and each project can have multiple employees.

Question: Which of the following is the best Composite Key for the ProjectAssignments table?

A) EmployeeID

B) ProjectID

C) Combination of EmployeeID and ProjectID

D) AssignmentDate

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

A table called Orders has the following columns: OrderID, CustomerID, ProductID, and OrderDate. The OrderID uniquely identifies each order, while both CustomerID and ProductID are required to uniquely identify an ordered product by a customer. What is the best key configuration for this table?

- A) OrderID should be the primary key.
- B) CustomerID should be the primary key.
- C) A composite key of CustomerID and ProductID should be the primary key.
- D) OrderDate should be included in the composite key.

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

A table called Orders has the following columns: OrderID, CustomerID, ProductID, and OrderDate. The OrderID uniquely identifies each order, while both CustomerID and ProductID are required to uniquely identify an ordered product by a customer. What is the best key configuration for this table?

A) OrderID should be the primary key.

B) CustomerID should be the primary key.

C) A composite key of CustomerID and ProductID should be the primary key.

D) OrderDate should be included in the composite key.

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

A table StudentCourses stores which courses students are enrolled in, with the columns StudentID, CourseID, EnrollmentDate, and Grade. Each student can enroll in multiple courses, and each course can have multiple students. What is the best key configuration?

- A) StudentID should be the primary key.
- B) CourseID should be the primary key.
- C) A composite key of StudentID and CourseID should be the primary key.
- D) EnrollmentDate should be the primary key.

Recap Quiz

Primary Key, Candidate Key, Foreign Key, & Composite Key

A table StudentCourses stores which courses students are enrolled in, with the columns StudentID, CourseID, EnrollmentDate, and Grade. Each student can enroll in multiple courses, and each course can have multiple students. What is the best key configuration?

A) StudentID should be the primary key.

B) CourseID should be the primary key.

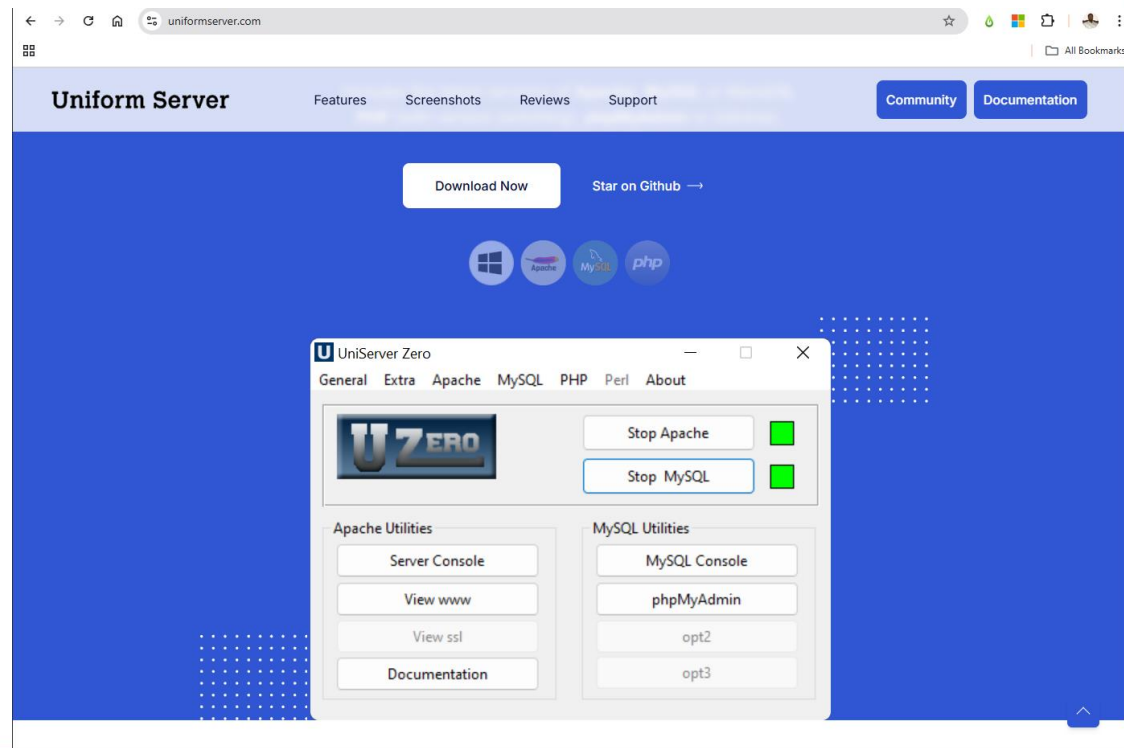
C) A composite key of StudentID and CourseID should be the primary key.

D) EnrollmentDate should be the primary key.

