Lab: Unit 01 – Introduction

# Overview

In this lab we will learn how to install, configure and access the database management system and its supporting tools.

## Learning Objectives

Upon completion of the lab, you should be able to:

* Use docker to start, stop, and troubleshoot the lab environment.
* Write queries using Azure Data Studio and SQLPad.
* Use the database provisioner to setup initial databases and add data.
* Connect to the Microsoft SQL Server DBMS using Azure Data Studio, SQLPad and Adminer.

## About the Lab Environment

There are several challenges to learning databases on a real database management system.

* You must go through the steps of installing the DBMS. Not something that is done every day.
* You have administrative access to the system and can easily screw things up.
* You have no sample databases to work from.
* Since you are learning, you might accidentally delete or update the data.

The lab environment I’ve created for you eliminates these problems. If you mess things up, you c an reset everything back to the way it was. It uses consistent tooling which will work on Windows, Mac, Linux and even a Chromebook. Sample databases are included, and you can install /install them easily.

## How is this possible?

The lab environment uses docker <https://docker.com> to run the database management system and supporting applications in containers. Containers are virtualized applications which are pre-configured for you and can be turned on and off easily.

This repository contains docker configurations and base scripts necessary to provide a complete database management system with sample data and web-based tooling.

Use this software to accompany the Applied Database Management textbook, the Introduction to Database Management Systems course, or to just explore databases on your own!

## What’s included?

1. Microsoft SQL Server 2017 database management system.   
   <https://www.microsoft.com/en-us/sql-server/sql-server-2017>
2. SQL Pad a web-based query tool.   
   <https://rickbergfalk.github.io/sqlpad>
3. Adminer a web-based database admin tool.   
   <https://www.adminer.org/>
4. Database Provisioner Application for creating sample databases and populating data.

# Install it or use it?

One decision you are going to have to make early on is whether to install the lab environment on your own computer or just use the environment set up for you on the iSchool’s instance of Microsoft Azure Labs.

## Use It: Azure Lab Services

Azure Labs is a cloud-hosted Windows 10 computer containing the exact lab setup. Everything is setup for you so if you do not want to bother setting up docker, you are your computer cannot manage it, you can use this setup. It runs in the Azure cloud and is paid for by the iSchool.

<https://answers.syr.edu/display/ischool/Azure+Lab+Services+--+Students>

## Install It: One your own computer.

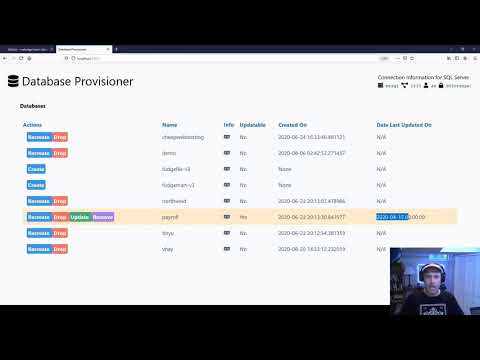
These instructions will guide you through the installation of the learn databases lab environment on your personal computer. If you want to have the lab environment beyond the score of the course, you should install it.

In installing on your computer, please read these instructions:

<https://github.com/mafudge/learn-databases>

# Walkthrough

This video demonstrates how to start, stop, and debug the docker environment and connect to Microsoft SQL Server through the Azure Data Studio, SQLPad and Adminer.

<https://youtu.be/CxCUrQ6knRo>   
[](https://www.youtube.com/embed/CxCUrQ6knRo?feature=oembed)

# Screen Shots 101

You will be asked to turn in screenshots along with your code as part of problem set submissions. Whenever prompted to provide a screenshot, you **must** include your NetID within the screenshot.

## Including Your NetID

For screen grabs, the easiest way to do this is open notepad or anotherother text editor, type in your NetID, and make sure that window is captured with the screenshot.

