iOSA: An Open-Source Clinical and Multimedia Data Processing Tool for Obstructive Sleep Apnea Diagnosis

Installation Guide

Version 5.3.0

Contenido

System Requirements

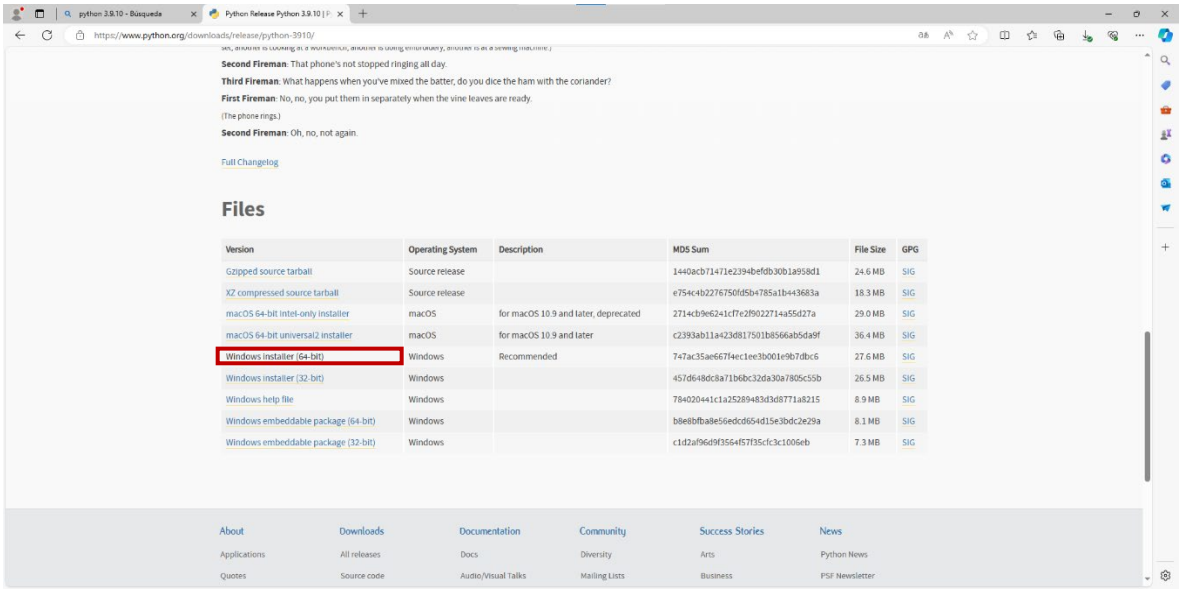
- OS: Windows 10 or greater
- Processor: Ryzen 7-3700u
- Memory: 8GB RAM
- Storage: 500 GB available space
- Network: Broadband Internet connection

Third-Party Software Installation

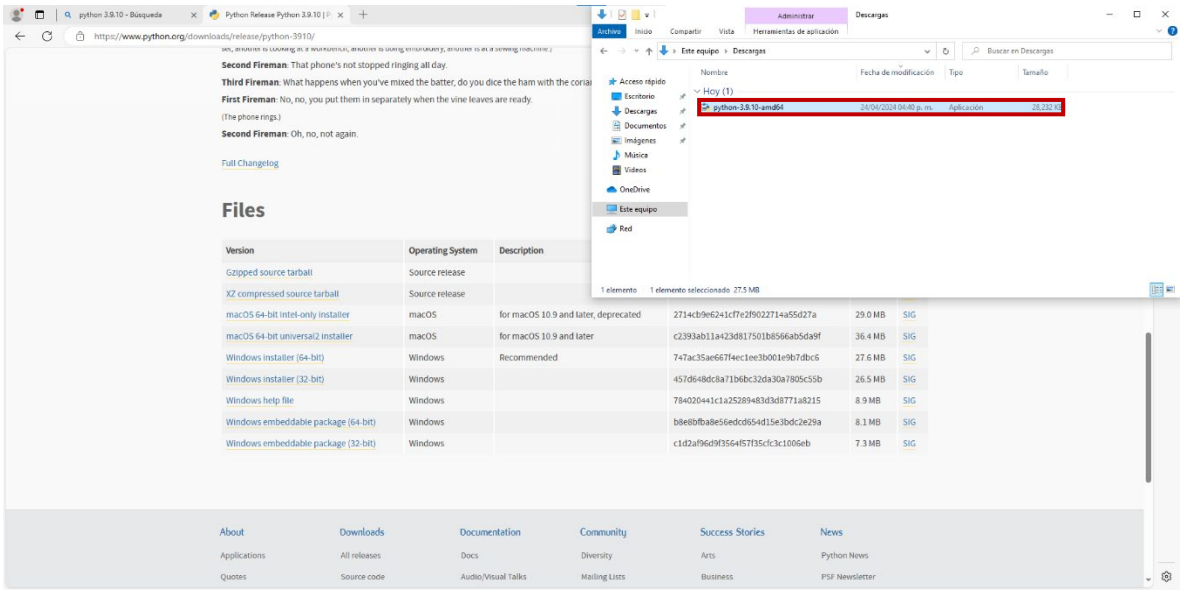
Python

It is necessary to download Python 3.9.10 or greater. It can be downloaded from: https://www.python.org/downloads/release/python-3910/

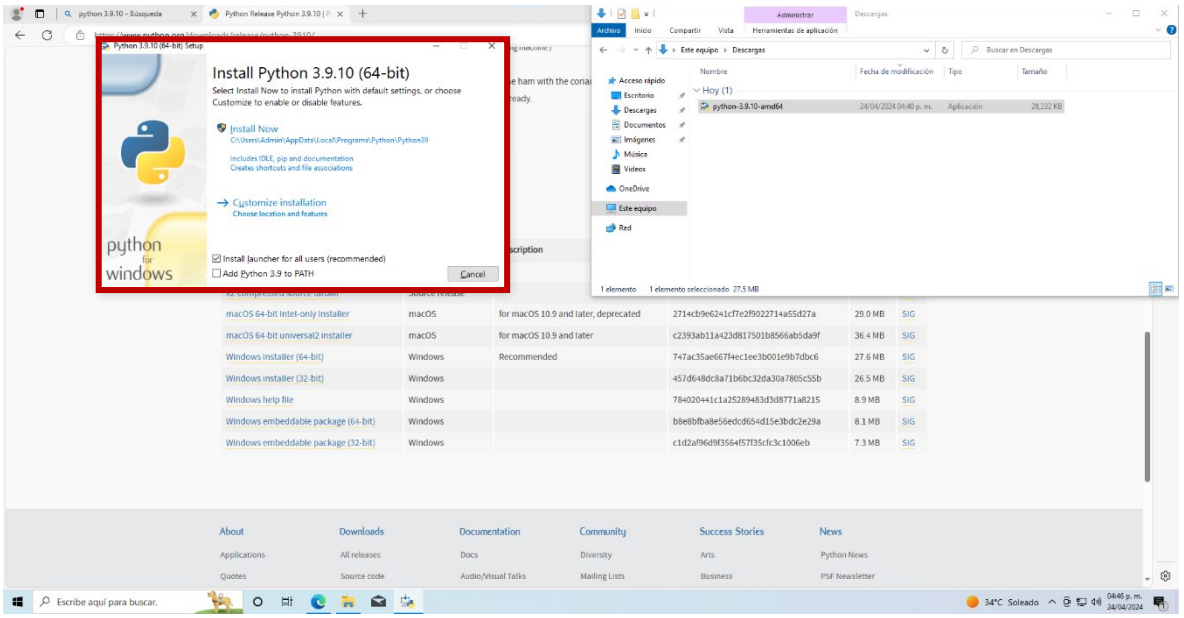
At the bottom of the page is the Windows installer. Click on the recommended installer (Windows installer 64-bit).



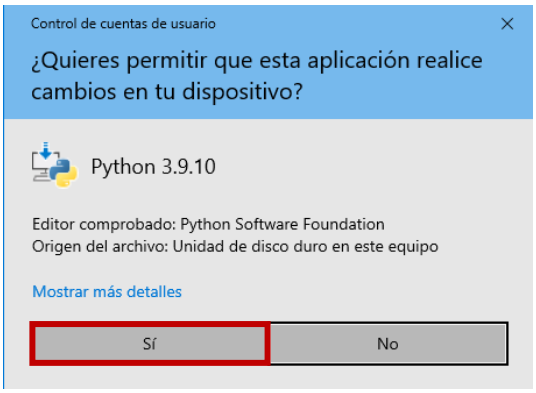
The installer will be automatically store on the “Download” folder. But the destination folder can also be selected manually. In this case, de installer is on the “Download" folder.



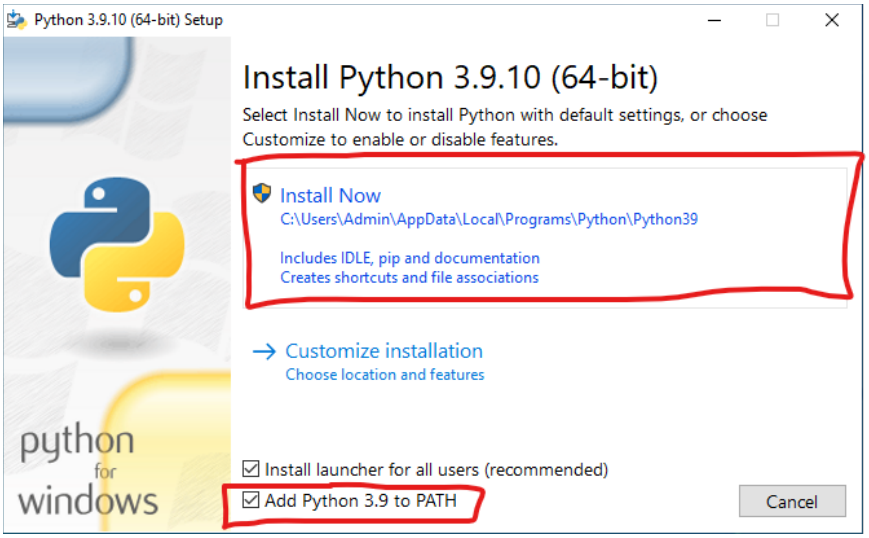
Once the installer was downloaded, press double click to execute it. With this, the python installation will start.

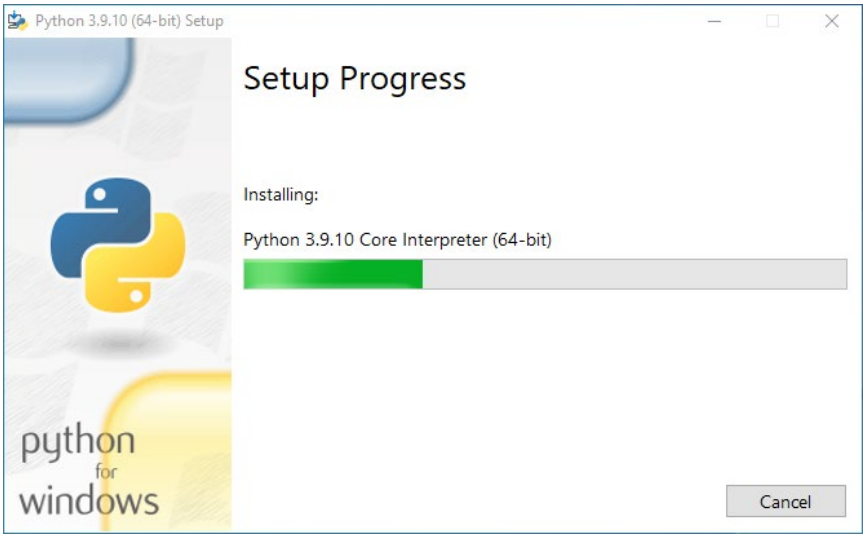


It may be a notification asking for administrative permission. If it appears, select the “Yes” option.

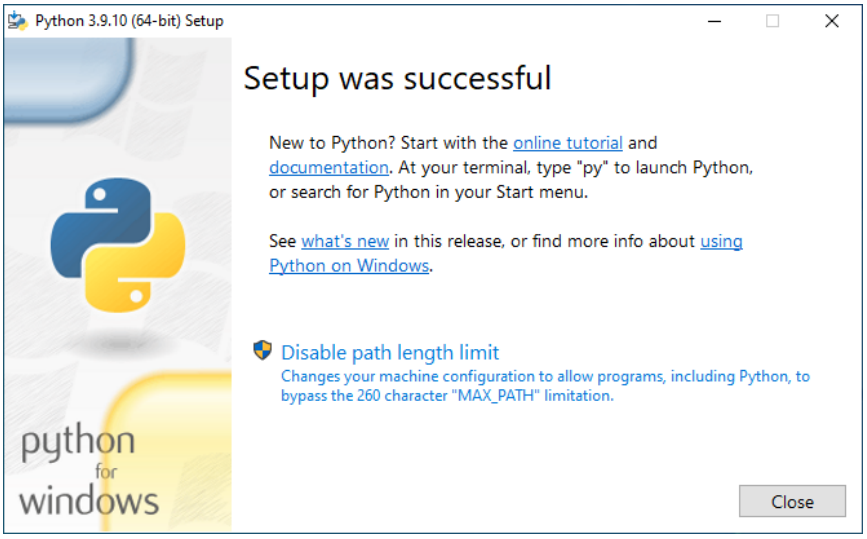


First check the checkbox that add python to the system PATH. Once it's checked, select the "Install Now" option and wait until the installation finish.





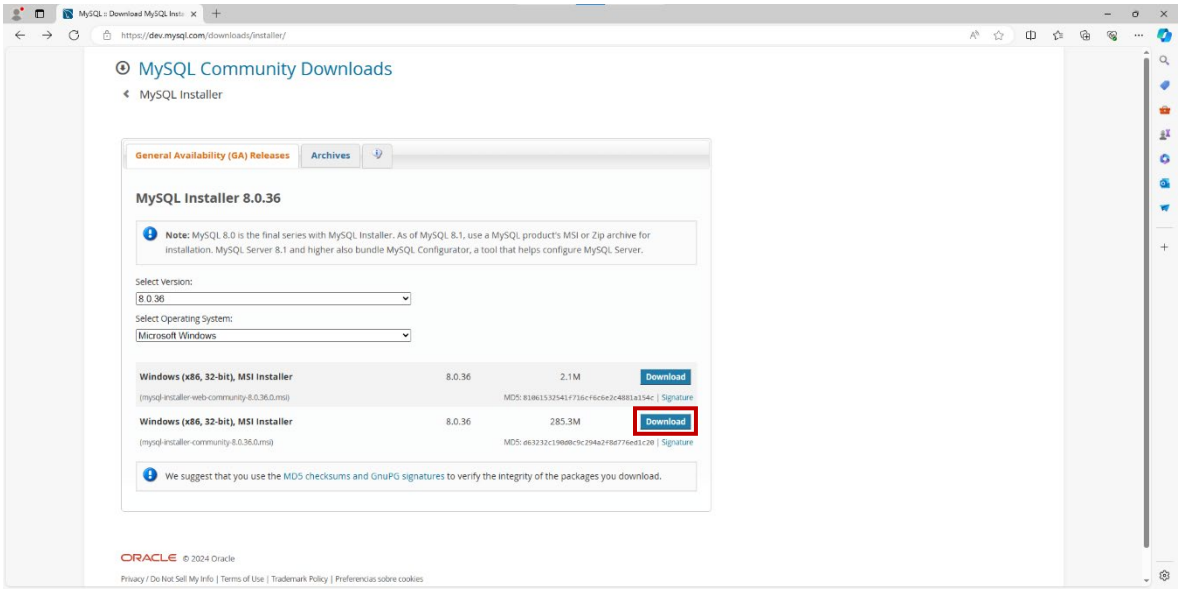
Finally, the Python successful screen appears. Now just click the “Close” button to close the installer.



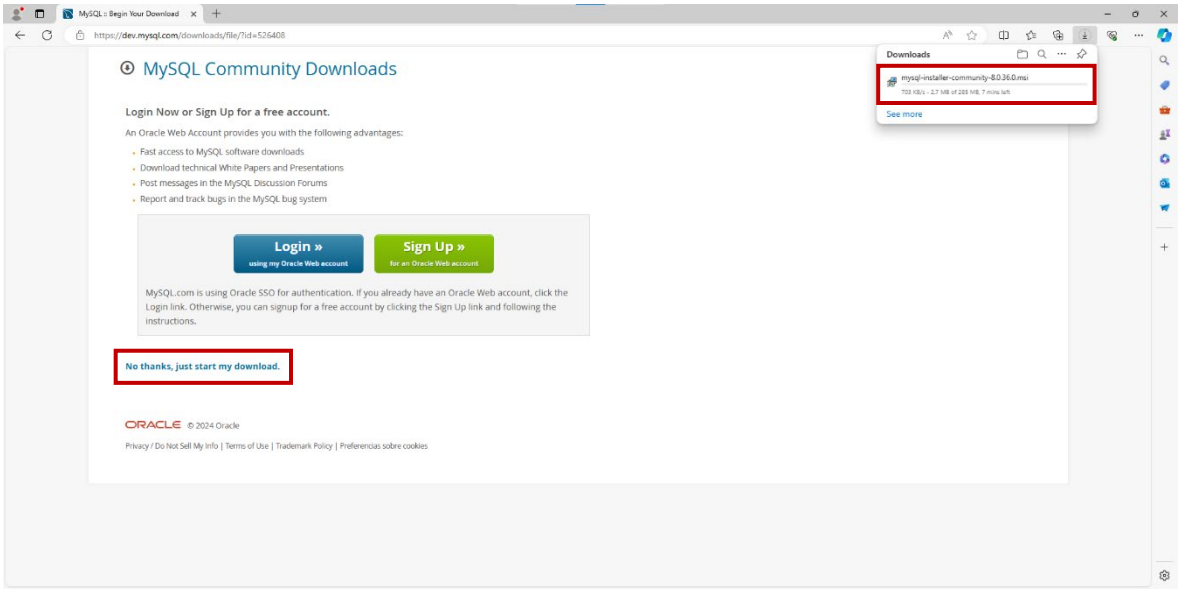
MySQL

It is necessary to download MySQL 8.0.36. It can be downloaded from: https://dev.mysql.com/downloads/installer/

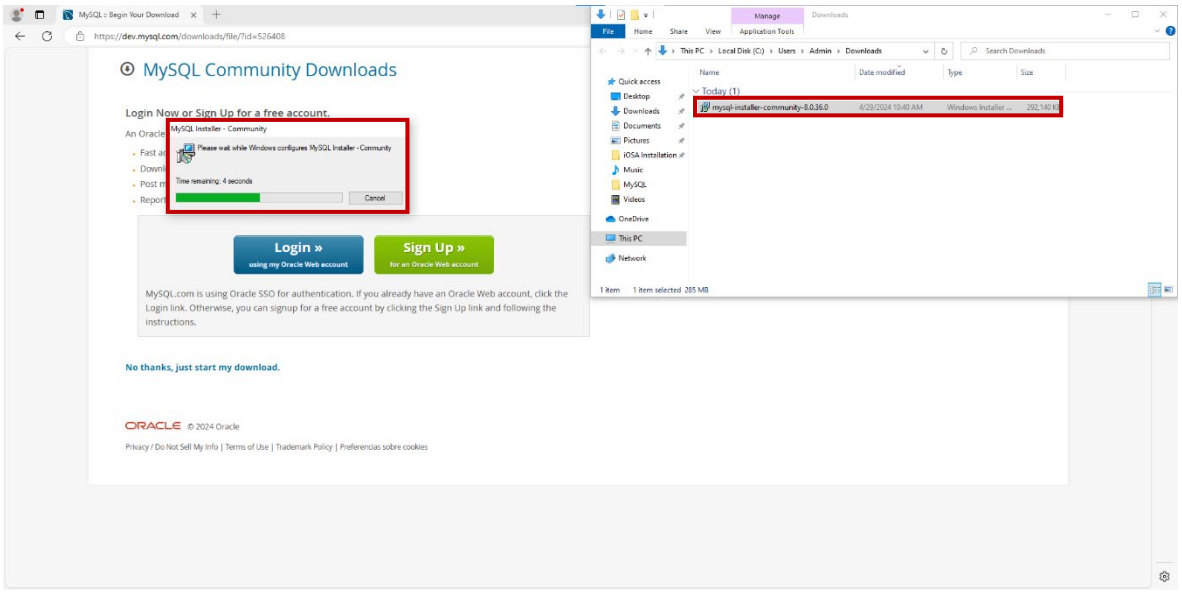
On the official page of MySQL select the “8.0.36” version and “Microsoft Windows” Operating System, then, select the second option and the page will be redirected to de download page.