Steps to Create a Simple Database

1) Download & unpack Uniform Server

<https://www.uniformserver.com/>



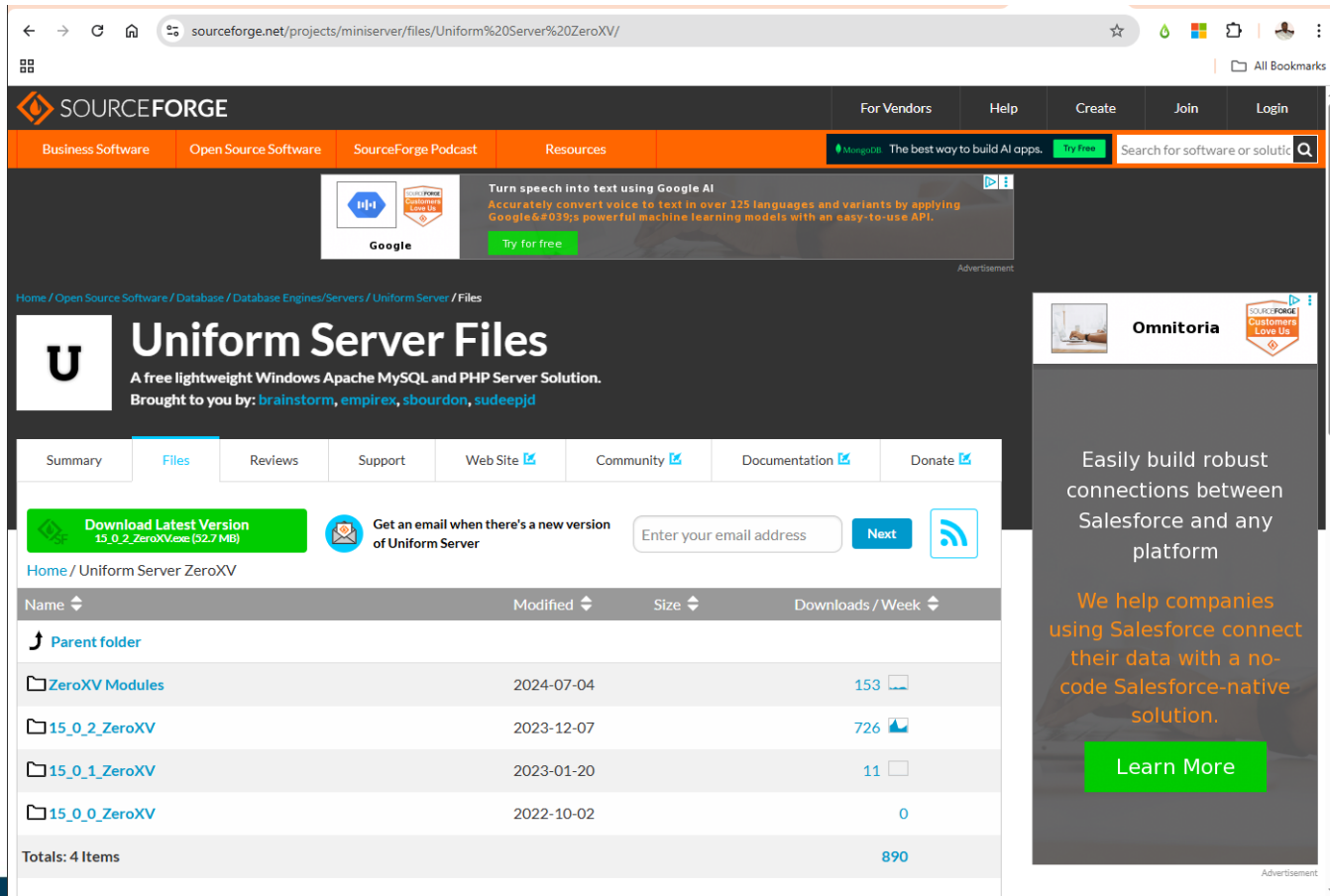
Download the Uniform Server package from the official site (or SourceForge)

The screenshot shows the SourceForge project page for Uniform Server. The browser address bar displays 'sourceforge.net/projects/miniserver/files/'. The SourceForge logo and navigation menu are at the top. A banner for TeamDesk is visible. Below the banner, there is a green button for 'Download Latest Version' (15_0_2_ZeroXv0ae (32.7 MB)) and a section for email notifications. The main content is a table of file releases.

Name	Modified	Size	Downloads / Week
Uniform Server ZeroXV	2023-11-25		890
Uniform Server ZeroXIV	2022-05-31		60
Uniform Server ZeroXIII	2019-09-01		18
Uniform Server ZeroXII	2016-06-23		6
Uniform Server ZeroXI	2015-10-24		24
Uniform Server	2013-08-23		15
Old Files	2013-05-25		1
Plugins	2012-11-19		3
MiniServer	2012-05-19		16
Totals: 9 Items			1,033

Below the table, there is a 'You Might Also Like' section. On the right side of the page, there are advertisements for Workday's New Payroll Platform and Recommended Projects (Wamp - WampServer and XAMPP).

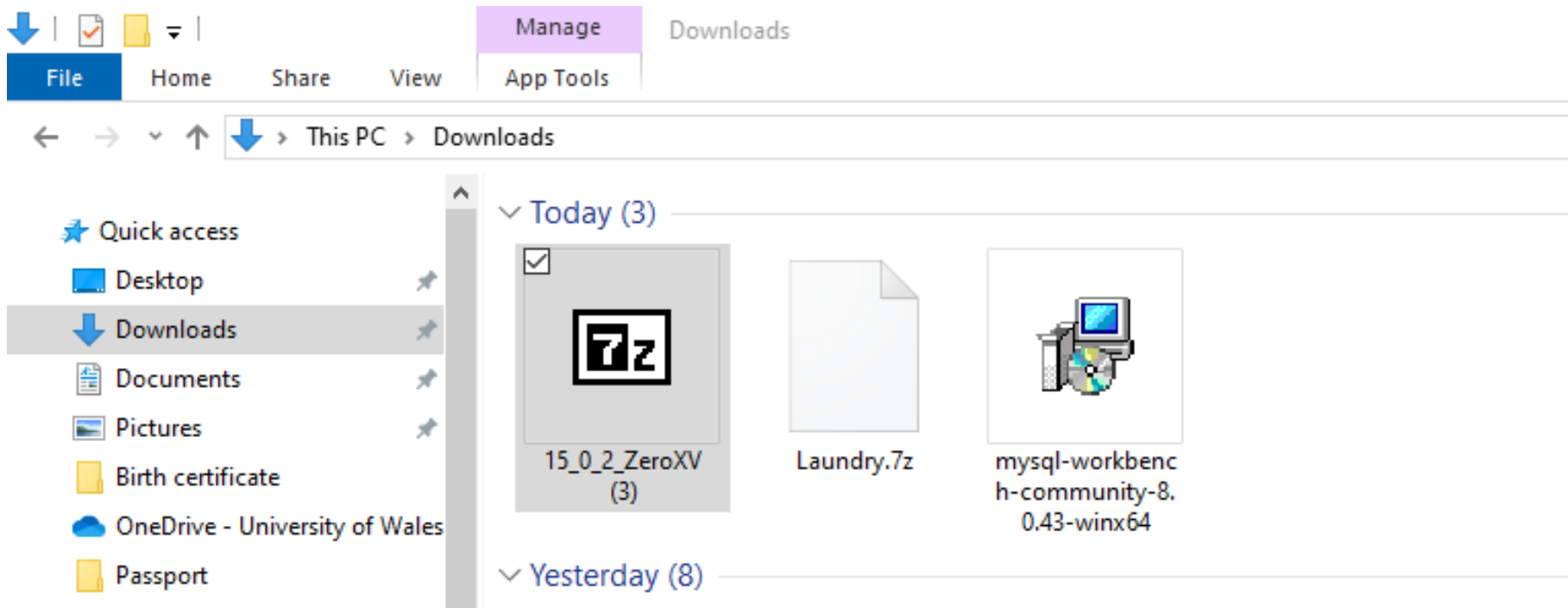
Extract the ZIP/EXE contents to a folder you control, C:\UniServerZ