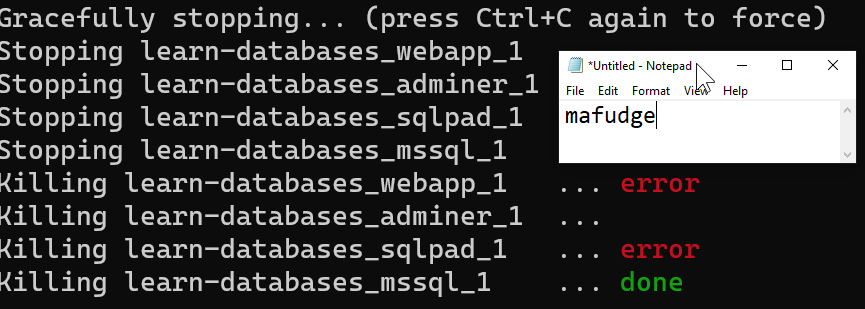


Figure 1 Sample screenshot with NetID displayed in notepad included.

## Screen Shots of Code You have Executed.

When taking a screenshot of code, it is not necessary to include notepad. Instead, just type your NetID as a code comment:

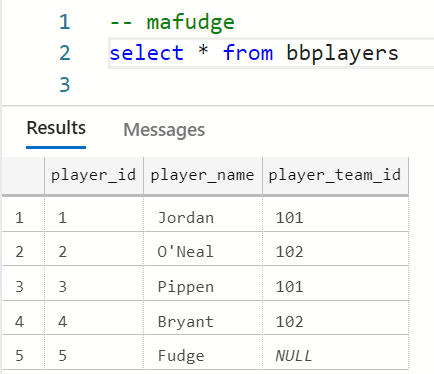


Figure 2 Sample screenshot with NetID in the code comments!

Code screenshots should **always** include evidence the code was executed (including the Results pane is sufficient) and include the text version of the code in addition to the screenshot.

## Be a Minimalist!

Do not include more screen in your screenshot than is necessary. Make sure your screenshot is legible. The best way to do this is to avoid full screen shots and instead focus on only what matters. Most screen shot utilities allow you to grab a region of the screen. Use that feature. For example, this is the full screen version of the previous screenshot. This screenshot is not particularly useful!

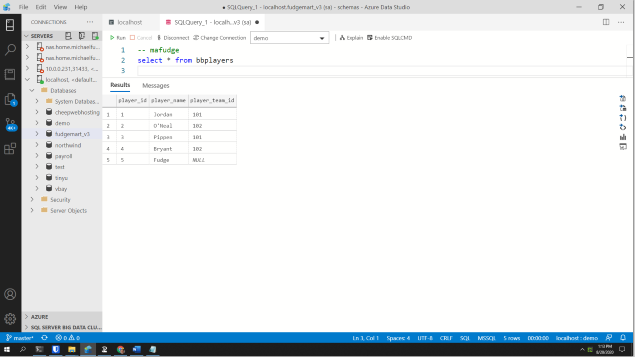


Figure 3 A not useful screenshot - because it’s the entire screen.

# Questions

Answer these questions using the problem set submission template.

1. Use docker-compose to start the containers. What is the command you typed to do this?
2. What is the command to show the running docker containers?
3. Provide a screenshot displaying evidence your containers are running (the output of the previous question should suffice).
4. Provision all the databases included in the Database provisioner application. Provide a screenshot as evidence they have been provisioned. Note: This might take some time so be patient!
5. Connect to MS SQL Server using azure data studio and provide a screenshot of the databases under the connection. This will provide evidence your connection works and your databases were provisioned.
6. Connect to MS SQL server using SQL Pad. Specifically connect to the **payroll** database and then run this query: select \* from department\_lookup  
   Include a screenshot of the query and output.
7. Connect to MS SQL server using Adminer, again connect to the **payroll** database. Include a screenshot of the structure of the **employees** table.
8. What is the command to shut down the running docker containers?
9. Provide a screenshot displaying evidence your containers are no longer running (the output of the previous question should suffice).