The page will ask to log in, but it isn't necessary, click on the blue phrase "No thanks, just start my download" to start the download.



The download will start and be stored at the "Download" folder. But the destination folder can be selected if the computer shows a "Save file" dialog. Once the download finished double click on the installer to start the installation.



It may be a notification asking for administrative permission. If it appears, select the "Yes" option.

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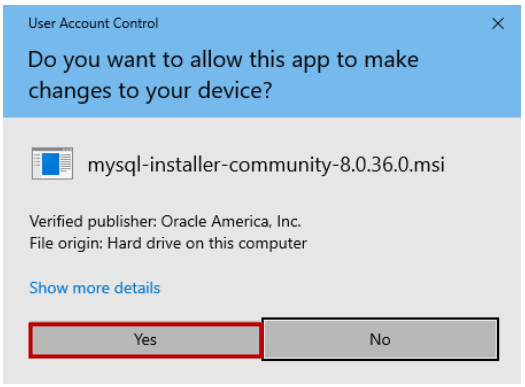
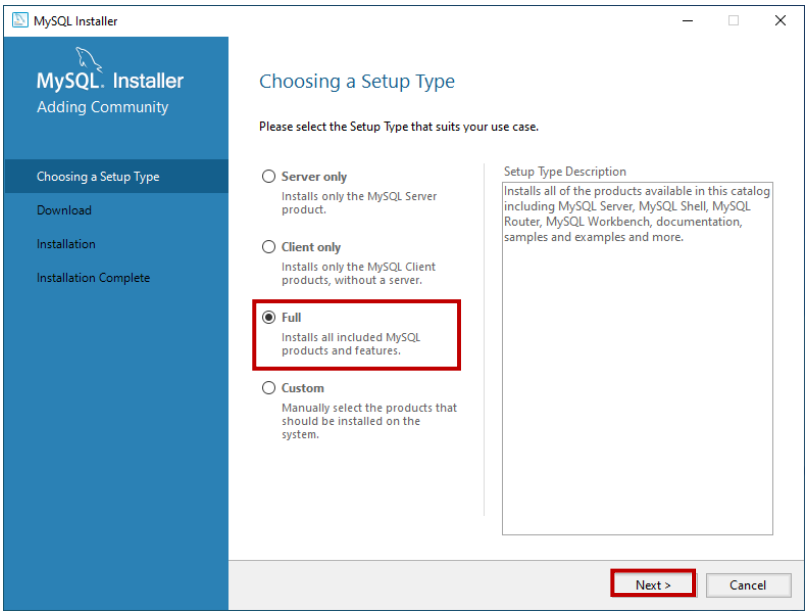
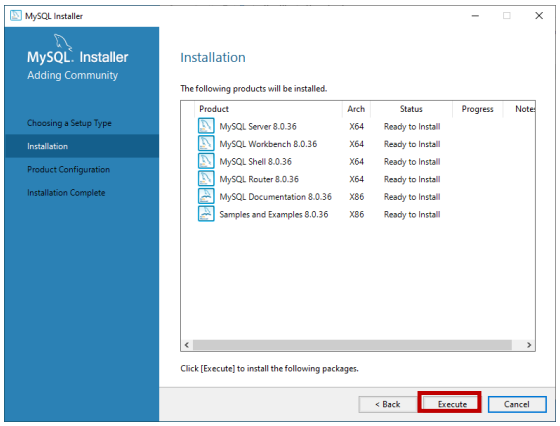
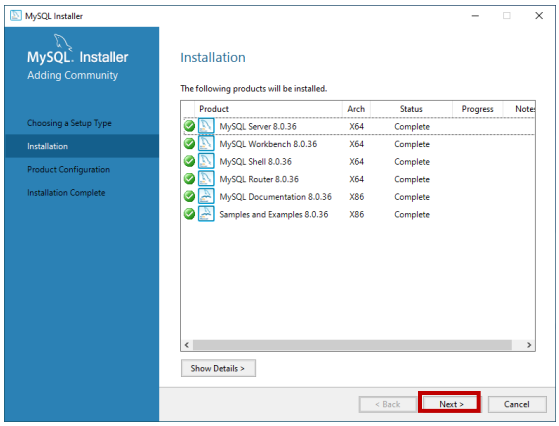


On the first installer screen select the “Full” setup type option and click on the “Next” button.

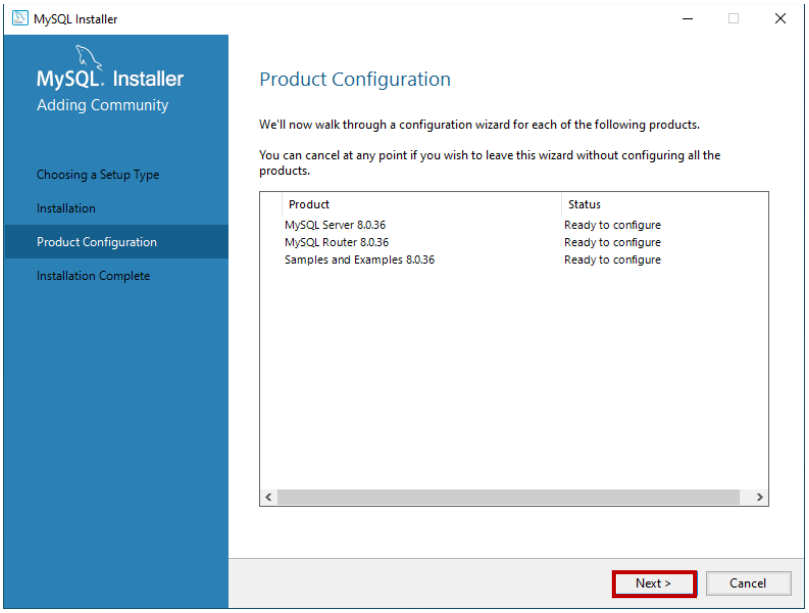


This will display all the products to be installed. Click on the “Execute” button and wait until the downloads and installations are completed. Once a green check mark is beside each product, click the “Next” button.

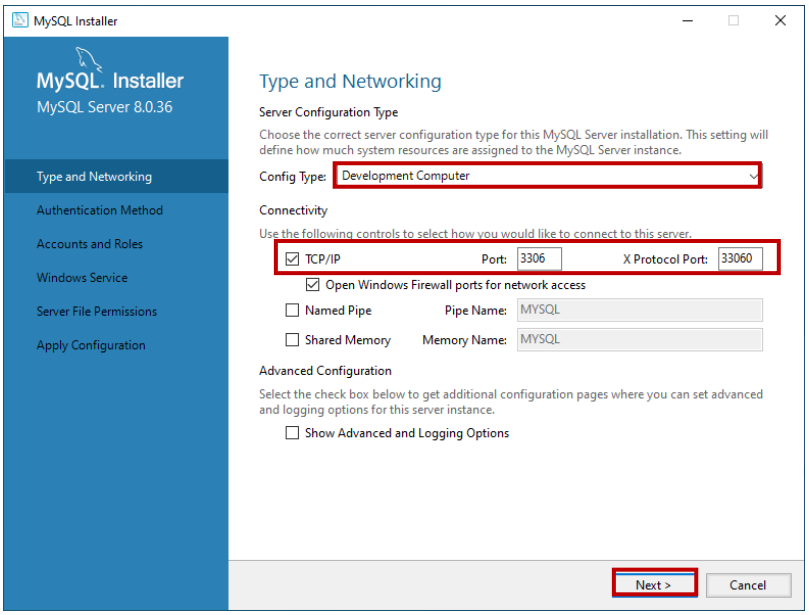




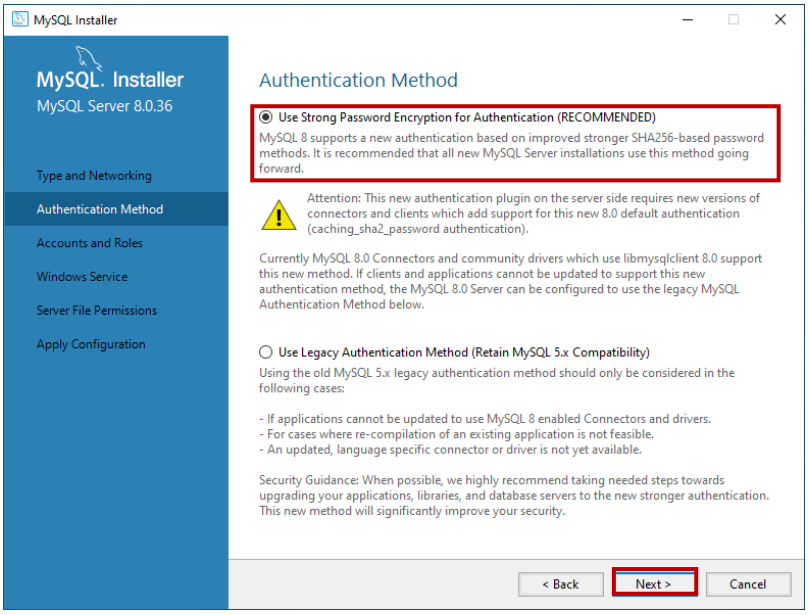
The next step is the “Product Configuration”, The first product is the MySQL server, so click on the “Next” button to start the configuration.



On the first screen leave the default values: on “Config Type” be sure the “Development Computer” is selected, the “TCP/IP” checked, the “Port” be “3306” and “X Protocol Port” as “33060”. Then, click on the “Next” button.



Next be sure to select the first option (the “RECOMMENDED” option) and click on the “Next” button.

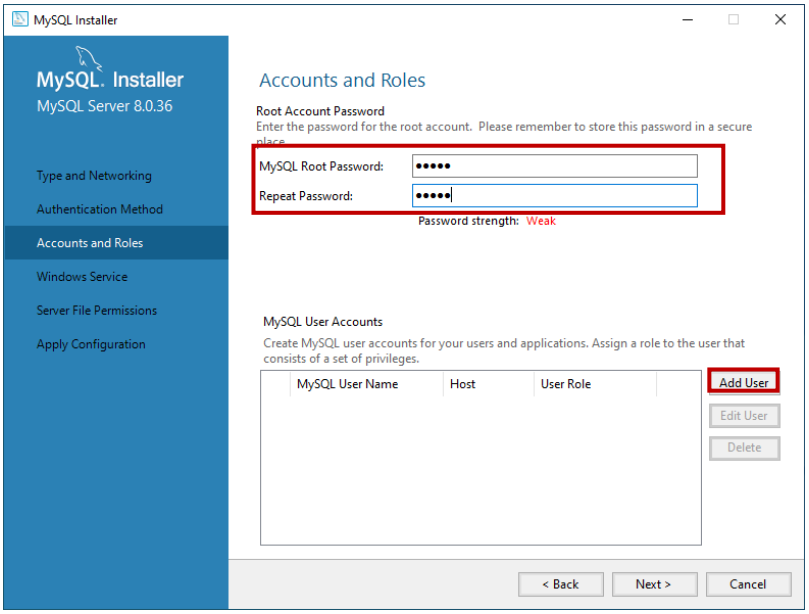


This next step is of highly importance, so be sure to follow the steps correctly.

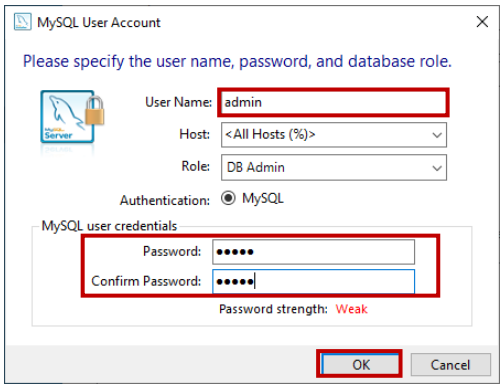
First, set the “MySQL root user” password as “admin” and write it again. If the person who is tasked with the system installation has the adequate knowledge about

MySQL, then the password can be set differently, but if not, is highly recommended to leave it as “admin”.

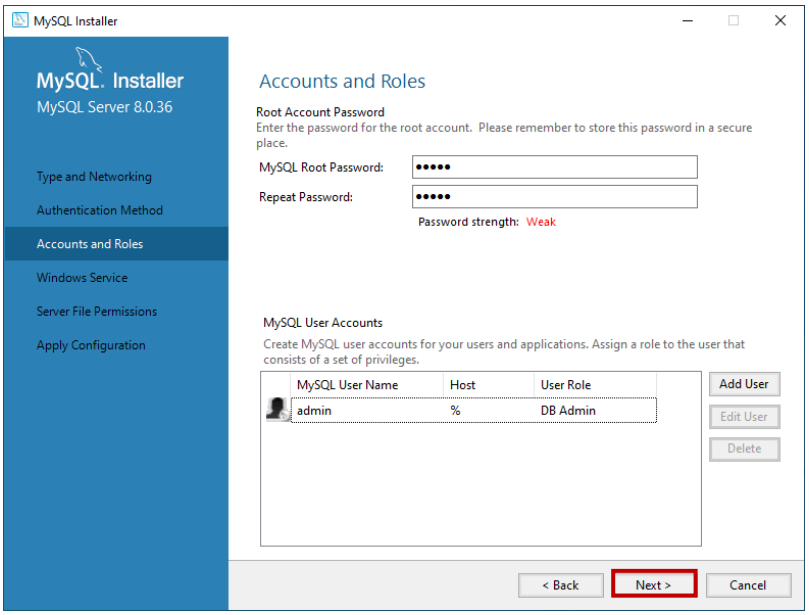
The second step is to setup the user the iOSA system will use to communicate with the database. Click on the “Add User” button.



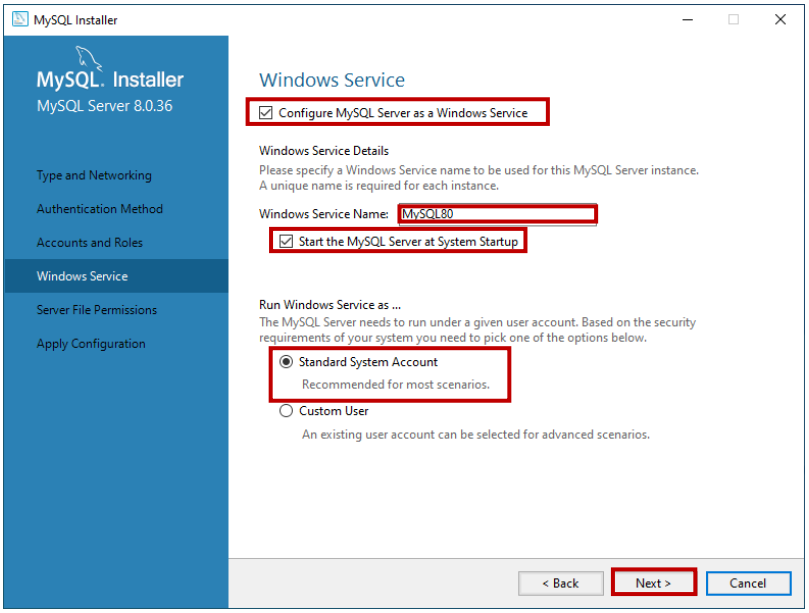
On the new displayed screen set the “User Name” as “admin” and the password also as “admin”. Finally, click the “Ok” button.



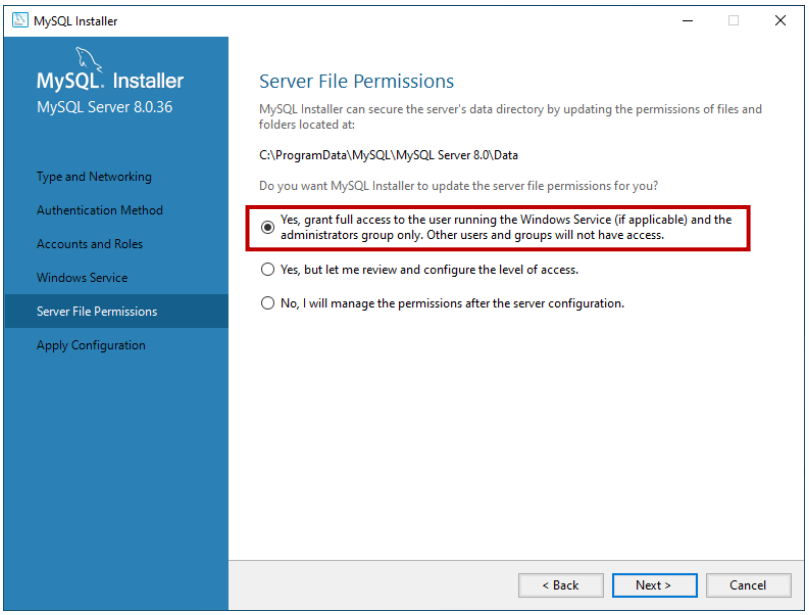
Again, remember to stablish both, the MySQL, and the user as its instructed, otherwise, the system will need to be configured manually. Because of this, please refrain of setting up another user and passwords. Then, click on the “Next” button.



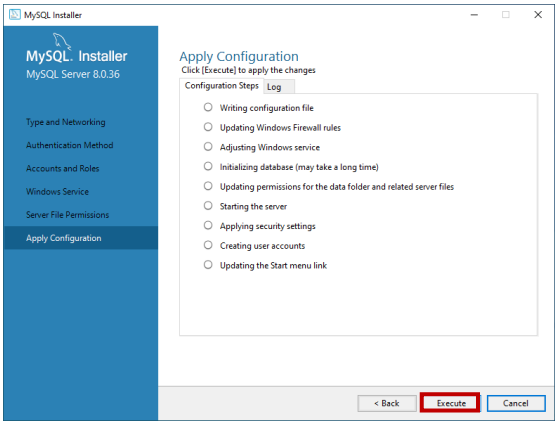
Next, set the MySQL server as a Windows Service on the “Configure MySQL as a Windows Server” checkbox. Leave the default “Windows Service Name”. check the “Start the MySQL Server at System Startup”. This will make the MySQL server is always active once the computer starts. Then, click on the “Next” button.