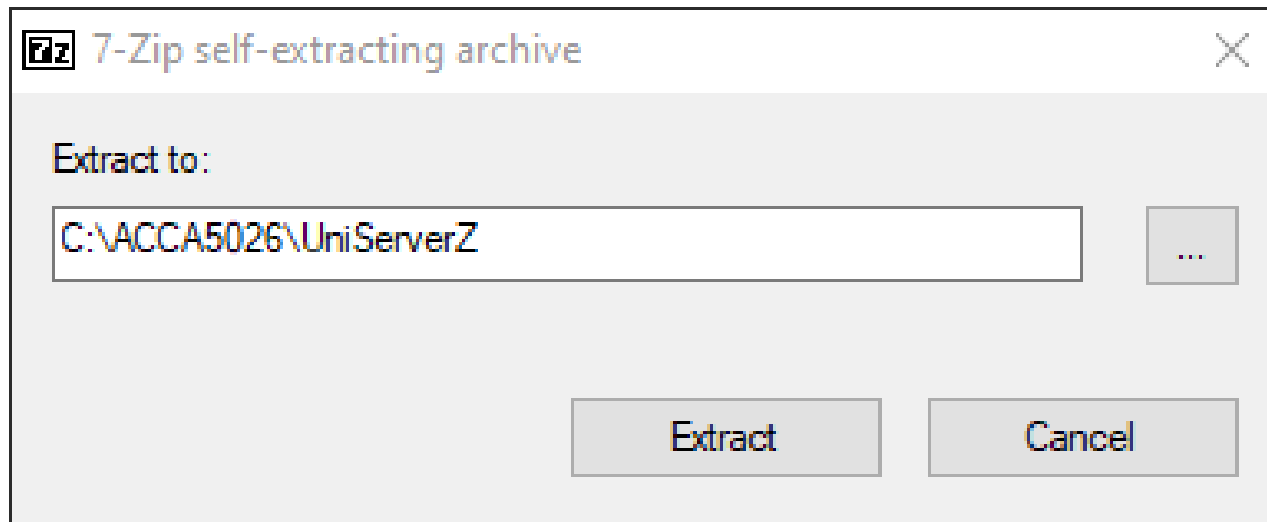
The screenshot shows the SourceForge project page for "Uniform Server Files". The page includes a navigation bar with links for Business Software, Open Source Software, SourceForge Podcast, Resources, and a search bar. The main content area features a "Download Latest Version" button (15_0_2_ZeroXV.exe, 52.7 MB) and a "Get an email when there's a new version of Uniform Server" form. Below this is a table listing files and folders.

Name	Modified	Size	Downloads / Week
Parent folder			
ZeroXV Modules	2024-07-04		153
15_0_2_ZeroXV	2023-12-07		726
15_0_1_ZeroXV	2023-01-20		11
15_0_0_ZeroXV	2022-10-02		0
Totals: 4 Items			890

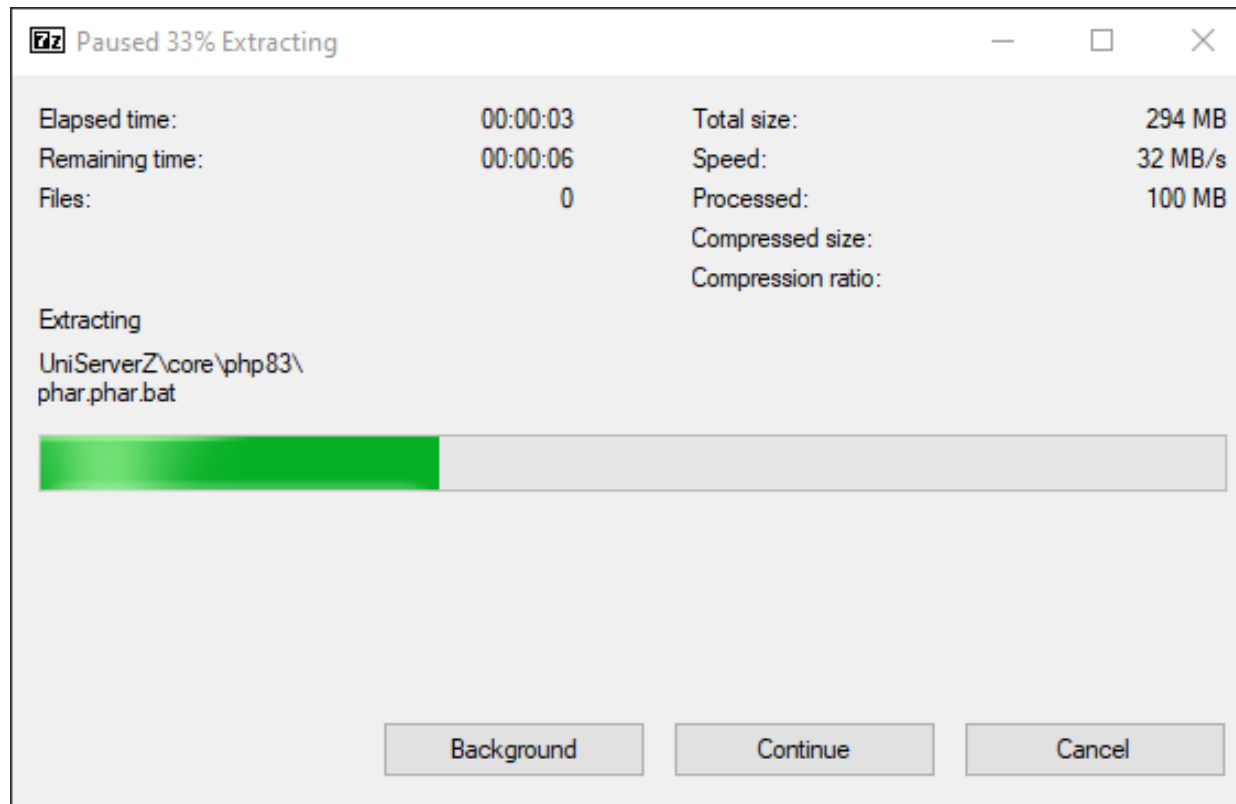
Extract the ZIP/EXE contents to a folder you control, C:\UniServerZ



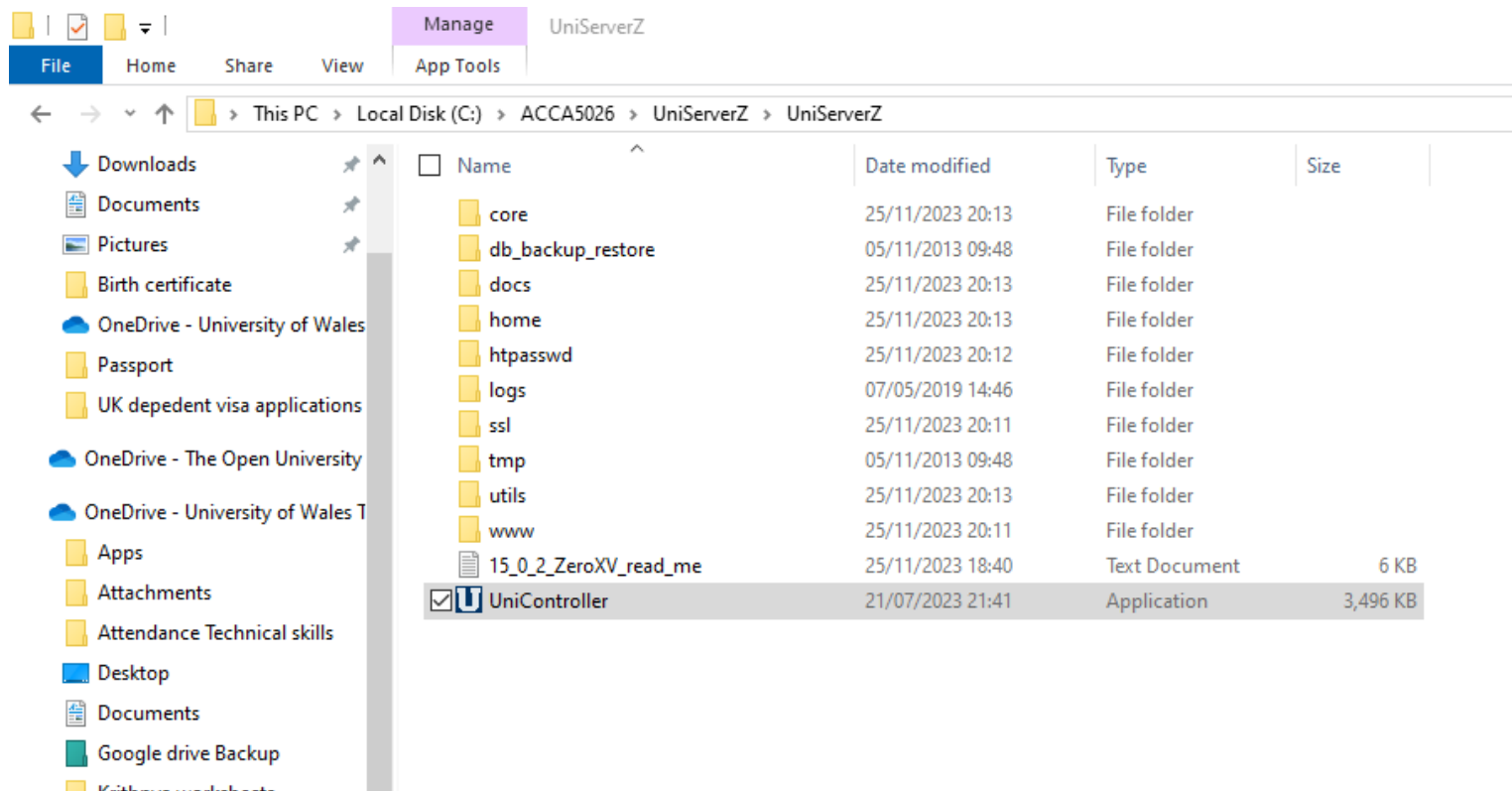
Extract the ZIP/EXE contents to a folder you control, C:\UniServerZ