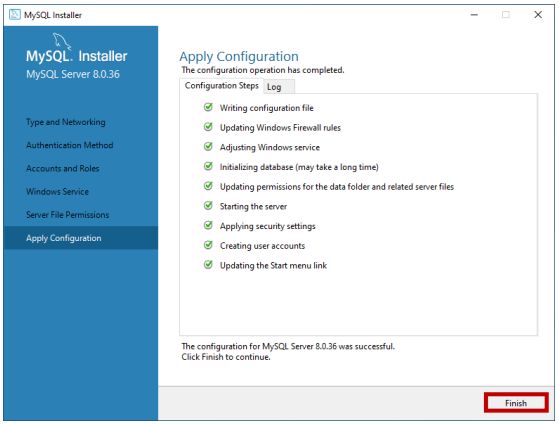


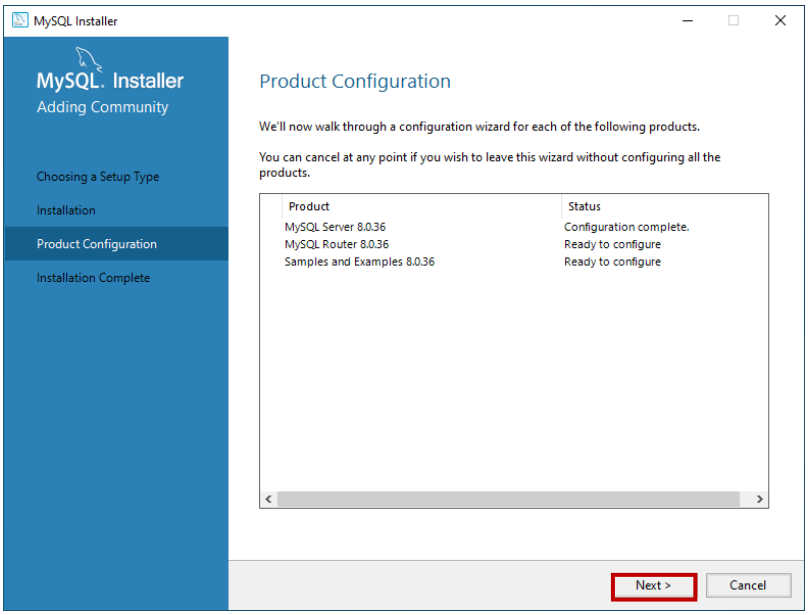
Grant, full permissions for the server, which is the first option and then click on the “Next” button.



Finaly, click on the “Execute” button to start the final configurations and when all have a green check mark, click on the “Finish” button.

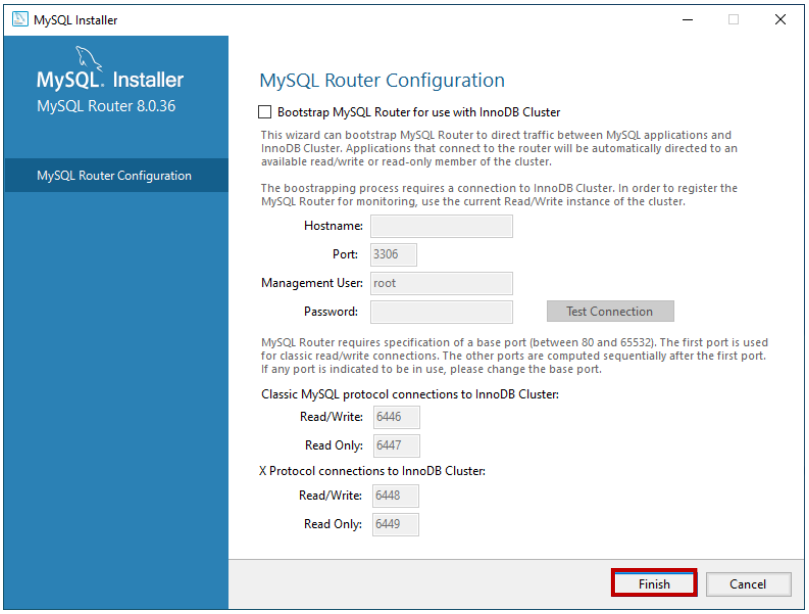




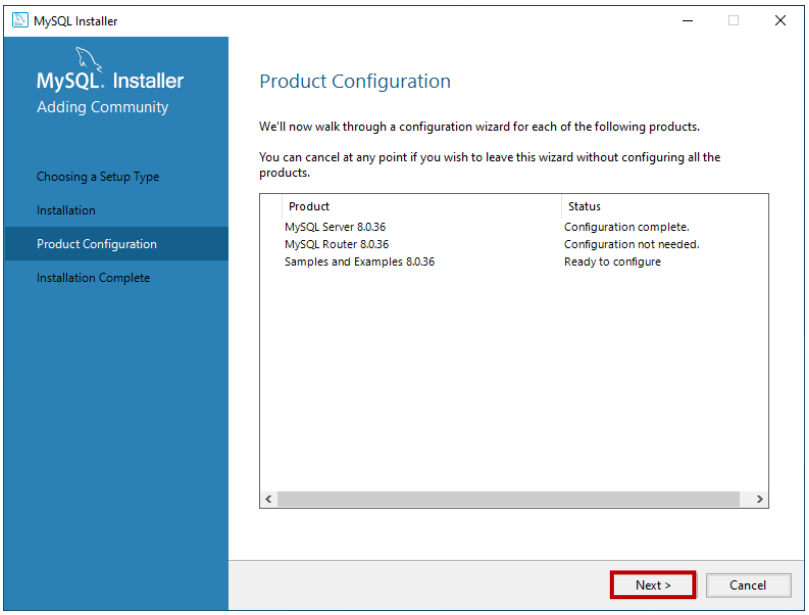


Again, on the “Product Configuration” screen click on the “Next” button for the router configuration.

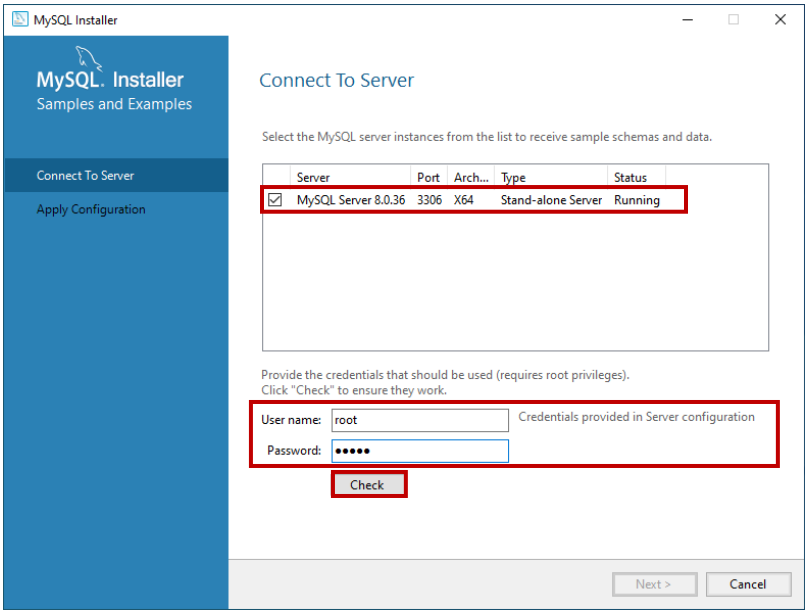
For the router, it isn’t necessary to configure anything. So leave all with their default values and click on the “Finish” button.



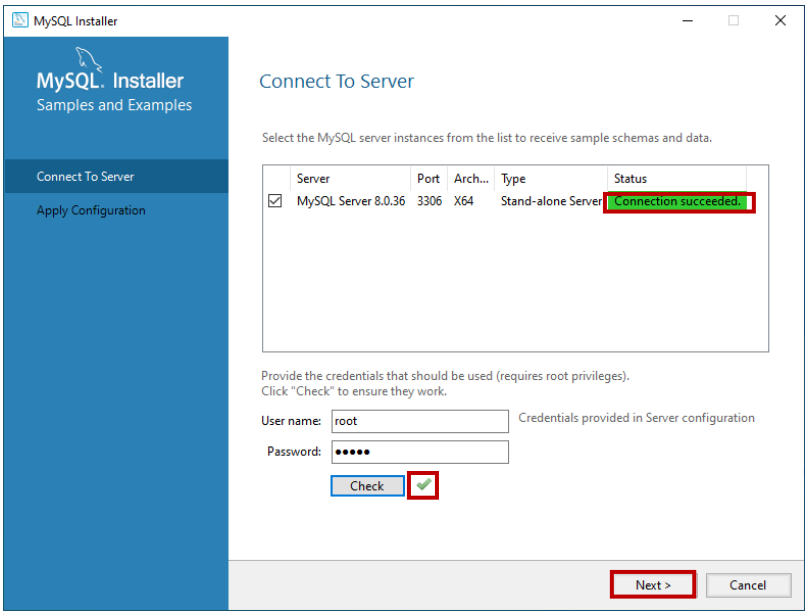
Lastly, click on the “Next button" for the last configuration product.



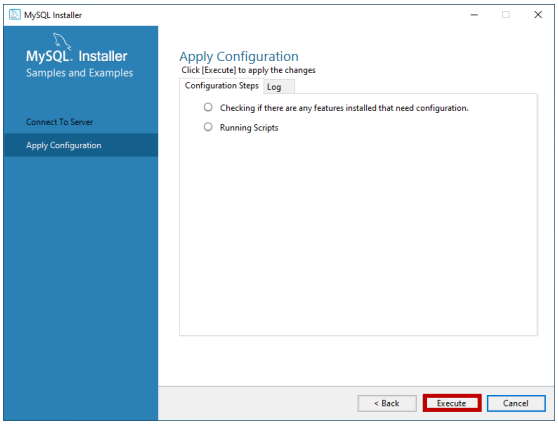
Select the “MySQL Server” checkbox and enter the password for the MySQL user that was setup before (on this case “admin”) and click on the “Check” button.

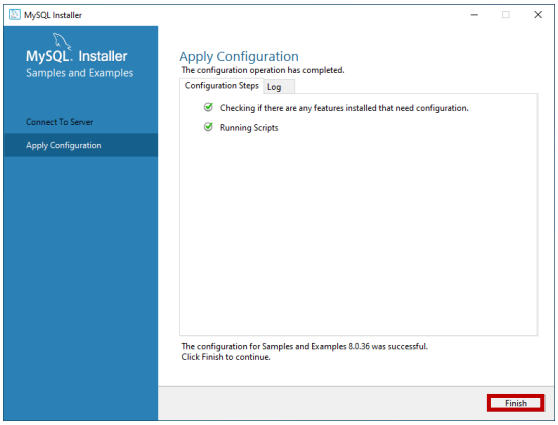


This will check if the server is working and if the password was established correctly. If everything is green, then click on the “Next” button.

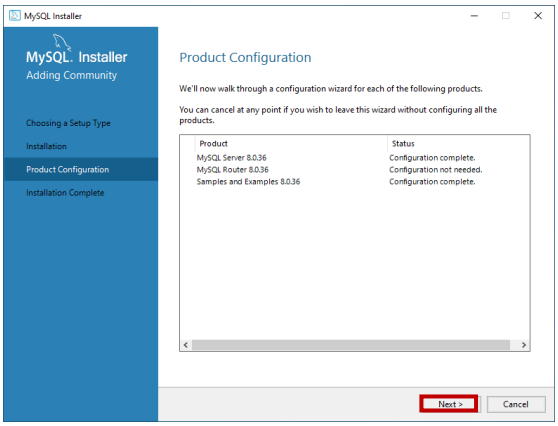


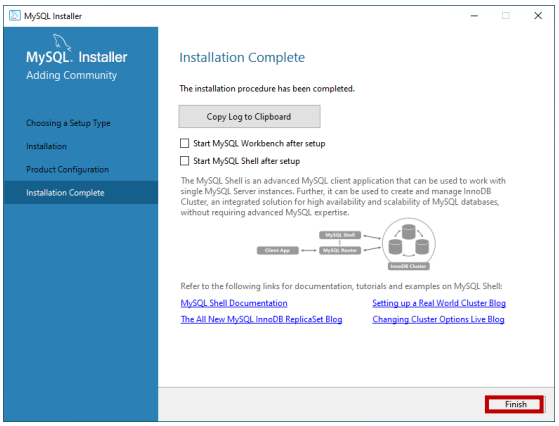
Then, click on the “Execute” button to set all the selected configurations on the server. Once all is setup, click on the “Next” button.





Finally click on the “Next" button and lastly on the “Finish” With this, the installation of MySQL is completed.

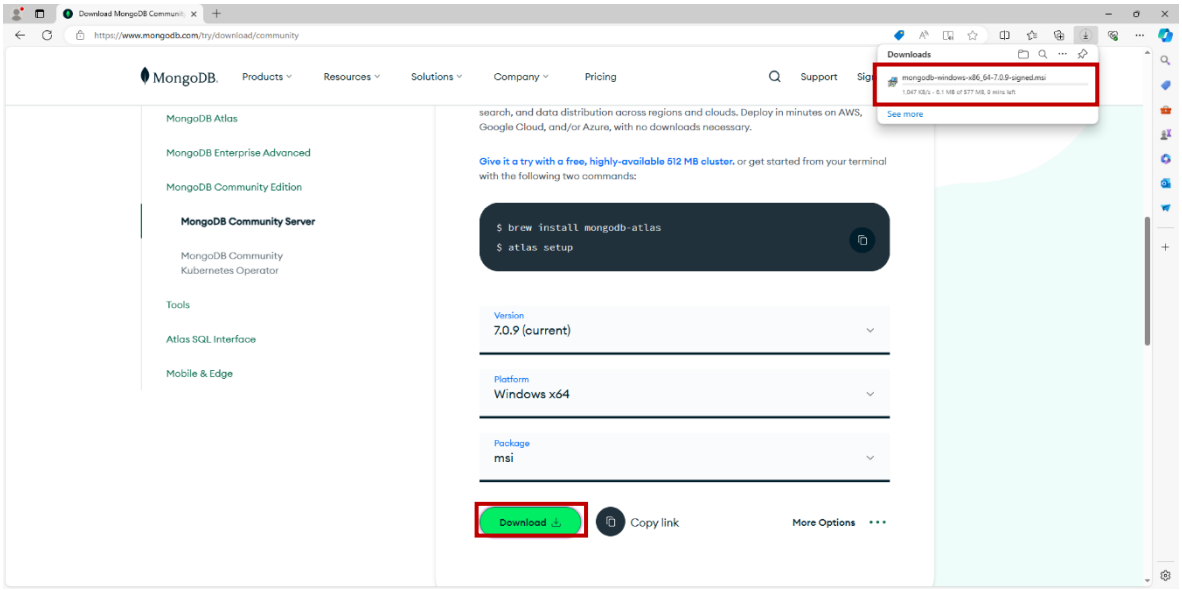




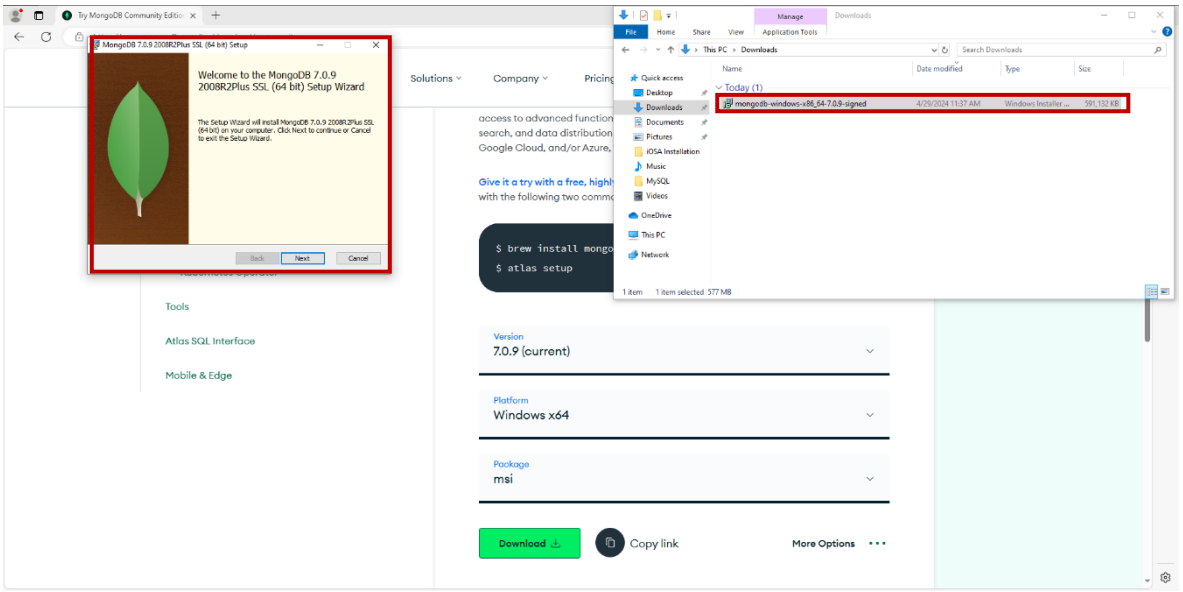
MongoDB

It is necessary to download MongoDB 7.0.9 or equivalent. It can be downloaded from: https://www.mongodb.com/try/download/community

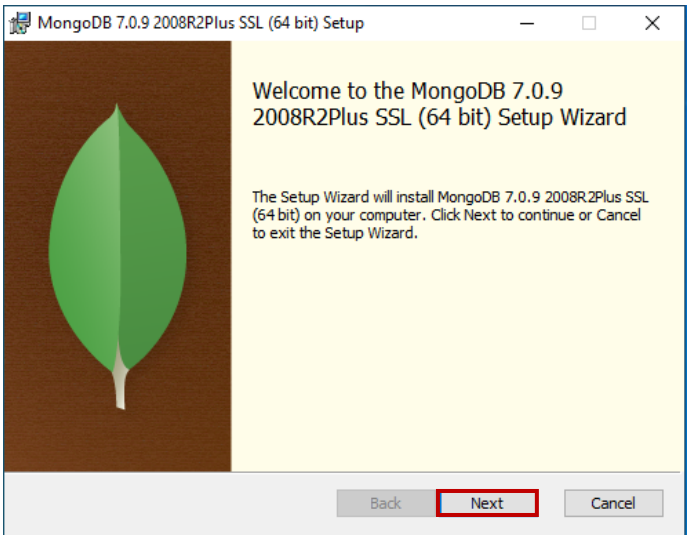
On the official website, scroll to the download section. Be sure to select the "7.0.9" version for "Windows" and the "MSI" package. Click on the "download" button.



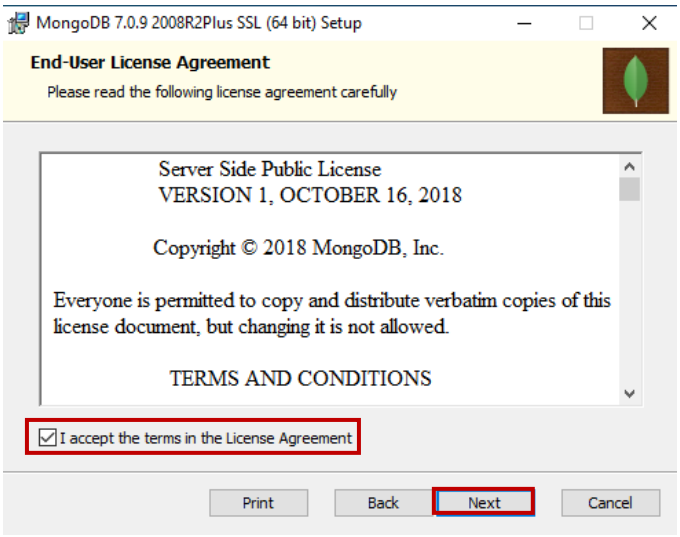
The download will start and be stored at the "Download" folder. But the destination folder can be selected if the computer shows a "Save file" dialog. Once the download is finished double click on the installer to start the installation.



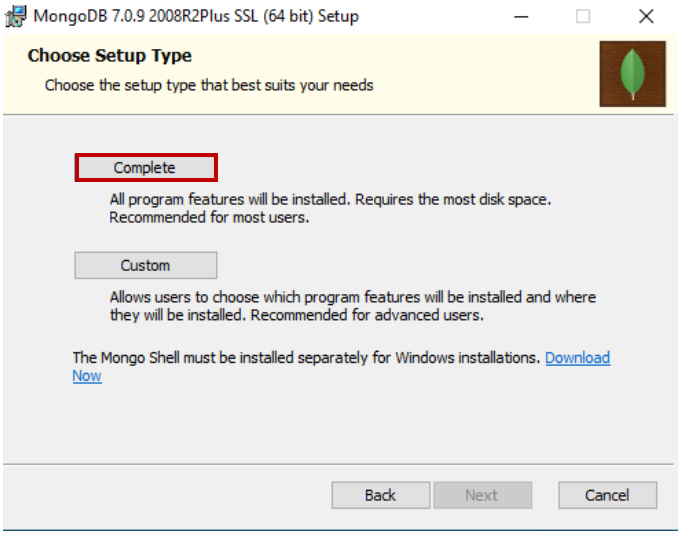
The first screen of the installer is a presentation of MongoDB. Click on the “Next” button to start the installation.



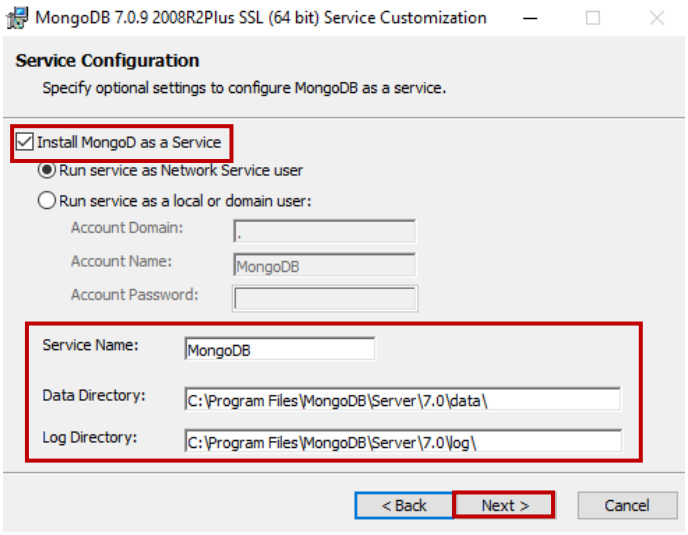
Mark the checkbox to accept the License of Agreement and then, click on the “Next” button.



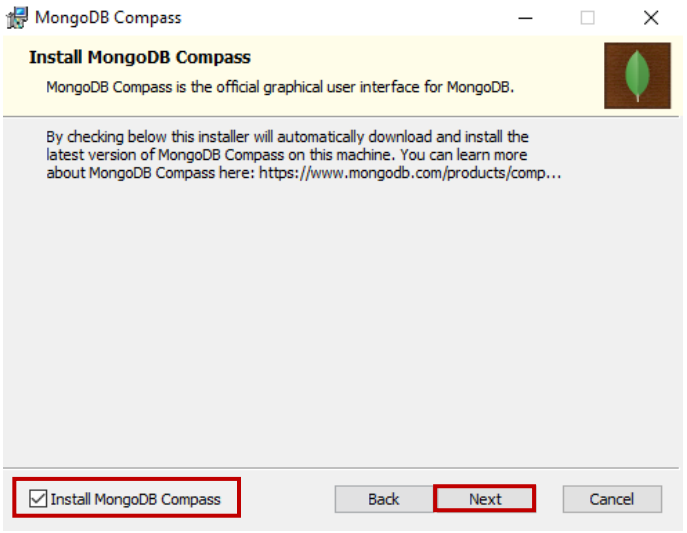
Select the “Complete” button. This will install all the packages that MongoDB offers.



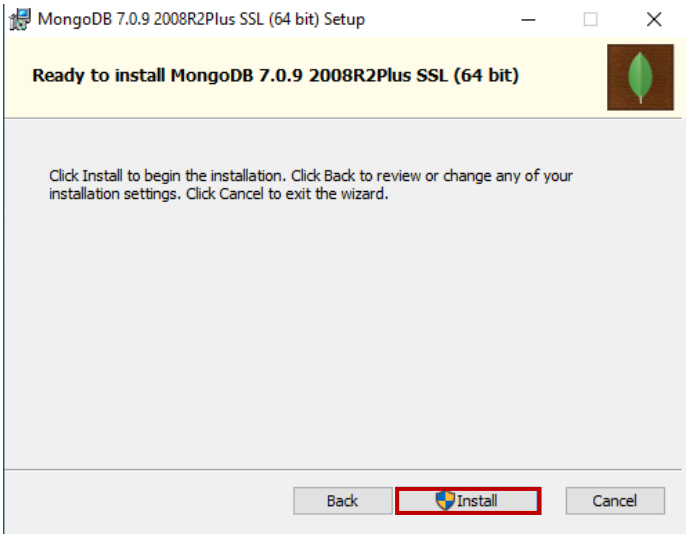
This part is of highly importance. Be sure to mark the “Install MongoD as a Service and leave the rest of the values as their default. Then, click on the “Next” button



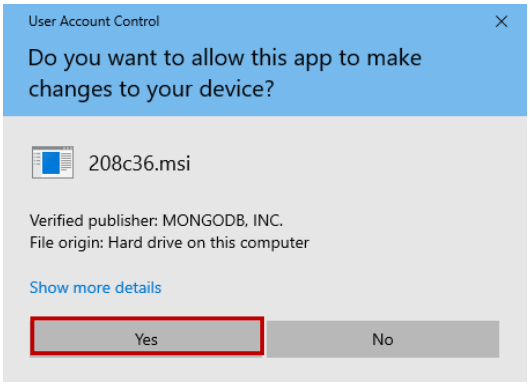
Next, the option to install “Compass” is presented. It’s highly recommended to install it in case of troubleshooting an unexpected error.



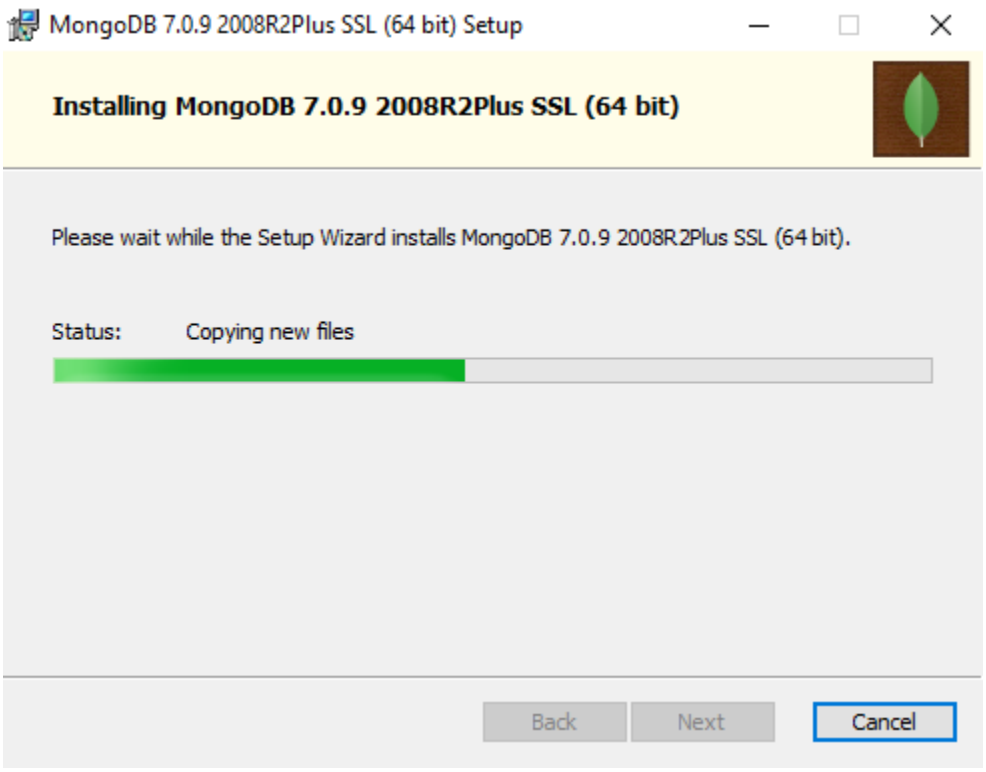
Now, press the “Install” button to start the installation.



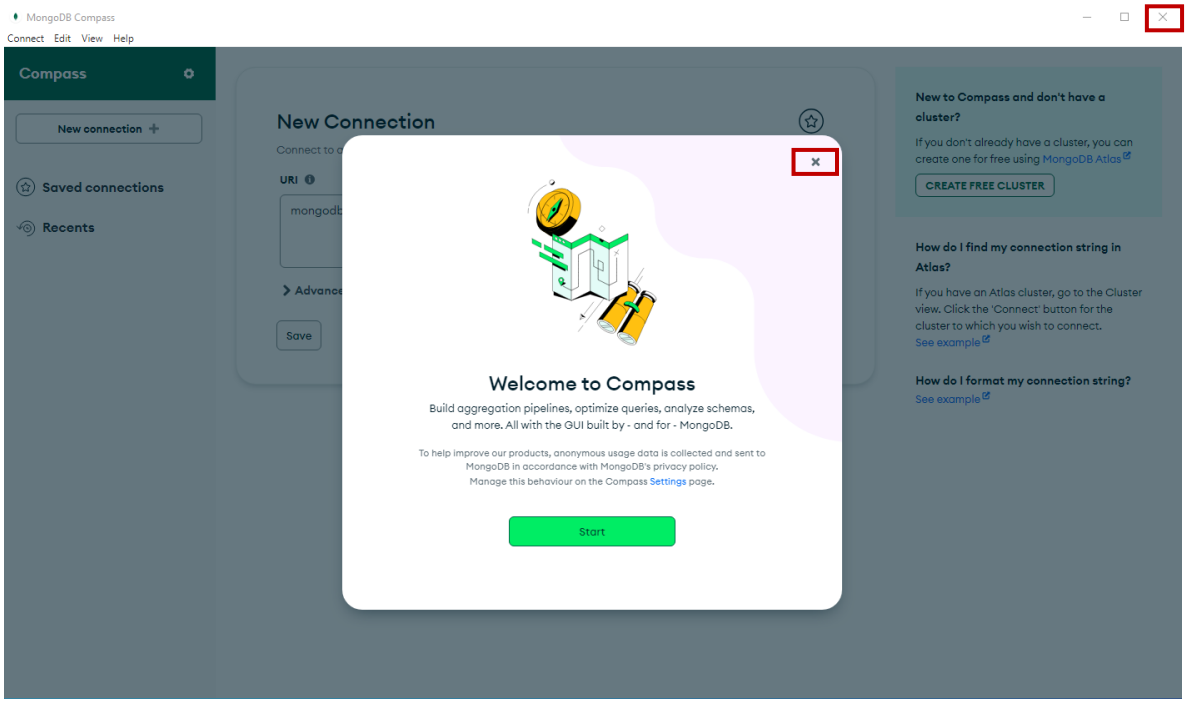
It may be a notification asking for administrative permission. If it appears, select the “Yes” option.



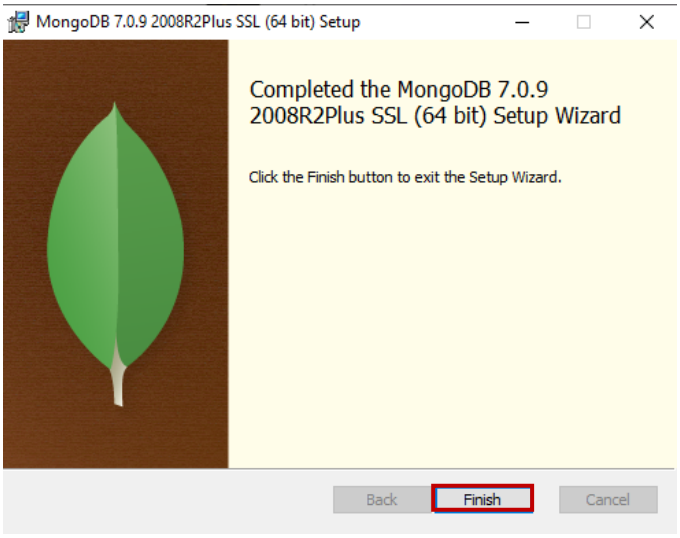
Because of the selection to install “Compass”, it will take a while to finish the installation, be patient and wait until the installation is complete.



Once the installation is complete “Compass” will be open. Just close the application.



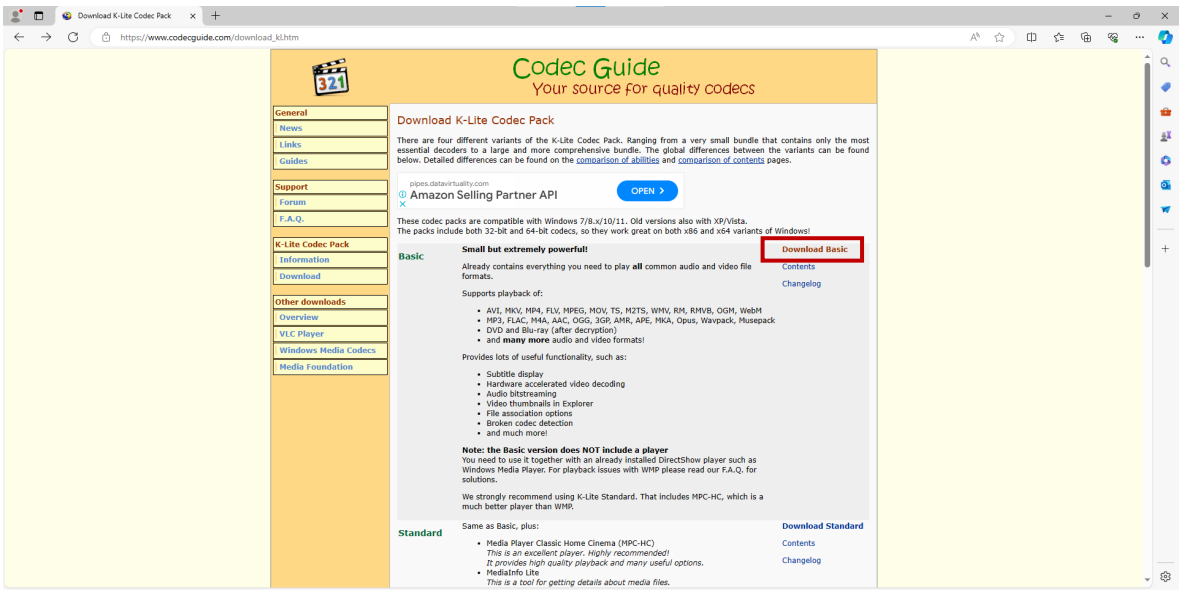
Finally, close the installer clicking on the “Finish” button.



K-Lite Codecs

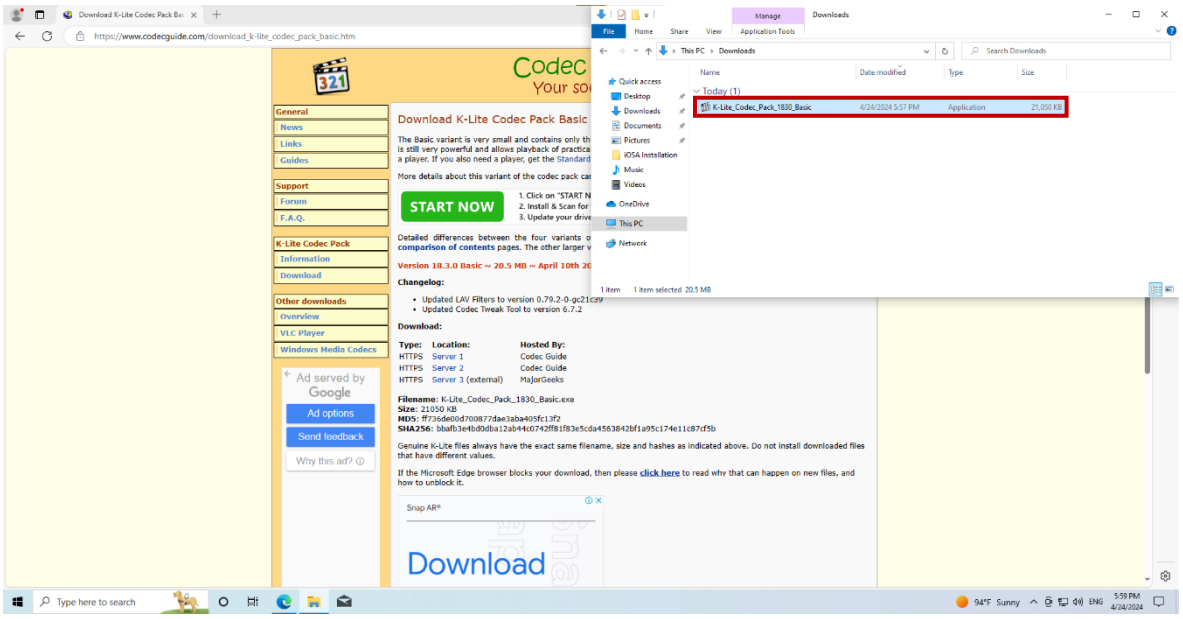
The system comes with its own video player, but the computer where the system is about to be install me not have the necessary video codecs, causing the system to possibly crash. To avoid that, it’s recommended to download the codecs. From here: https://www.codecguide.com/download_kl.htm, can be found all the codecs that the system required.

In the page, select the basic codecs package.

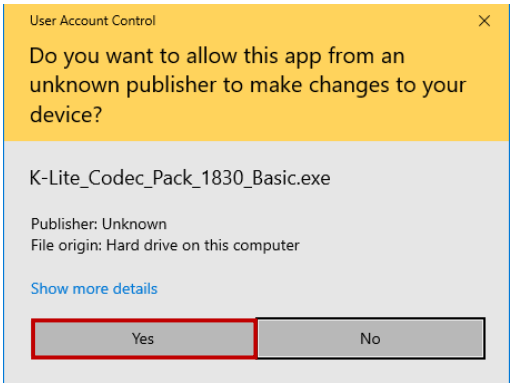


There are three different servers for the download, in this case the first one is selected. Automatically the download will be stored at the “Download” folder, if a “Save file” dialog appears the destination folder can be selected.

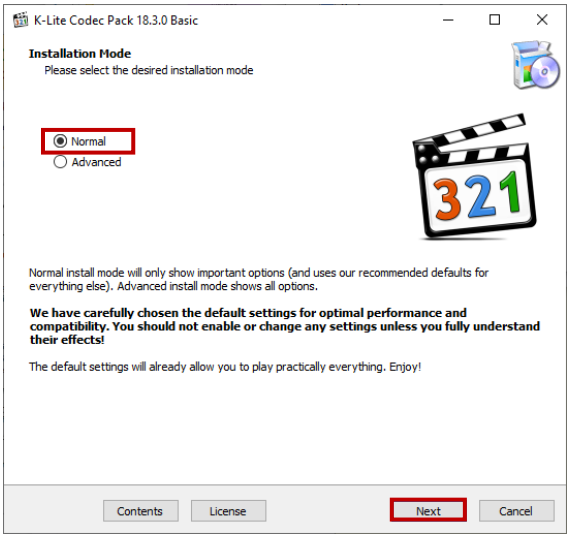
Once the download is complete, the codecs package will be in the “Download” folder. Now, doble click to open it and start the codecs installation.