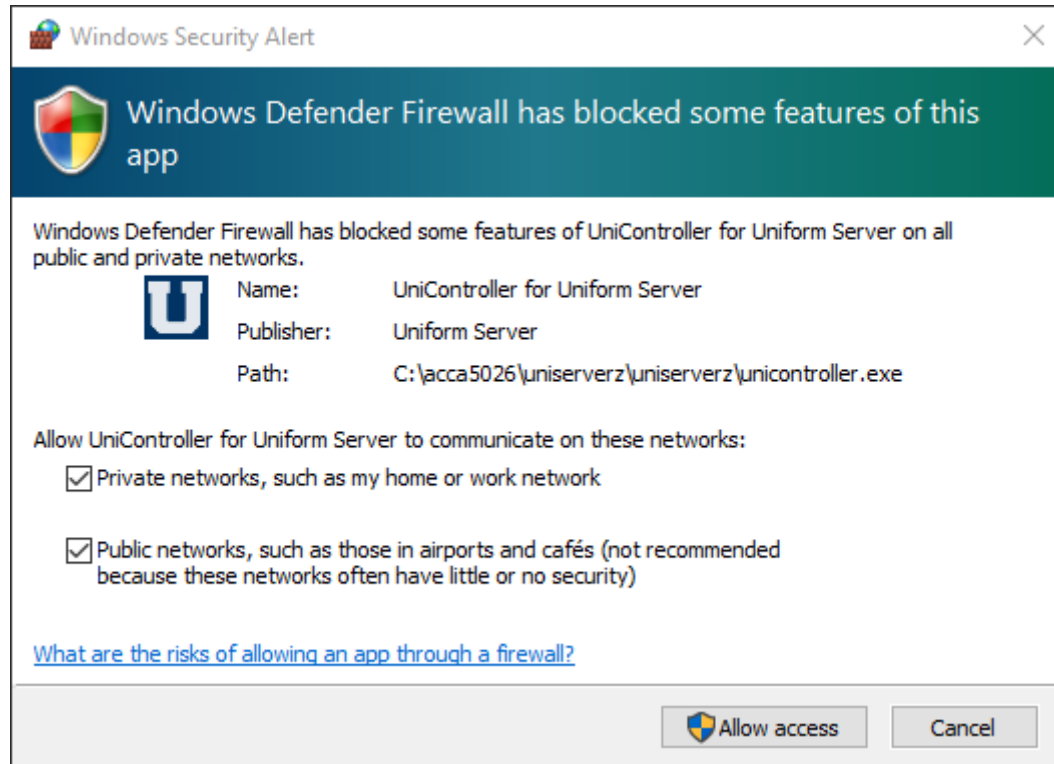
Extract the ZIP/EXE contents to a folder you control, C:\UniServerZ



Open the Uniform Server folder and run **UniController.exe**

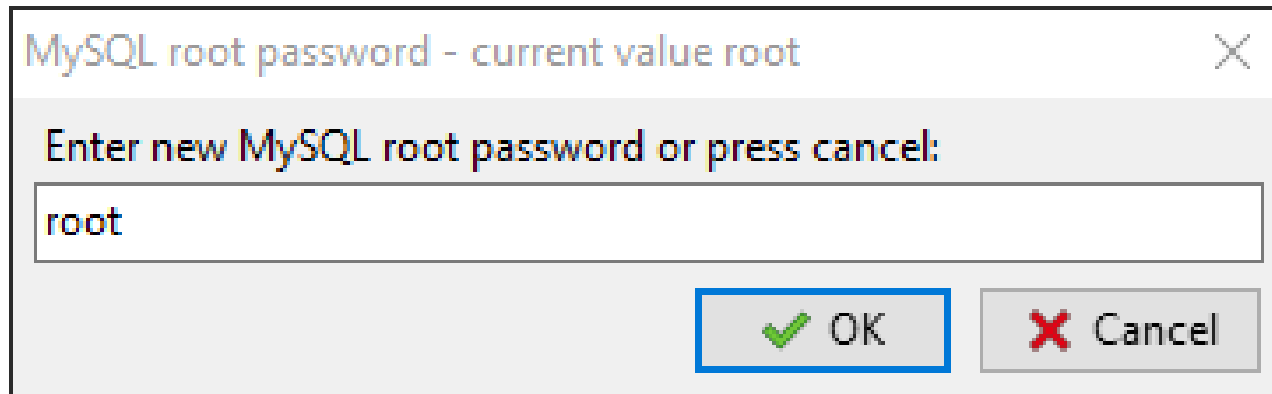


Start the servers (Apache + MySQL)