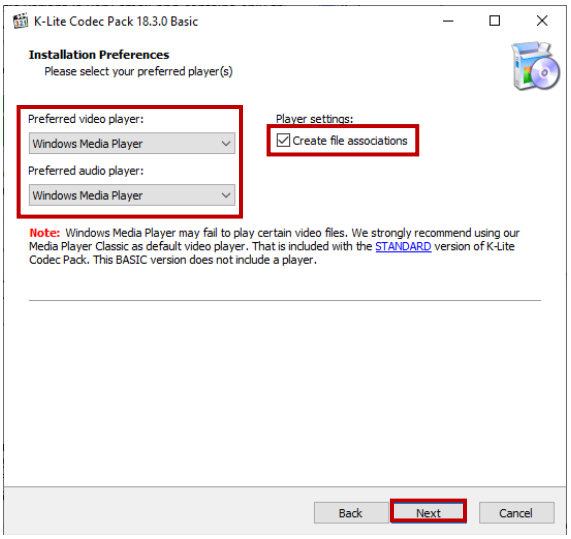
It may be a notification asking for administrative permission. If it appears, select the “Yes” option.



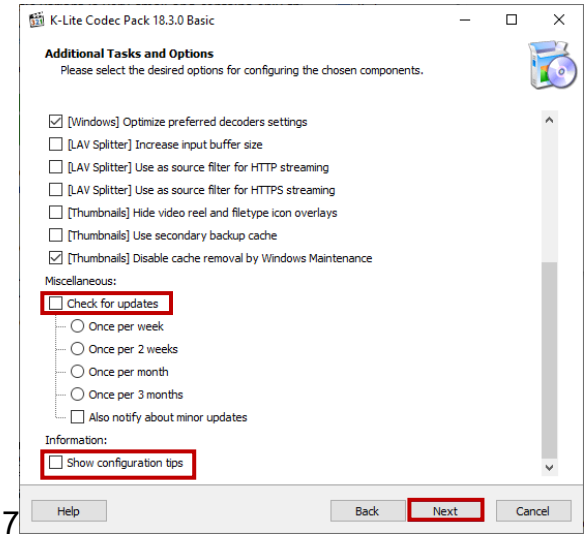
For the first step, select the “normal installation mode”. This option will install the necessary codecs without to select them manually. Then, click next.



Select the video player the computer uses most, if the computer doesn’t use a player, just select the “Windows Media Player” and leave the “Create files associations” checkbox marked. Then, click next.

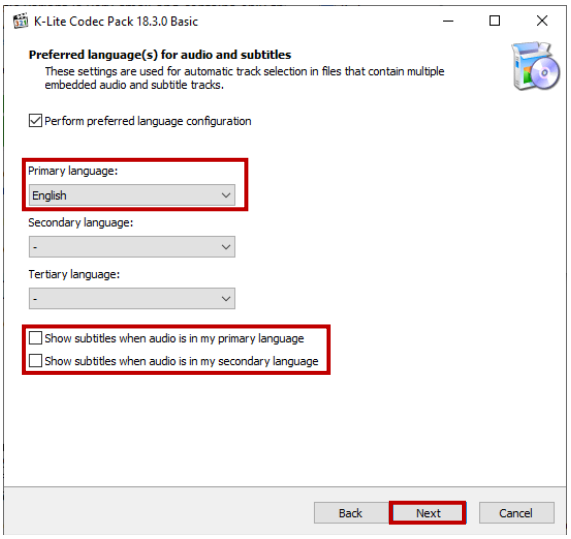


This screen will display numerous checkboxes, scroll to the bottom, and uncheck the “Check for update” and “Show information tips” checkboxes. Be sure to leave the rest of them with their default values. Then, click next.

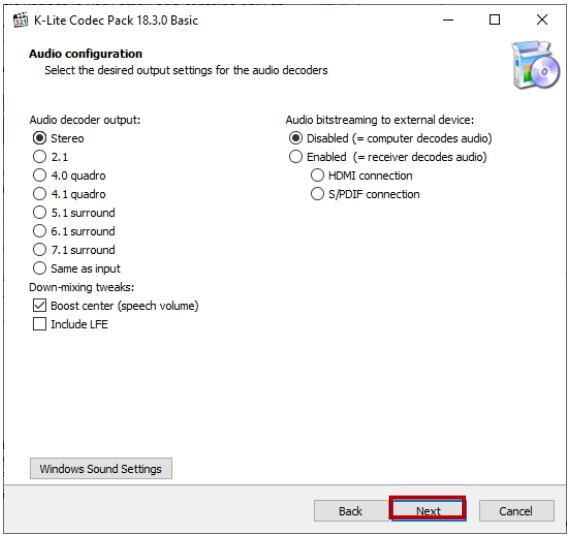


7

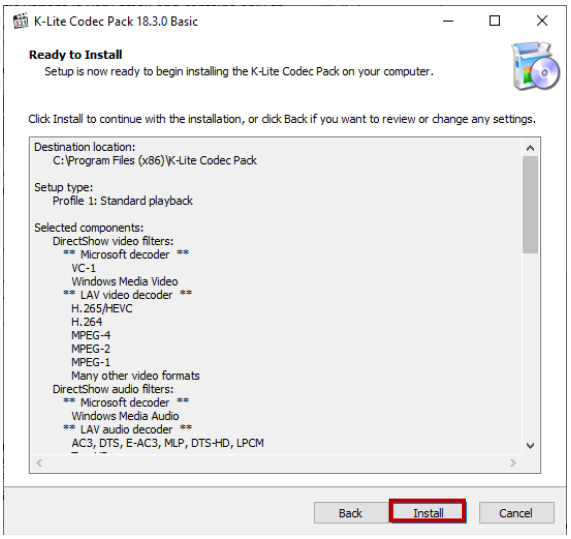
Now select the primary language and uncheck both subtitle checkboxes. Then, click next.



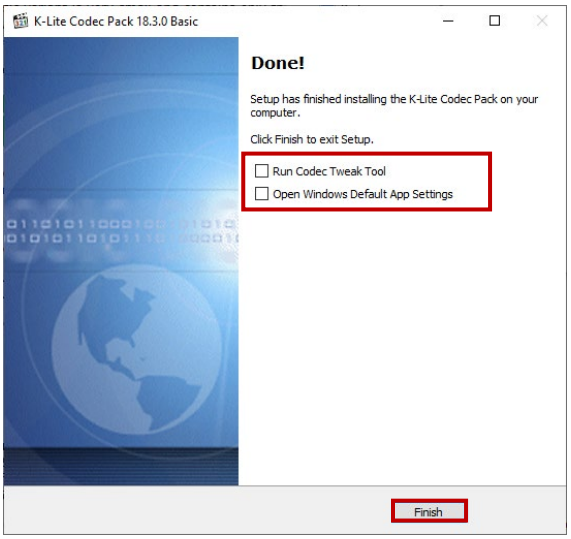
Leave all the options by its default values and click next.



Lastly, a review of the options is shown. Then, click “Install”.



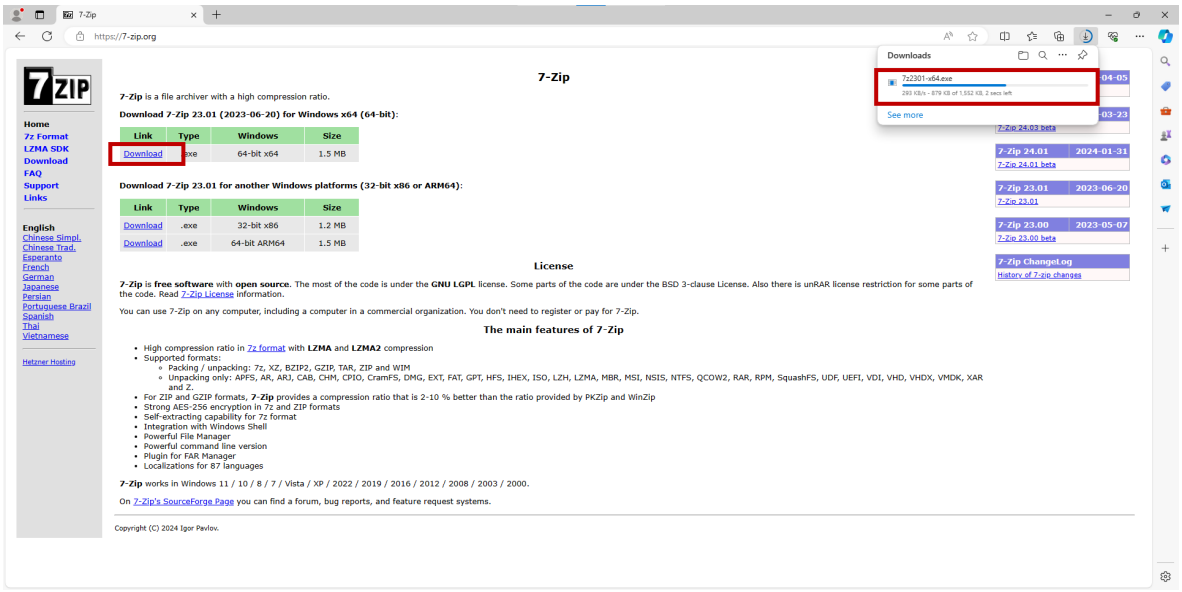
Finaly, click the “Finish” button.



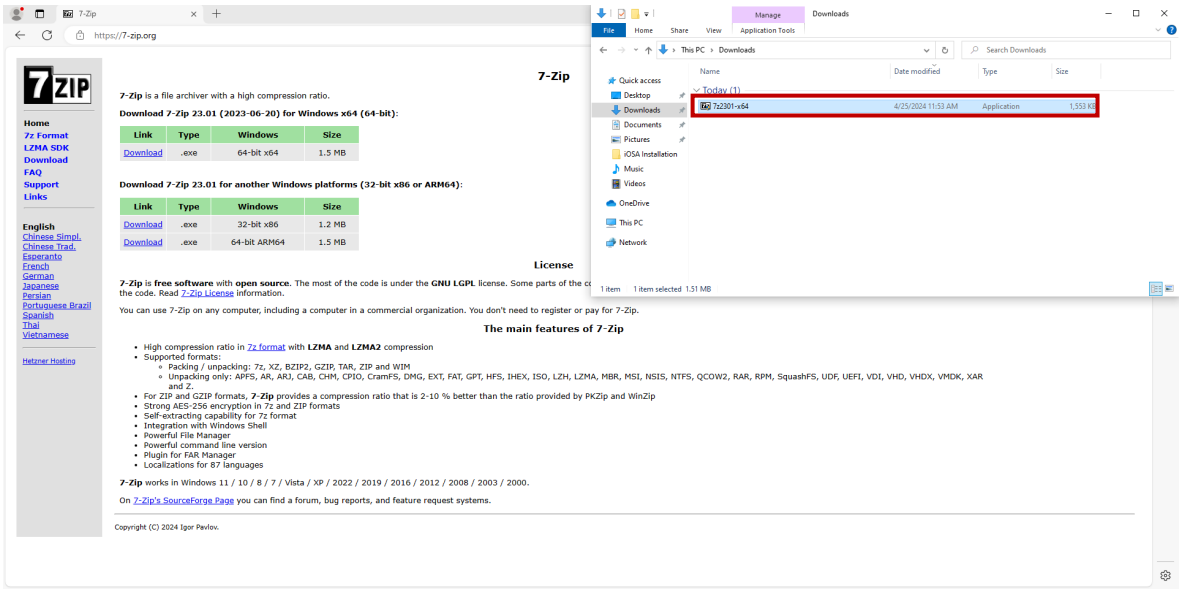
7Zip

The computer where the system is installed may not have a file extraction utility, so the 7Zip is necessary. It can be downloaded from https://7-zip.org/

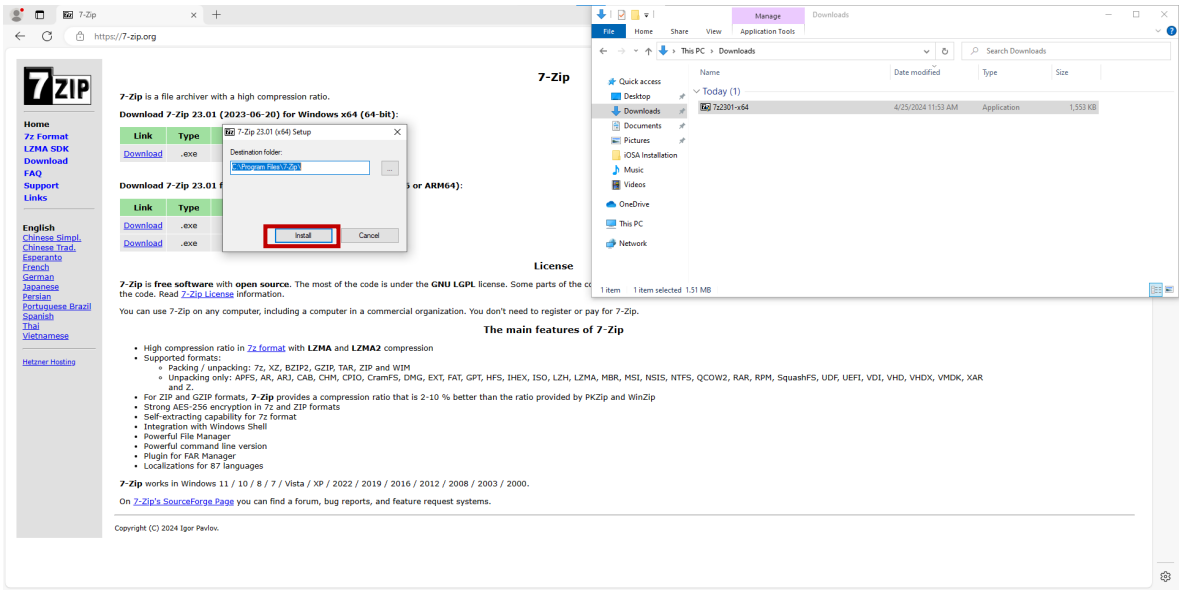
To start the download, click on the download link for windows 64 bit. Automatically the download will be stored at the “Download” folder, if a “Save file” dialog appears the destination folder can be manually selected.



Once the download is finished, find the installer on the “Download” folder, and double click it.



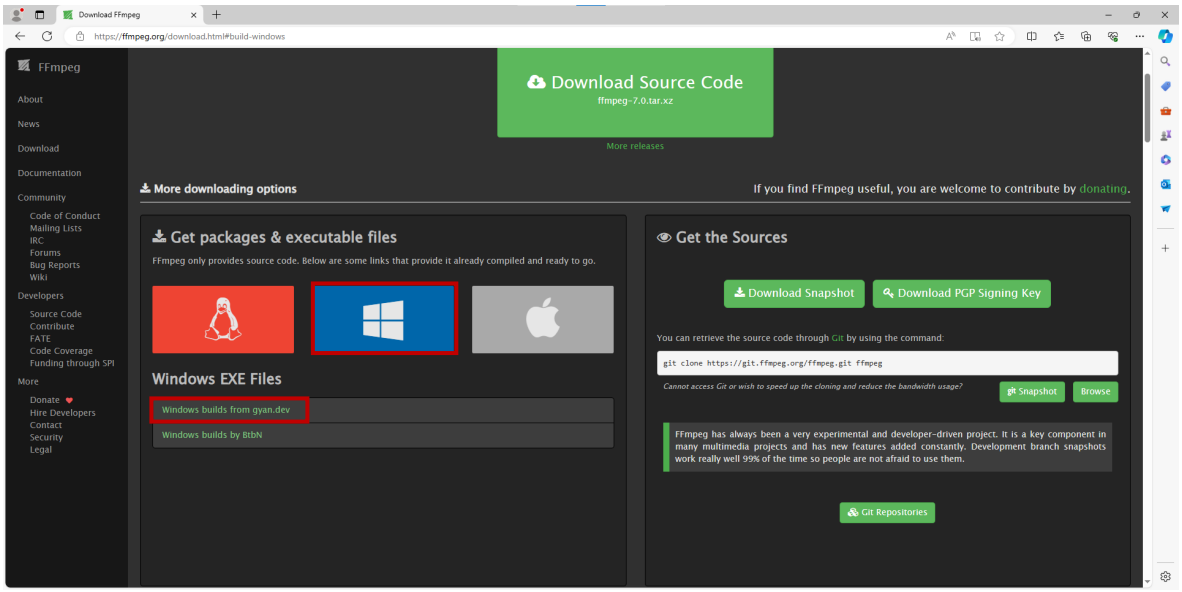
The installer will open, and just click the “Install” button.



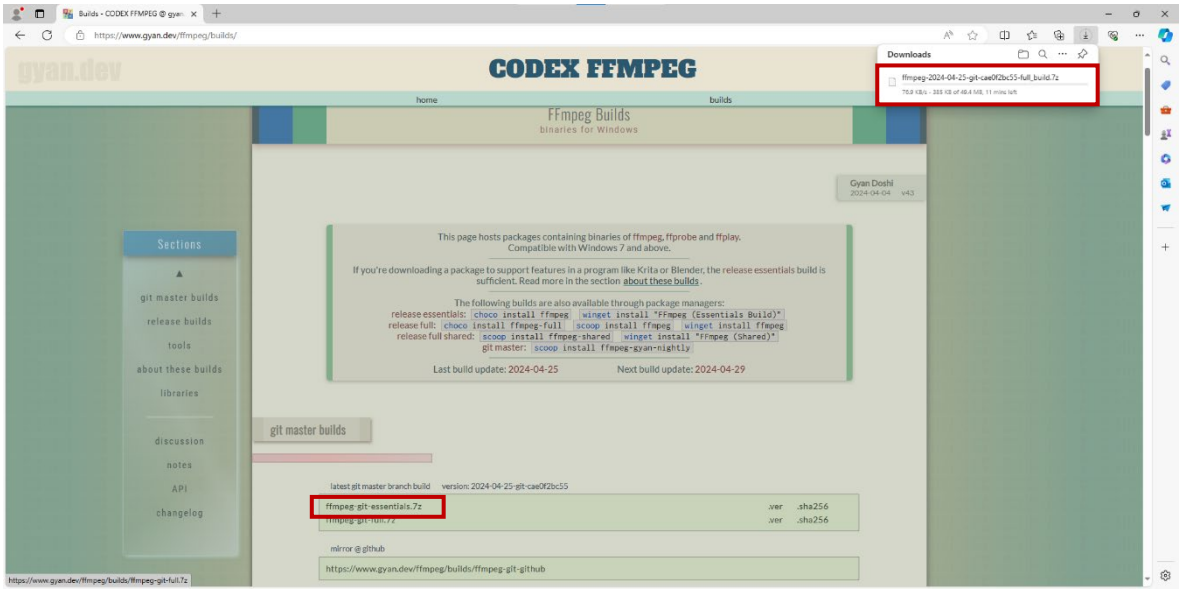
FFmpeg

The system also handles audio files and as with the video files, if the computer where the system is being installed doesn't have the audio codecs, a possible crash may occur. The necessary audio codes are in the FFmpeg package, that can be downloaded from: https://ffmpeg.org/download.html

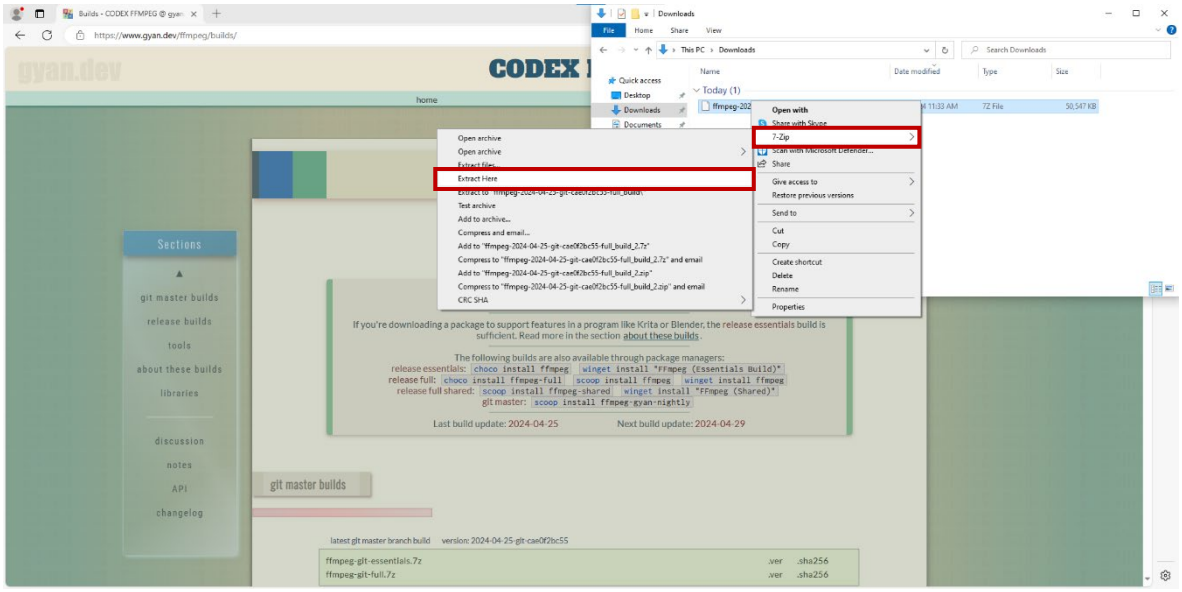
On the FFmpeg official website hover the windows icon and then click on the first option "Windows builds from gyan.dev"



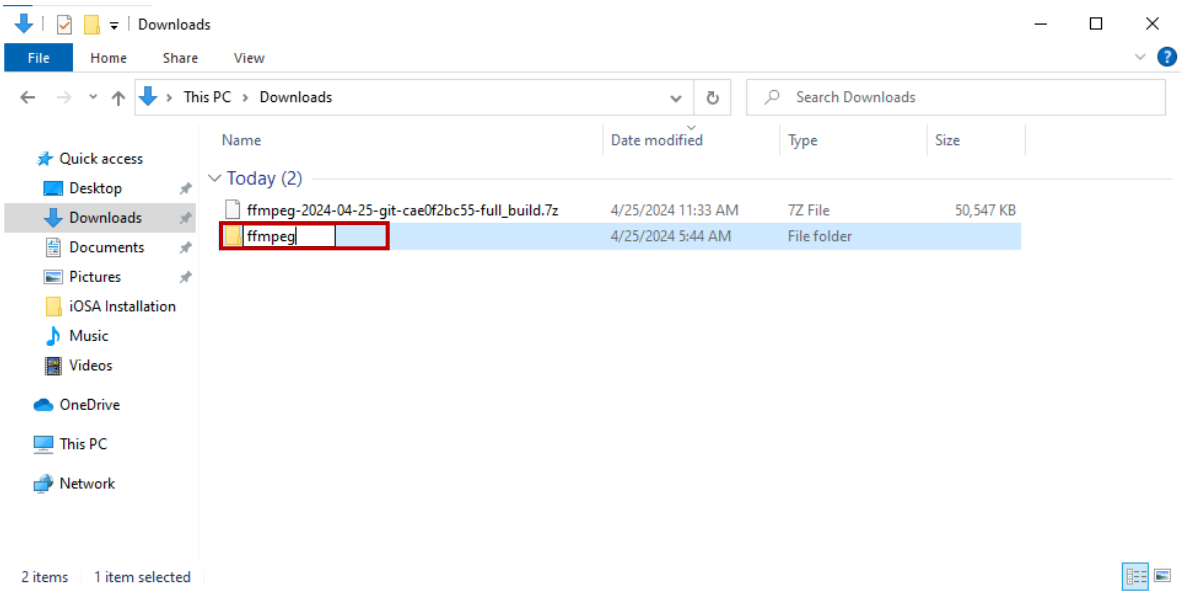
This redirects to the gyan website. On the “last git master branch build” section, click on the “ffmpeg-git-full.7z” link. The download will start and be stored at the “Download” folder. But the destination folder can be selected if the computer shows a “Save file” dialog.



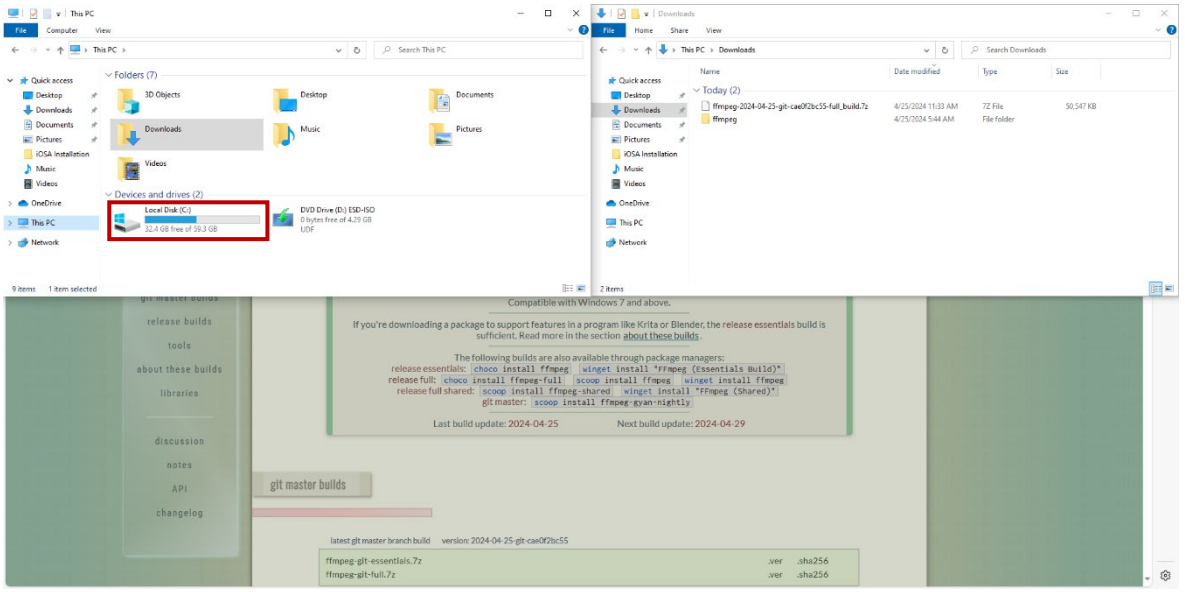
Find de “Download” folder and right click on the ffmpeg 7zip file. Hover on “7-zip” utility and click on “Extract Here”. This will create a folder that contains all the audio codecs.



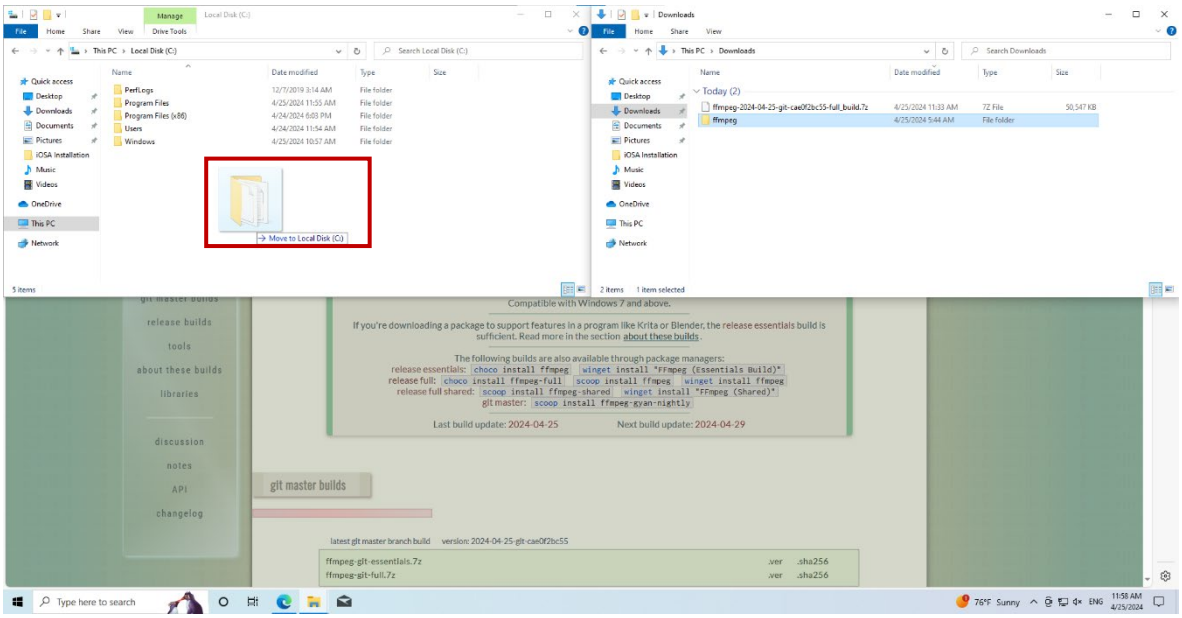
Now rename the folder to “ffmpeg”.



Next, open a new “File Explorer” window and on “This PC”, open the “Local Disk (C:)”.



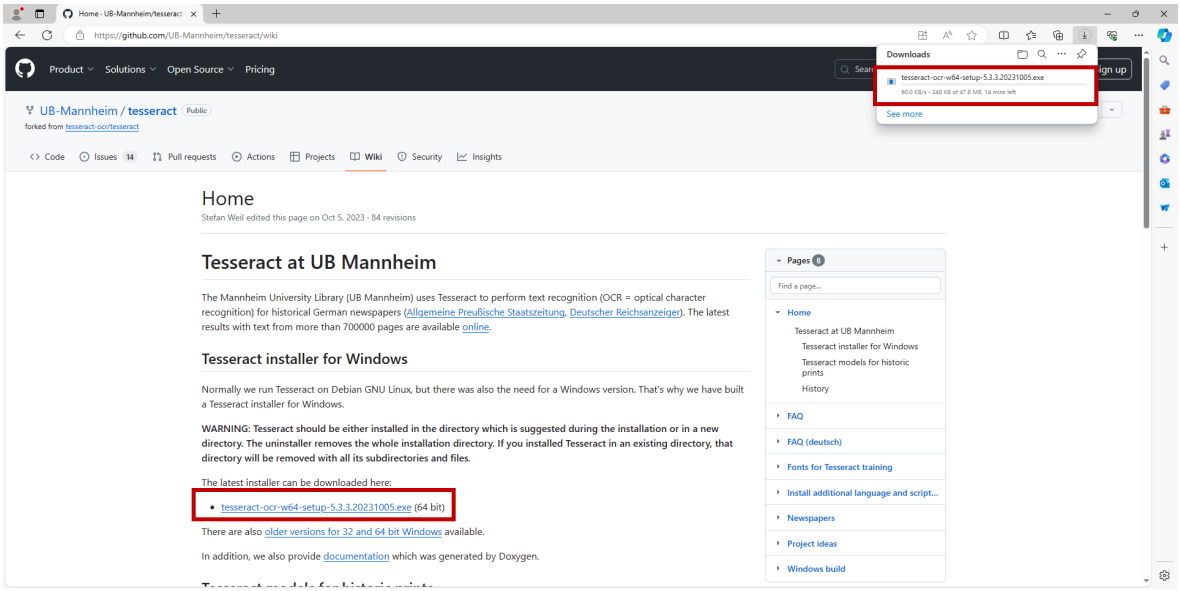
Finally, move the “ffmpeg” folder from “Download” to the “Local Disk (C:)” folder.



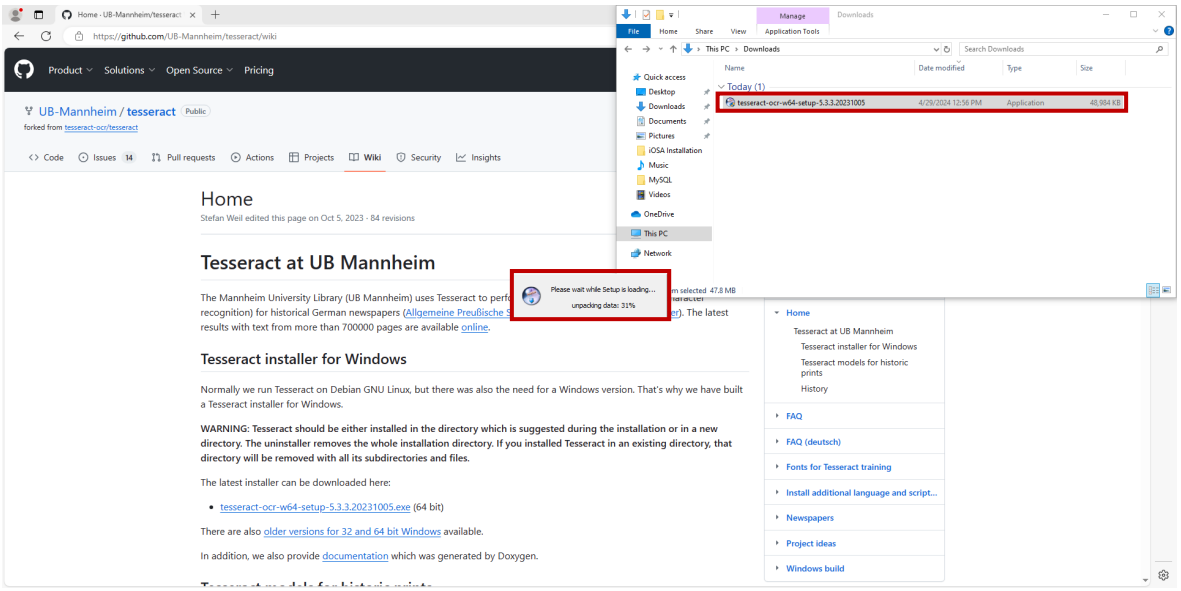
Tesseract-ORC

The system also recognize text from files and images, for this task it use Tesseract-ORC, that can be download from: https://github.com/UB-Mannheim/tesseract/wiki

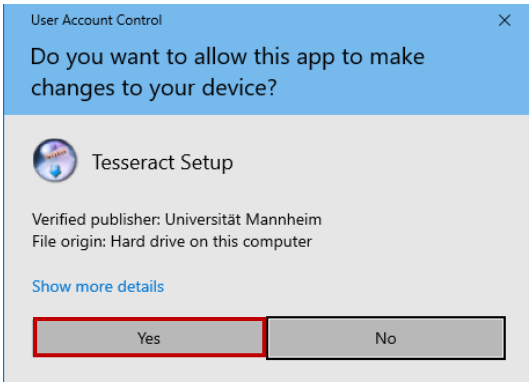
On the official GitHub repository, click on the “tesseract-ocr-w64-setup-5.3.3.20231005.exe (64 bit)” link to start the download. The download will start and be stored at the “Download” folder. But the destination folder can be selected if the computer shows a “Save file” dialog.



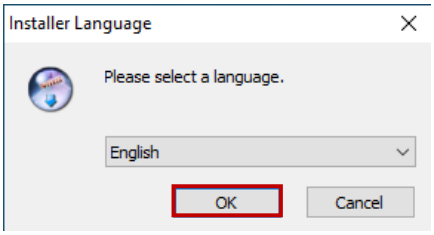
Once the installer was downloaded, double click on it to start the installation.



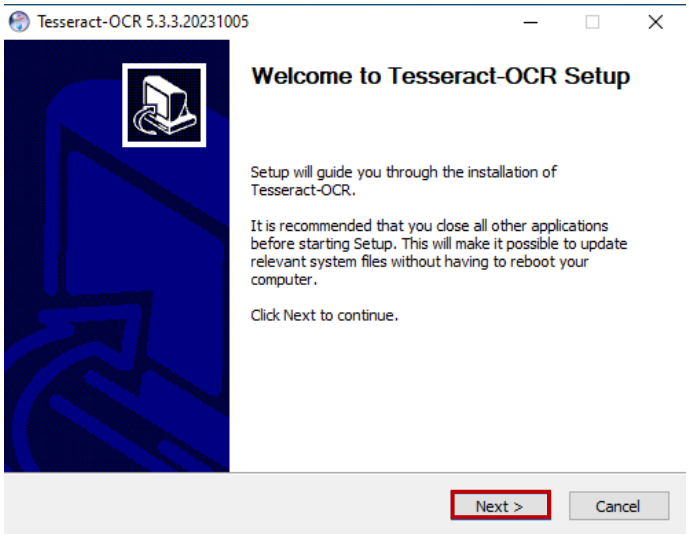
It may be a notification asking for administrative permission. If it appears, select the “Yes” option.



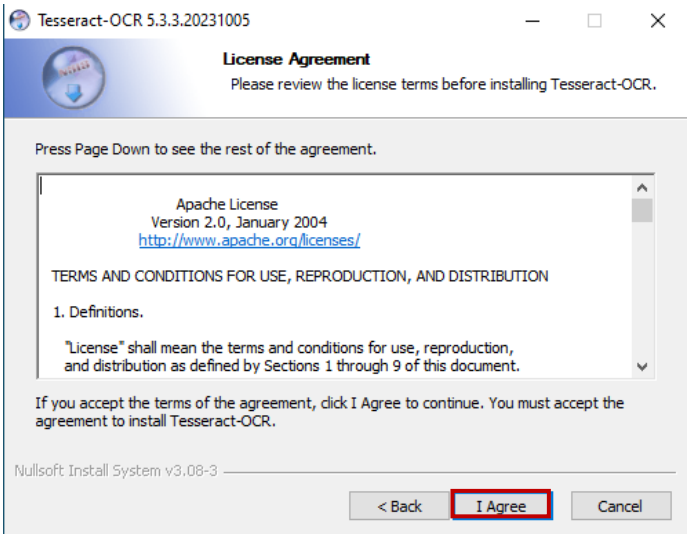
Select the language desired for the installation.



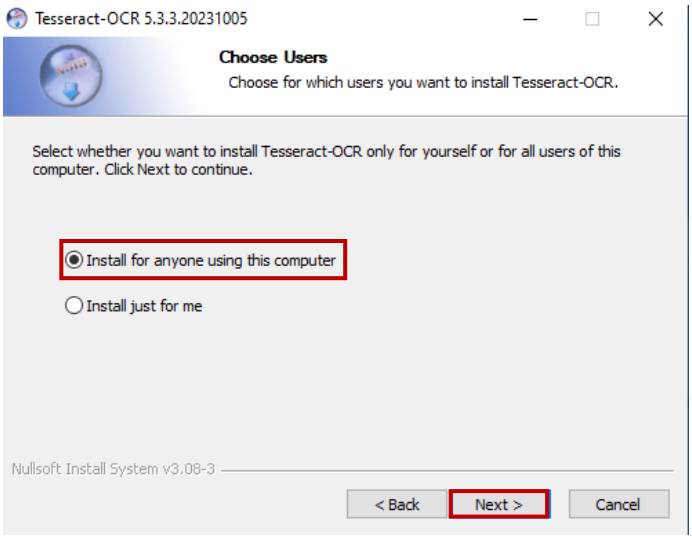
Firstly, the main screen introduces Tesseract-OCR. To start the installation, click on the “Next” button.



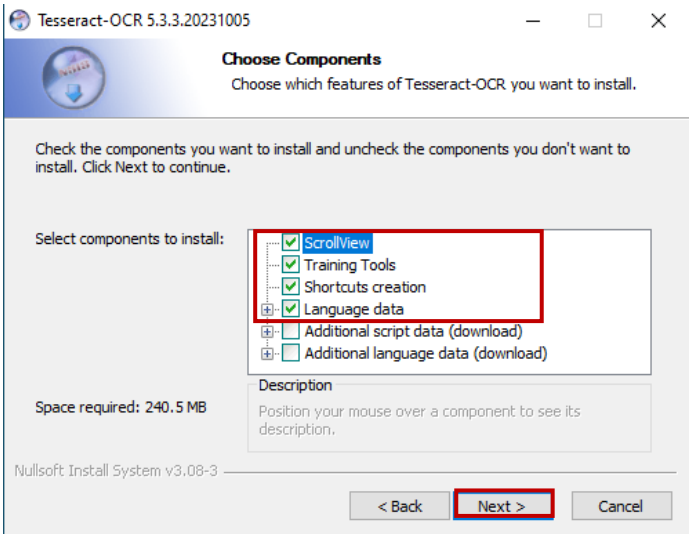
Click on the “I Agree” button after reading the License of Agreement.