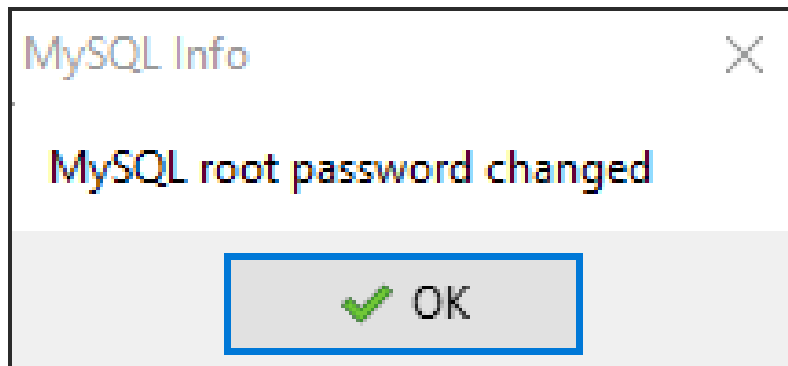
Set password-remember this

root – is set as the password

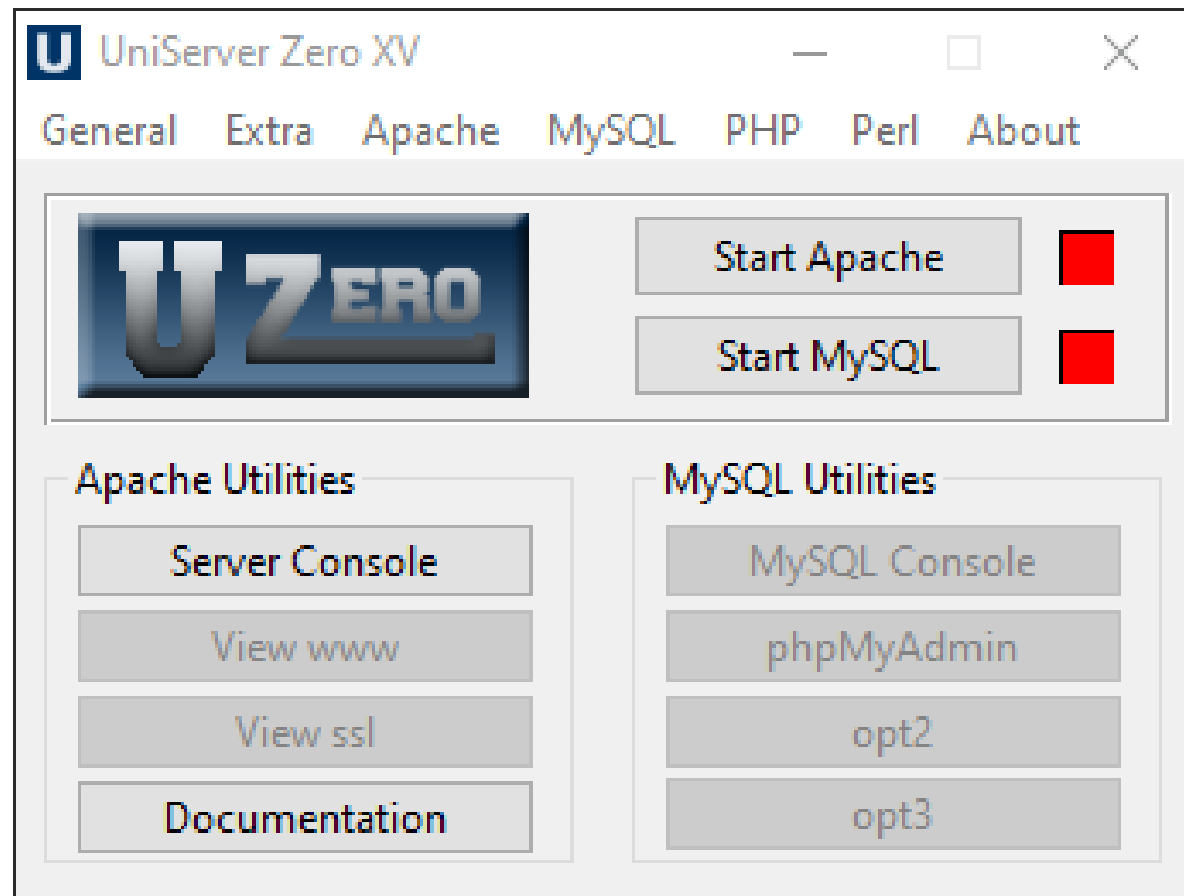


A screenshot of a MySQL root password dialog box. The title bar reads "MySQL root password - current value root" with a close button (X) on the right. The main text says "Enter new MySQL root password or press cancel:". Below this is a text input field containing the word "root". At the bottom right are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon. The "OK" button is highlighted with a blue border.

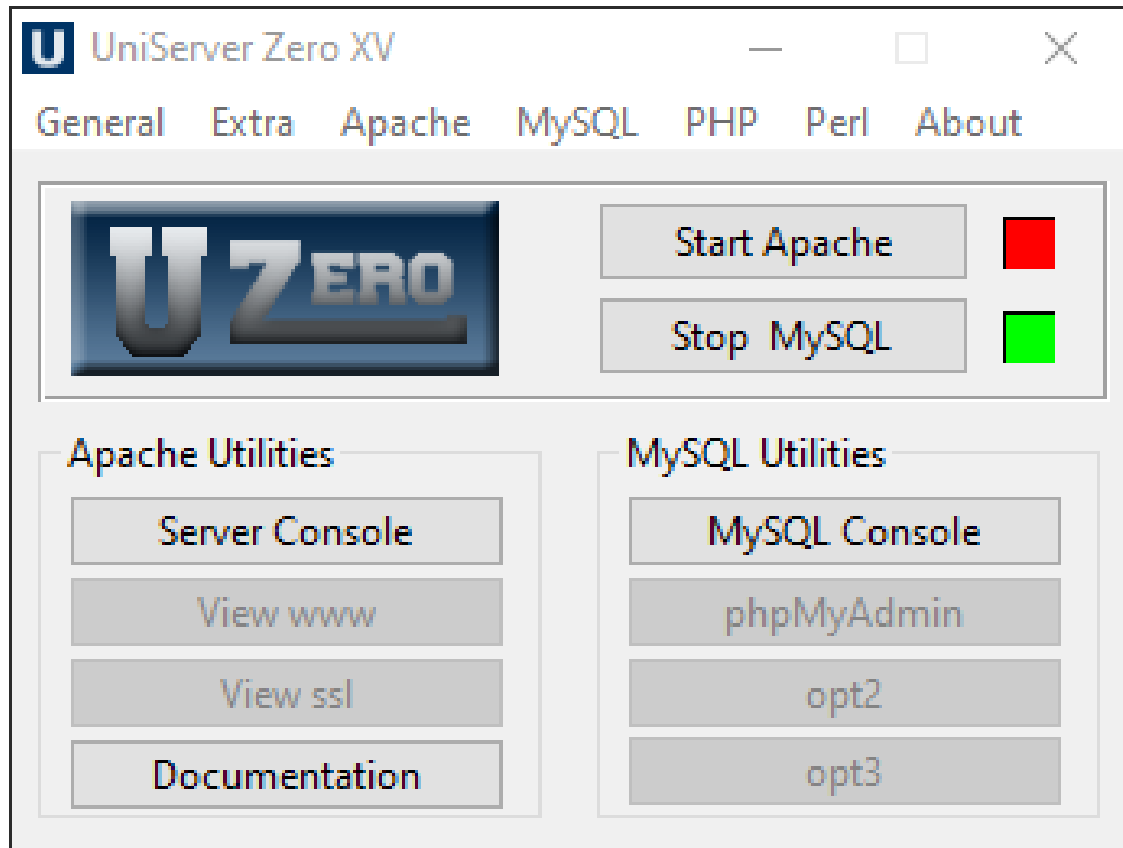
Password changed



In UniController click **Start MySQL**



Click **MySQL Console** in UniController.