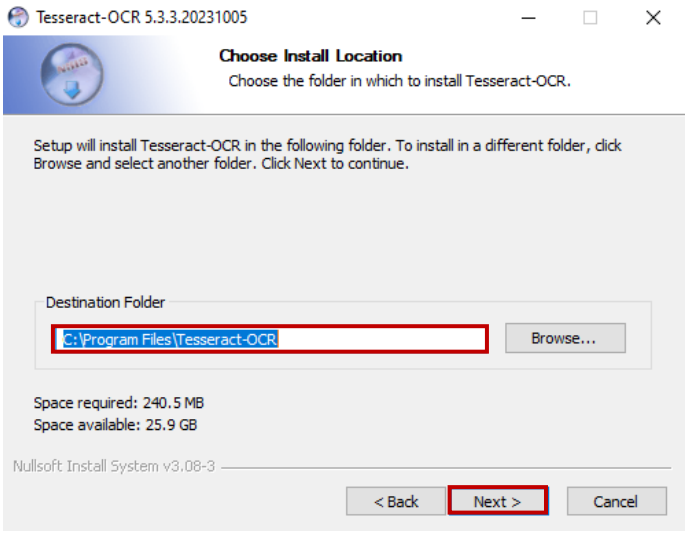
Select the option “Install for anyone using this computer”. This option will enable Tesseract-OCR to any user on the computer.



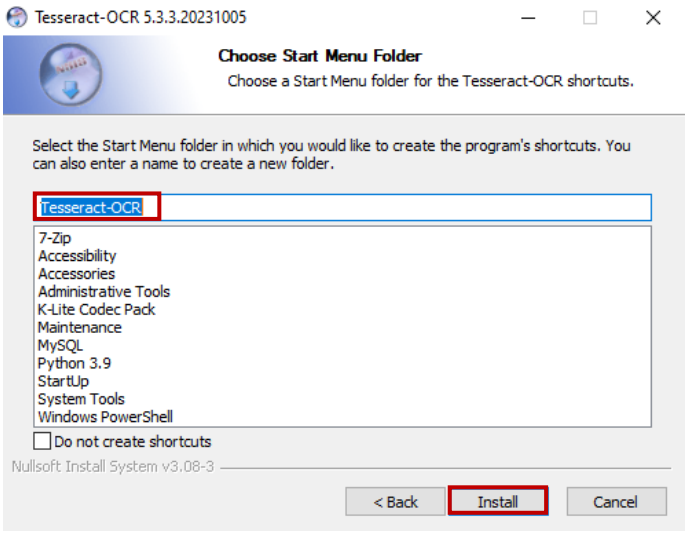
On this screen leave the default values. The last two option aren't required for the system.



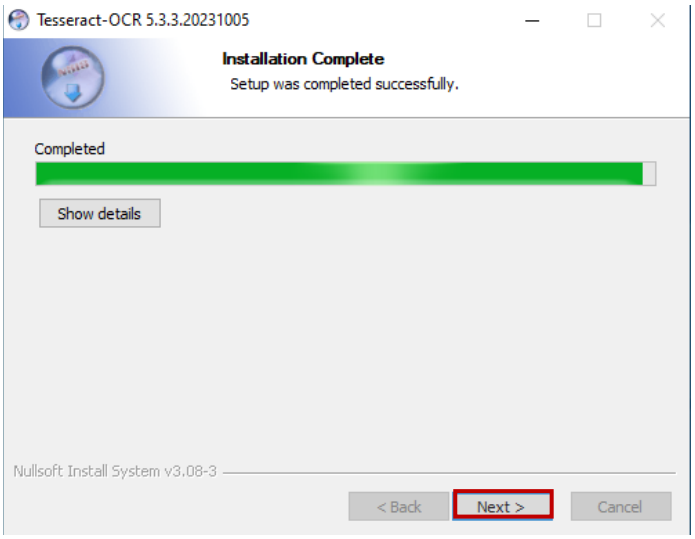
It is highly recommended to leave the default installation path. This is because on the "System Configuration" section, this path is the one its used.



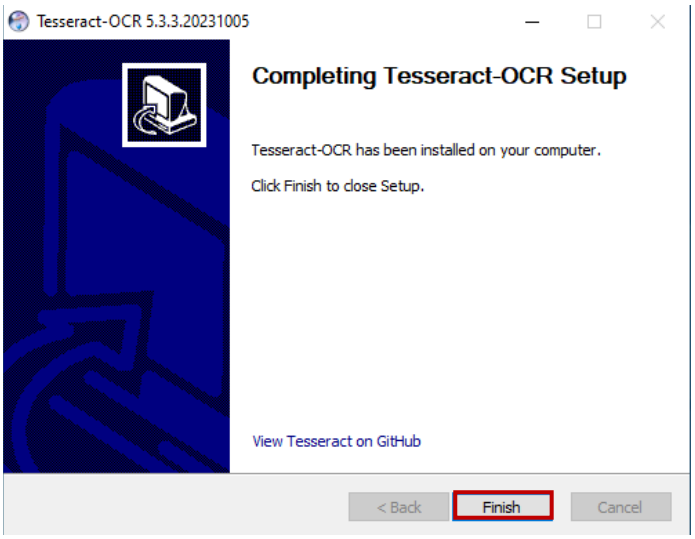
For the “Start Menu Folder” leave the default values. Then, click on the “Install” button.



When the progress bar is full, click on the “Next” button.



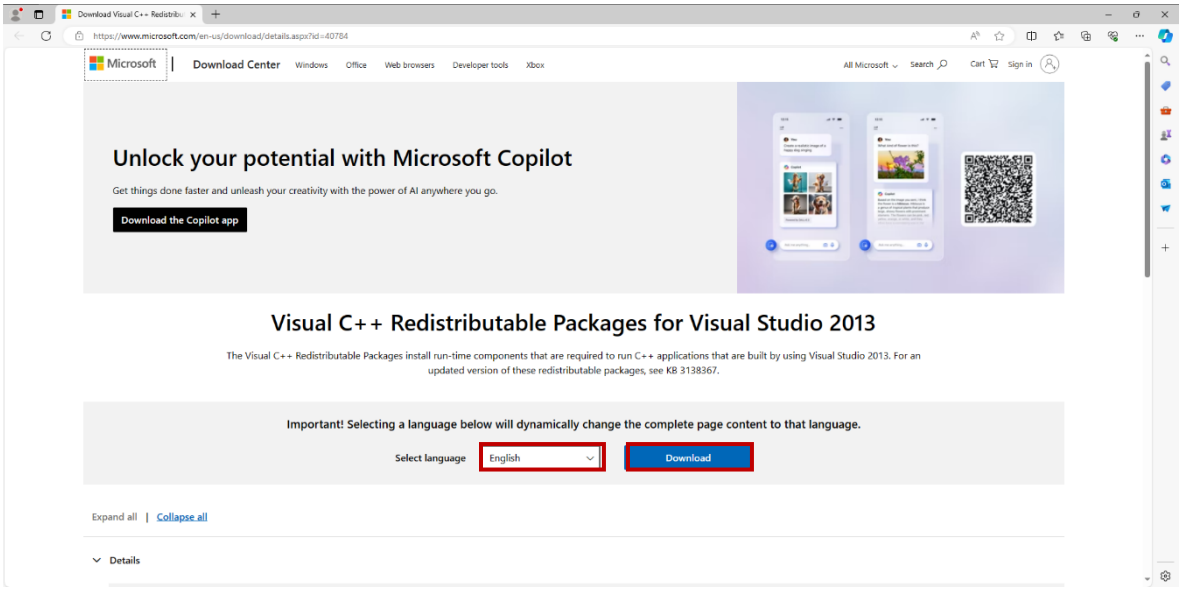
With this, the last screen will appear. Finishing the installation of Tesseract-OCR.



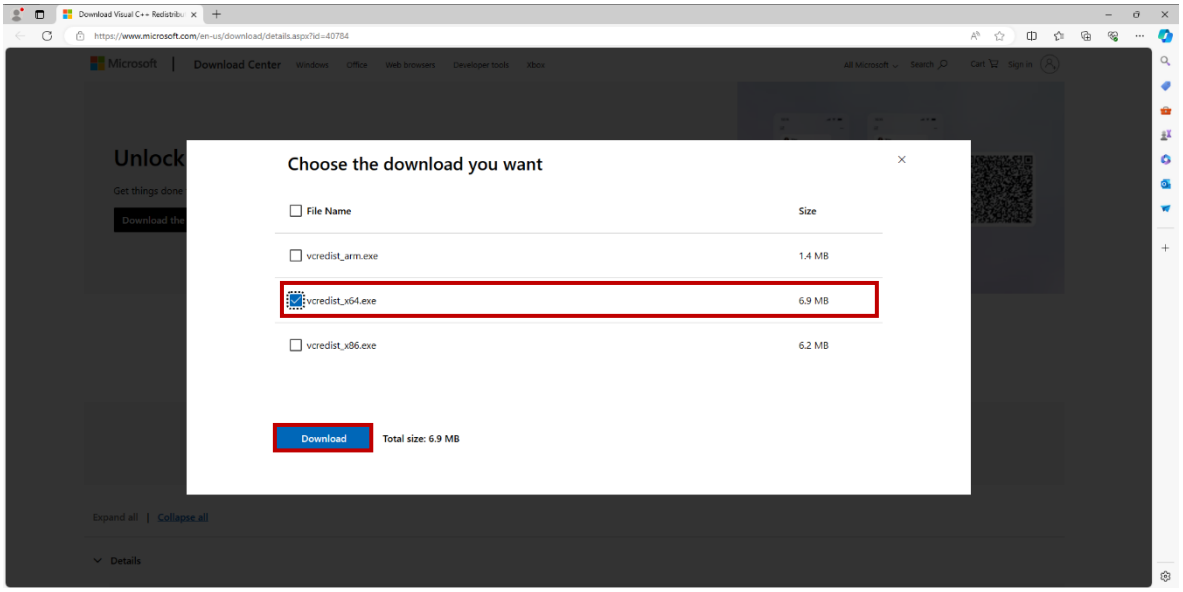
Visual C++ Redistributable Packages for Visual Studio 2013

The system requires the computer be able to run C++ codes, so if the computer doesn't have the Microsoft C++ packages, they can be downloaded from: https://www.microsoft.com/en-us/download/details.aspx?id=40784

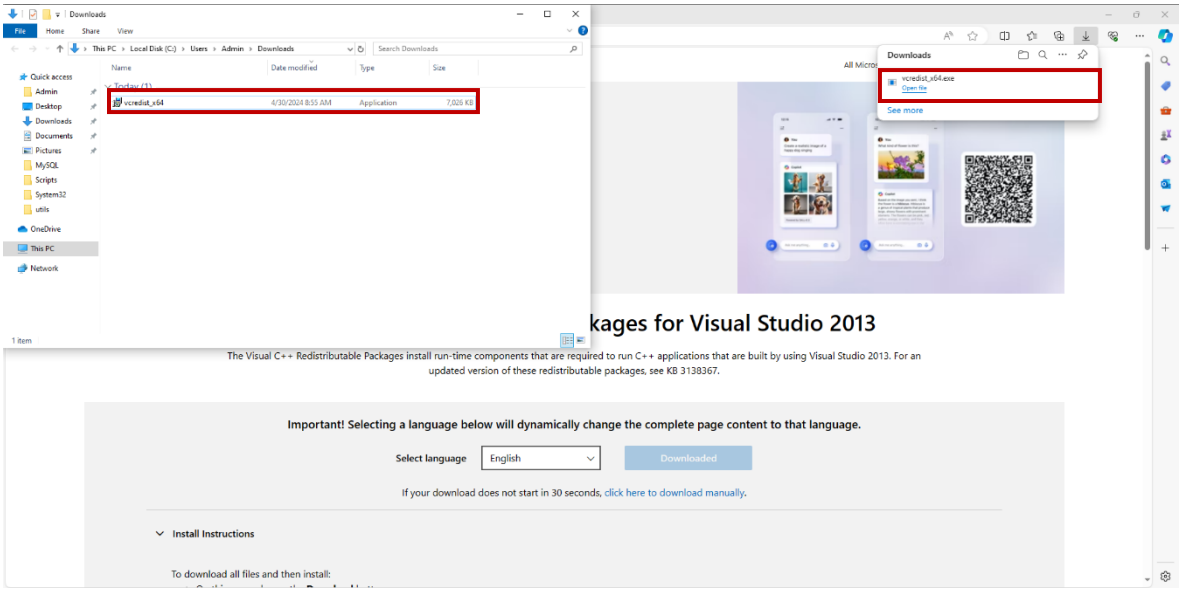
On the official Microsoft website, select the language of preference and click on the download blue button to choose the necessary package for the computer.



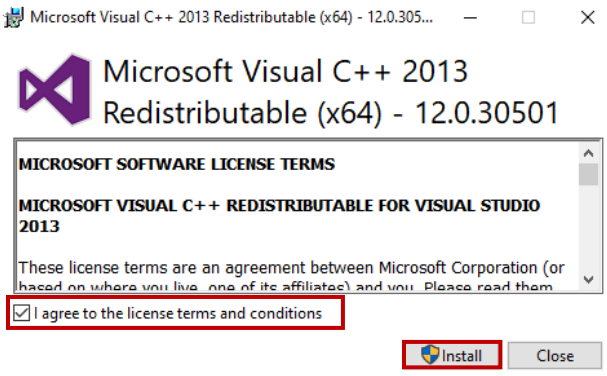
In the case of having installed the Python version for 64 bits (as was explained on the Python section), choose the “vscredis_x64.exe” option. Just as a note, the “vscredist_x86.exe” option is for the Python version for 32 bits computers. Then, click the download button. The download will start and be stored at the “Download” folder. But the destination folder can be selected if the computer shows a “Save file” dialog.



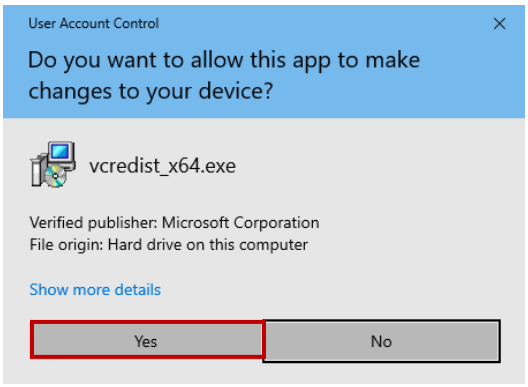
Once the package installer was downloaded, find it on the “Download” folder and double click on it to execute the installer.



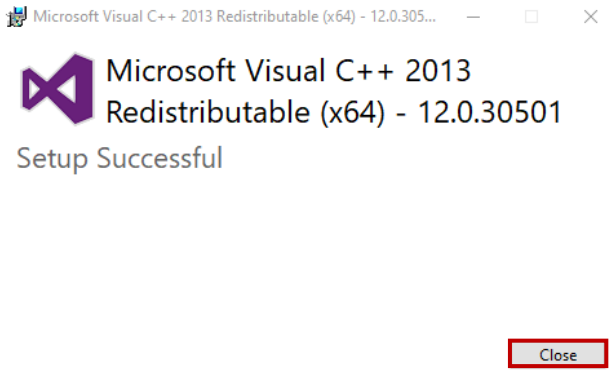
Mark the license agreement checkbox and click on the “Install” button to start the installation.



It may be a notification asking for administrative permission. If it appears, select the “Yes” option.



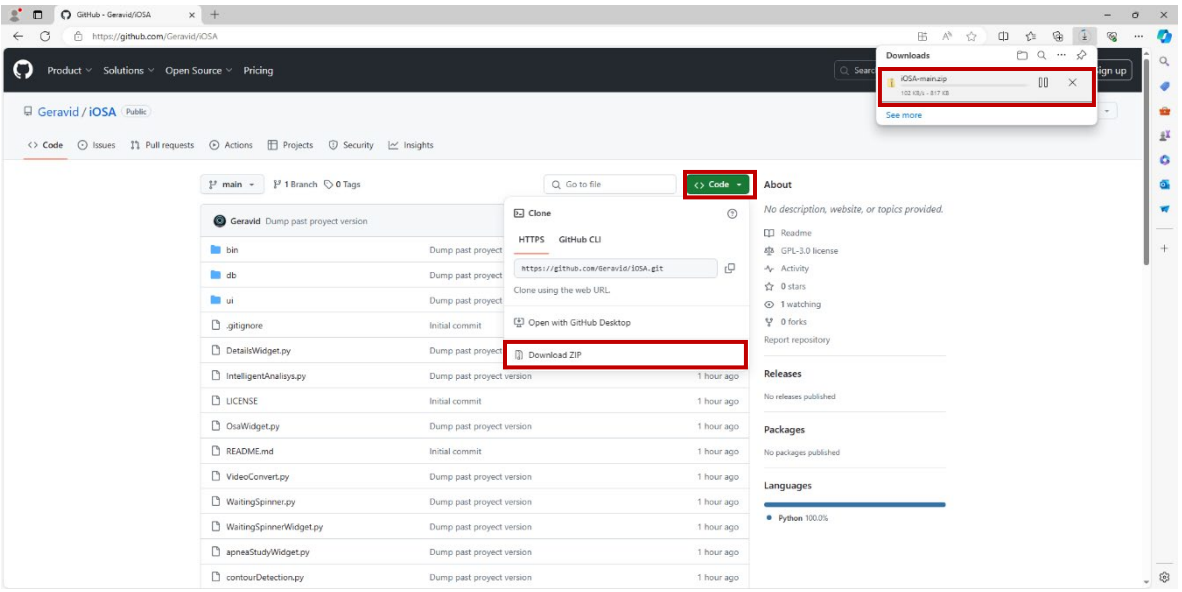
Now, wait until the progress bar is completed and once its completed, means the setup was successful, then, click on the “Close” button.



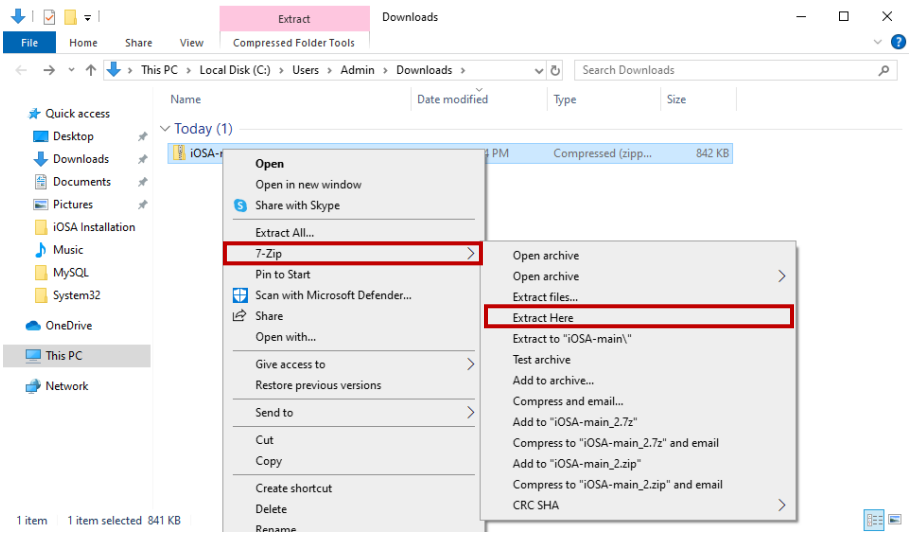
iOSA Installation

The system is located on a GitHub repository and for its download it is recommended to download it as a zip file directly from the repository. It’s also possible to clone it, but for an easy demonstration, the zip file process is the one described in this guide.