MySQL Console

```
C:\> "SERVER MySQL Command Console" - mysql.exe --host=localhost --port=3306 --user=root --password=root

mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.2.0 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

USE school_db;

```
"SERVER MySQL Command Console" - mysql.exe --host=localhost --port=3306 --user=root --password=root
mysql> USE school_db;
Database changed
mysql>
```

Create the database and two tables (students + courses)

CREATE DATABASE IF NOT EXISTS school_db;

```
C:\> "SERVER MySQL Command Console" - mysql.exe --host=localhost --port=3306 --user=root --password=root

mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.2.0 MySQL Community Server - GPL

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Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE IF NOT EXISTS school_db;
Query OK, 1 row affected (0.02 sec)

mysql>
```

Create students table

```
CREATE TABLE students (  
    StudentID INT PRIMARY KEY,  
    FirstName VARCHAR(50),  
    LastName VARCHAR(50),  
    Email VARCHAR(100) UNIQUE,  
    PhoneNumber VARCHAR(20)  
);
```

```
C:\ "SERVER MySQL Command Console" - mysql.exe --host=localhost --port=3306  
mysql> USE school_db;  
Database changed  
mysql> CREATE TABLE students (  
    -> StudentID INT PRIMARY KEY,  
    -> FirstName VARCHAR(50),  
    -> LastName VARCHAR(50),  
    -> Email VARCHAR(100) UNIQUE,  
    -> PhoneNumber VARCHAR(20)  
    -> );  
Query OK, 0 rows affected (0.32 sec)  
  
mysql>
```

View students table

describe students;

```
Ca: "SERVER MySQL Command Console" - mysql.exe --host=localhost --port=3306 --user=root --pas
mysql> USE school_db;
Database changed
mysql> CREATE TABLE students (
  ->   StudentID INT PRIMARY KEY,
  ->   FirstName VARCHAR(50),
  ->   LastName VARCHAR(50),
  ->   Email VARCHAR(100) UNIQUE,
  ->   PhoneNumber VARCHAR(20)
  -> );
Query OK, 0 rows affected (0.32 sec)

mysql> describe students;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| StudentID  | int           | NO   | PRI | NULL    |       |
| FirstName  | varchar(50)   | YES  |     | NULL    |       |
| LastName   | varchar(50)   | YES  |     | NULL    |       |
| Email      | varchar(100)  | YES  | UNI | NULL    |       |
| PhoneNumber | varchar(20)   | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.50 sec)

mysql>
```

Create and view courses table

```
CREATE TABLE courses (  
  CourseCode VARCHAR(10) PRIMARY KEY,  
  CourseName VARCHAR(100) NOT NULL  
);
```

```
describe courses;
```

```
mysql> CREATE TABLE courses (  
->   CourseCode VARCHAR(10) PRIMARY KEY,  
->   CourseName VARCHAR(100) NOT NULL  
-> );  
Query OK, 0 rows affected (0.17 sec)
```

```
mysql> describe courses;
```

Field	Type	Null	Key	Default	Extra
CourseCode	varchar(10)	NO	PRI	NULL	
CourseName	varchar(100)	NO		NULL	

```
2 rows in set (0.01 sec)
```

```
mysql>
```

INSERT 3 datasets for students

```
INSERT INTO students (StudentID, FirstName, LastName, Email, PhoneNumber)
VALUES
```

```
(101, 'Alice', 'Brown', 'alice@email.com', '1234567890'),
(102, 'Bob', 'Smith', 'bob@email.com', '9876543210'),
(103, 'Charlie', 'Davis', 'charlie@email.com', '5556667777');
```

```
mysql> INSERT INTO students (StudentID, FirstName, LastName, Email, PhoneNumber) VALUES
-> (101, 'Alice', 'Brown', 'alice@email.com', '1234567890'),
-> (102, 'Bob', 'Smith', 'bob@email.com', '9876543210'),
-> (103, 'Charlie', 'Davis', 'charlie@email.com', '5556667777');
Query OK, 3 rows affected (0.08 sec)
Records: 3 Duplicates: 0 Warnings: 0
```

View datasets from students table

```
Select * from students;
```

```
mysql> select * from students;
```

StudentID	FirstName	LastName	Email	PhoneNumber
101	Alice	Brown	alice@email.com	1234567890
102	Bob	Smith	bob@email.com	9876543210
103	Charlie	Davis	charlie@email.com	5556667777

3 rows in set (0.01 sec)

```
mysql>
```

INSERT 3 datasets for courses

```
INSERT INTO courses (CourseCode, CourseName) VALUES  
('CSE101', 'Introduction to Computer Science'),  
('MAT201', 'Calculus II'),  
('ENG105', 'English');
```

```
mysql> INSERT INTO courses (CourseCode, CourseName) VALUES  
-> ('CSE101', 'Introduction to Computer Science'),  
-> ('MAT201', 'Calculus II'),  
-> ('ENG105', 'English Composition');  
Query OK, 3 rows affected (0.01 sec)  
Records: 3  Duplicates: 0  Warnings: 0  
  
mysql>
```

view datasets from courses table

```
SELECT * FROM courses;
```

```
mysql> SELECT * FROM courses;
```

CourseCode	CourseName
CSE101	Introduction to Computer Science
ENG105	English Composition
MAT201	Calculus II

```
3 rows in set (0.00 sec)
```

```
mysql>
```

Create enrollments table

```
CREATE TABLE enrollments (  
  StudentID INT NOT NULL,  
  CourseCode VARCHAR(10) NOT NULL,  
  EnrollmentDate DATE NOT NULL,  
  PRIMARY KEY (StudentID, CourseCode),  
  FOREIGN KEY (StudentID) REFERENCES students(StudentID)  
    ON UPDATE CASCADE  
    ON DELETE CASCADE,  
  FOREIGN KEY (CourseCode) REFERENCES courses(CourseCode)  
    ON UPDATE CASCADE  
    ON DELETE CASCADE  
);
```

Create enrollments table

ON UPDATE CASCADE

If the StudentID value in the parent table (students) changes (e.g., you update a StudentID from 101 → 201), MySQL automatically updates the StudentID in all matching rows in the child table (enrollments) so the link stays valid.

ON DELETE CASCADE

If a row in the parent table is deleted (e.g., you delete student 101), MySQL automatically deletes all related rows in the child table (all enrollments for that student).

Create enrollments table

```
mysql> CREATE TABLE enrollments (  
->   StudentID INT NOT NULL,  
->   CourseCode VARCHAR(10) NOT NULL,  
->   EnrollmentDate DATE NOT NULL,  
->   PRIMARY KEY (StudentID, CourseCode),  
->   FOREIGN KEY (StudentID) REFERENCES students(StudentID)  
->     ON UPDATE CASCADE  
->     ON DELETE CASCADE,  
->   FOREIGN KEY (CourseCode) REFERENCES courses(CourseCode)  
->     ON UPDATE CASCADE  
->     ON DELETE CASCADE  
-> );
```

Query OK, 0 rows affected (0.15 sec)

```
mysql> █
```

View enrollments table

Describe enrollments;

```
mysql> describe enrollments;
```

Field	Type	Null	Key	Default	Extra
StudentID	int	NO	PRI	NULL	
CourseCode	varchar(10)	NO	PRI	NULL	
EnrollmentDate	date	NO		NULL	

```
3 rows in set (0.02 sec)
```

```
mysql>
```

Insert datasets in enrollments table

INSERT INTO enrollments (StudentID, CourseCode, EnrollmentDate) VALUES

(101, 'CSE101', '2025-01-10'),
(101, 'MAT201', '2025-01-12'),
(102, 'CSE101', '2025-01-10');

```
mysql> INSERT INTO enrollments (StudentID, CourseCode, EnrollmentDate) VALUES  
-> (101, 'CSE101', '2025-01-10'),  
-> (101, 'MAT201', '2025-01-12'),  
-> (102, 'CSE101', '2025-01-10');  
Query OK, 3 rows affected (0.02 sec)  
Records: 3  Duplicates: 0  Warnings: 0
```

View datasets from enrollments table

SELECT * FROM enrollments;

```
mysql> select * from enrollments;
```

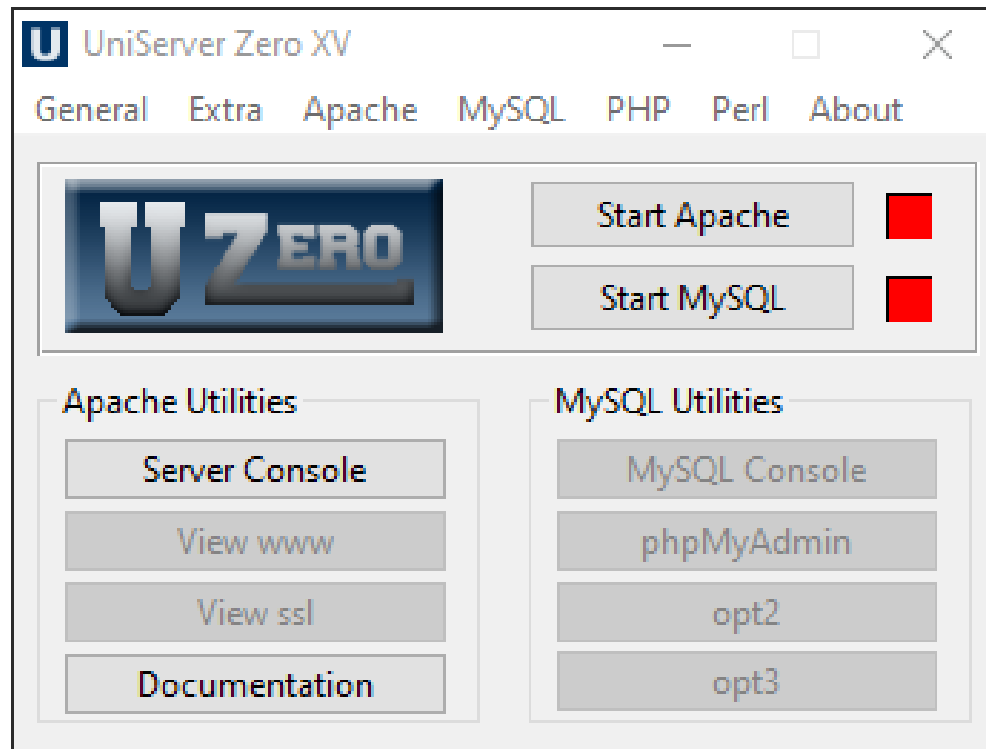
StudentID	CourseCode	EnrollmentDate
101	CSE101	2025-01-10
101	MAT201	2025-01-12
102	CSE101	2025-01-10

```
3 rows in set (0.00 sec)
```

```
mysql>
```

Stop servers when done

In UniController click **Stop MySQL**



Practice

Create a new database library_activity, three tables (authors, books, borrowers), and inserts three sample rows in each

See instructions in Moodle Week 1

Further Reading :

Chapter 1: Introduction to Databases

Chapter 2 Database Environment

Chapter 4.2.5 Relational Keys

Database Systems: A Practical Approach to
Design, Implementation, and Management
Sixth edition by

• Thomas Connolly • Carolyn Begg