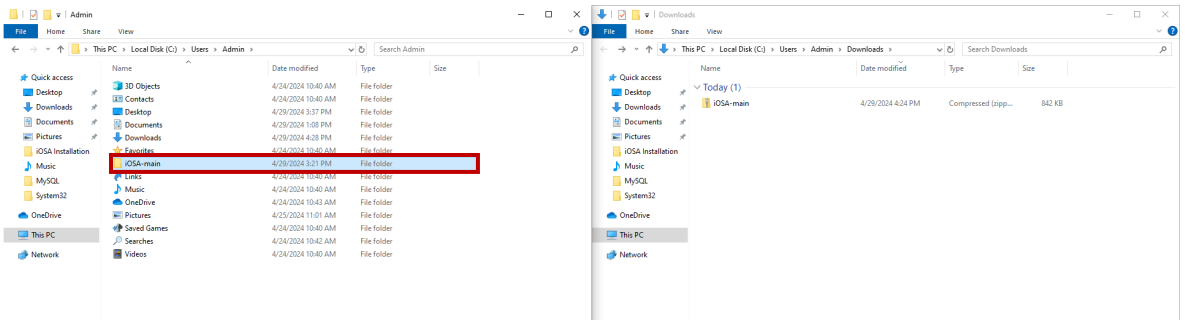
Go to the repository website: https://github.com/Geravid/iOSA.git and click on the green code button and select the “Download ZIP” option to start the download.



Once the zip file is download go to the “Download” folder and right click on the zip file. Select the “7-Zip” option, then, click the “Extract Here” option. This will start the extraction of the system.



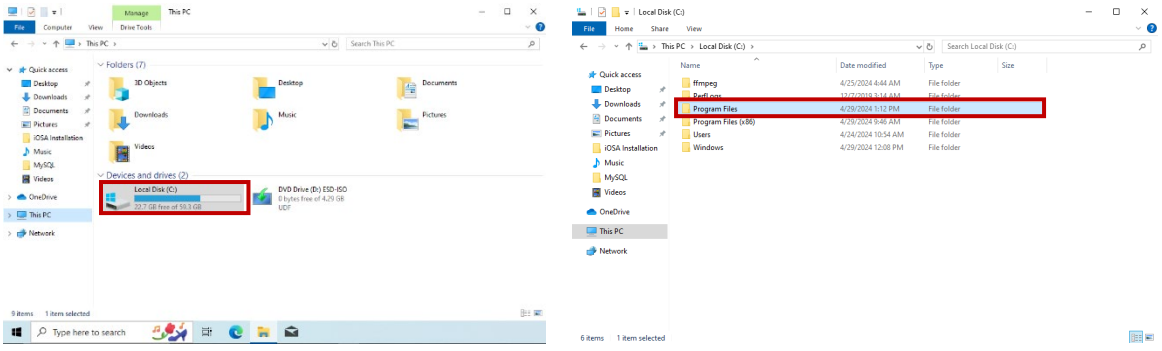
Now, for user convenience, move the “iOSA" folder from the “Download” to another preferred folder. In this case, it is moved to the computer user folder.

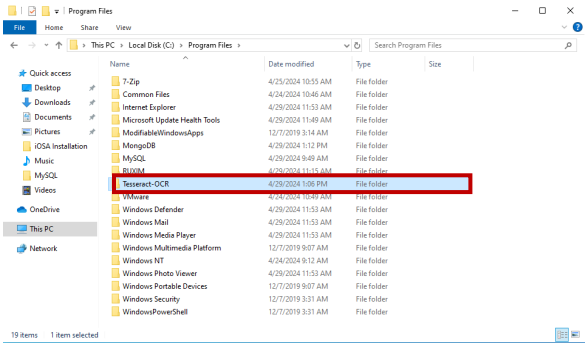


System Configuration

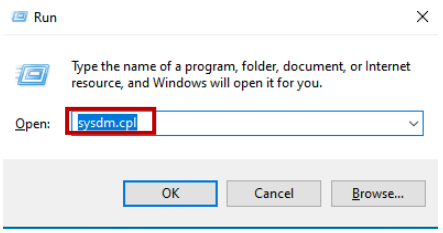
Tesseract-OCR

It's necessary to add the Tesseract to the computer "Environment Variable". For this go to the folder where Tesseract is located. Following this guide would be on "C:" -> "Programs Files" -> "Tesseract-ORC"

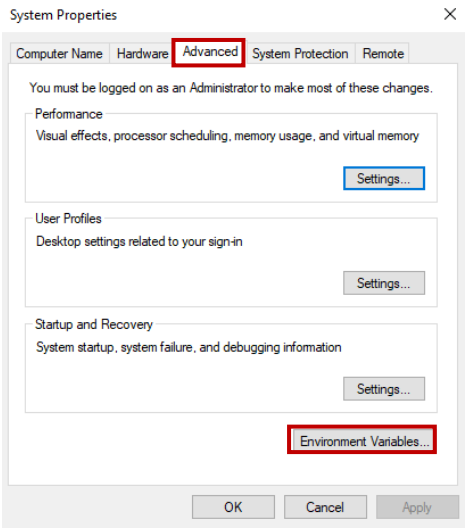




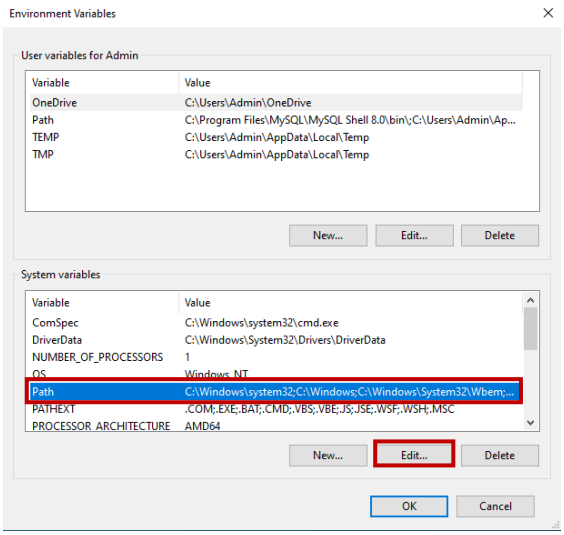
Now, press "Windows Key" + "R", then write "sysdm.cpl" and click on the "Ok" button. This will open the "System Properties" where the "Environments Variables" can be setup.



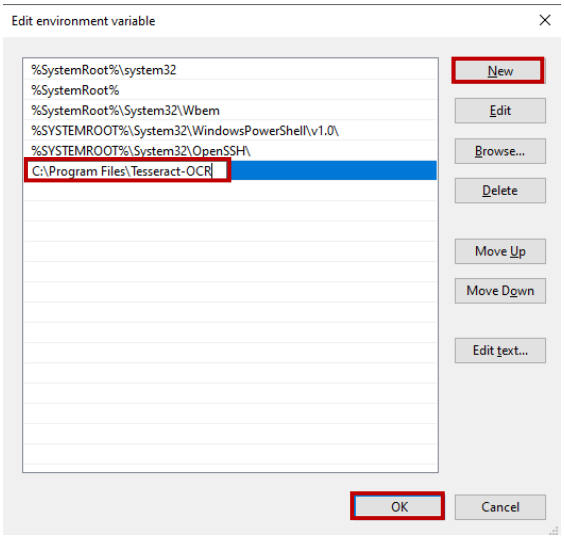
Select the “Advance” tab and click on the “Environment Variables” button.



On the “System variables” section, click on the “Path” option, then on the “Edit” button.

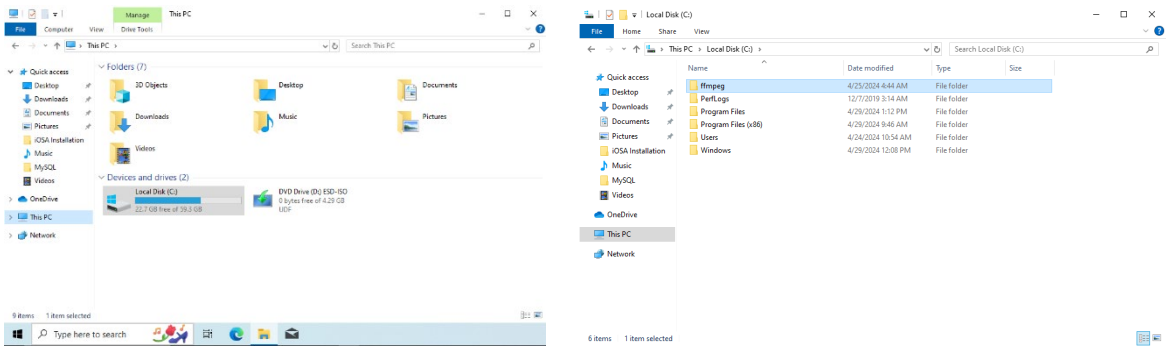


Click on the “New” button and write the path where the Tesseract folder was firstly located. Finally, click on the “Ok” button and with this, Tesseract has been added to the “Environment Variables”.

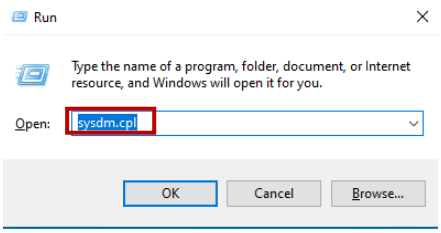


FFmpeg

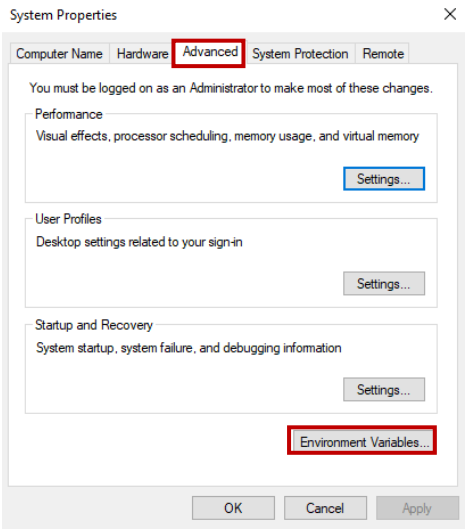
It's also necessary to add the FFmpeg to the computer "Environment Variable". For this, go to the folder where FFmpeg is located. Following this guide would be on "C:" -> "ffmpeg" -> "bin"



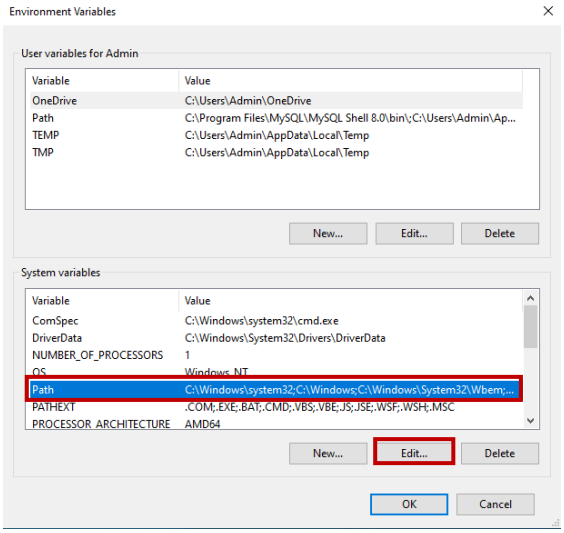
Now, press "Windows Key" + "R", then write "sysdm.cpl" and click on the "Ok" button. This will open the "System Properties" where the "Environments Variables" can be setup.



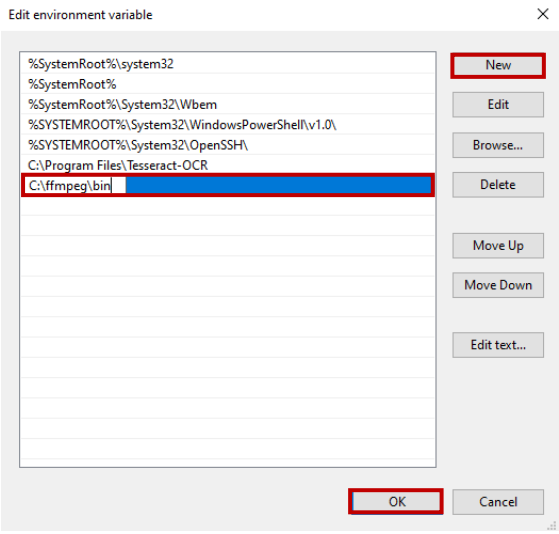
Select the "Advance" tab and click on the "Environment Variables" button.



On the “System variables” section, click on the “Path” option, then on the “Edit” button.

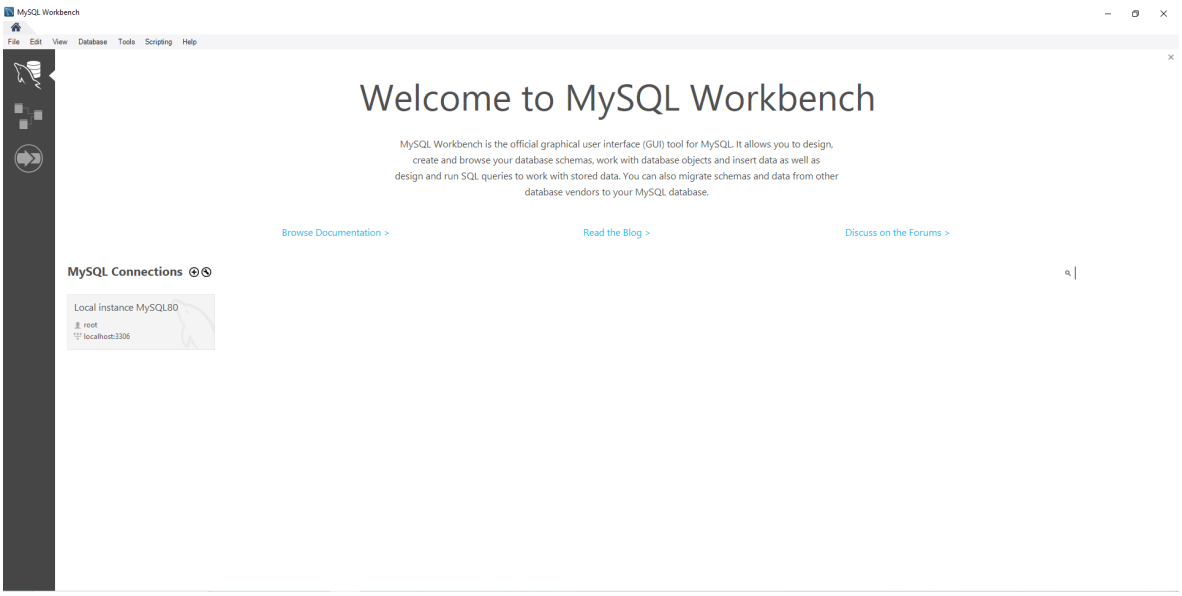


Click on the “New” button and write the path where the FFmpeg folder was firstly located. Finally, click on the “Ok” button and with this, FFmpeg has being added to the “Environment Variables”.

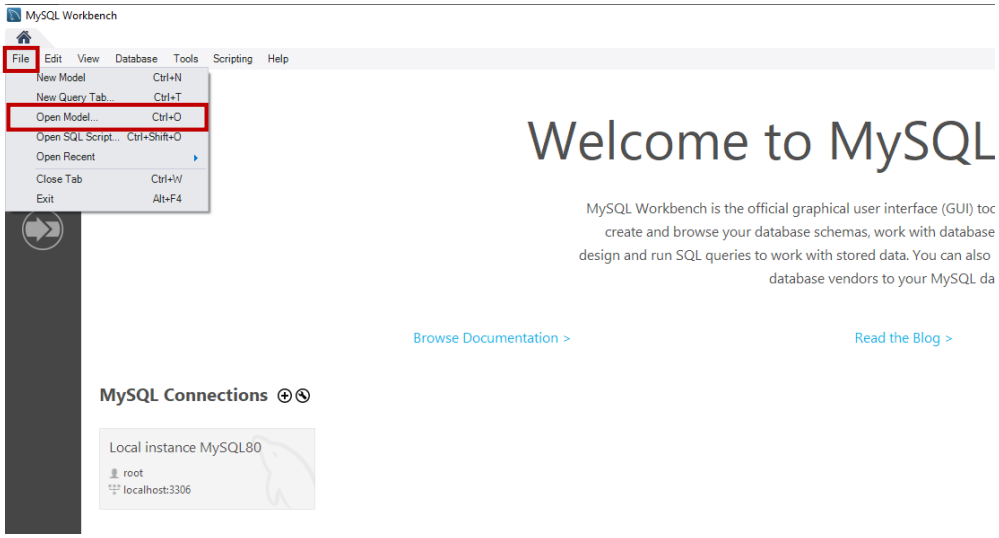


MySQL Database

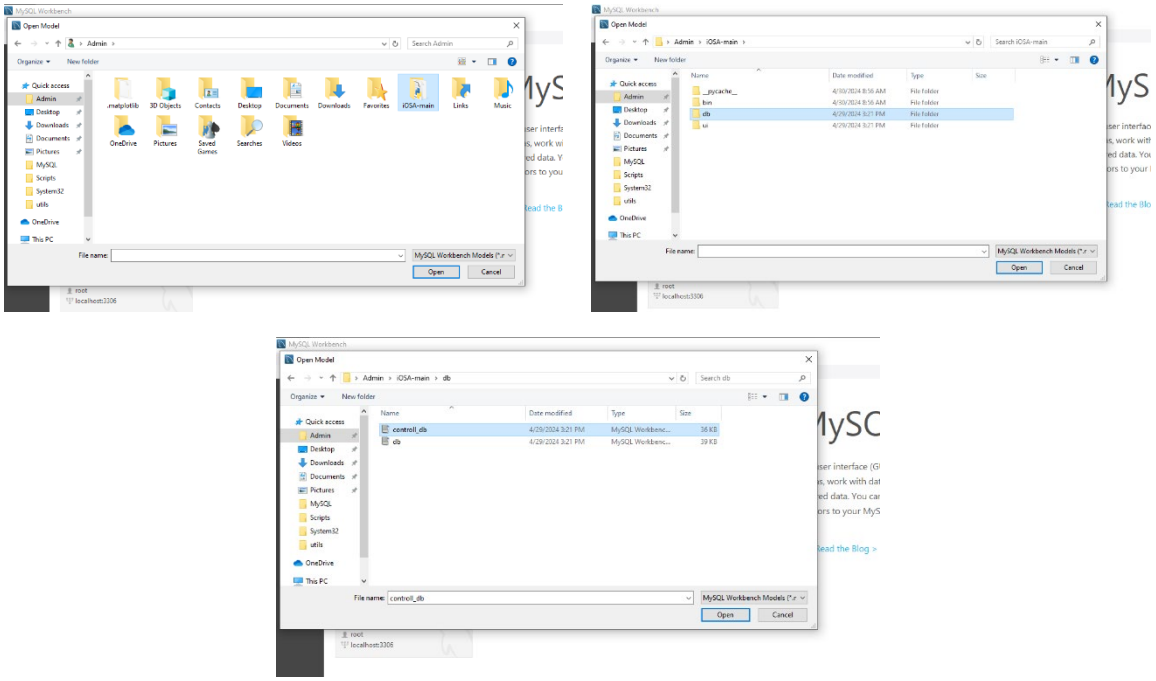
The system already has a database scheme, but on a new installation it requires to import it so the system works correctly and be able to store the patient data. For this open the “MySQL Workbench” application.



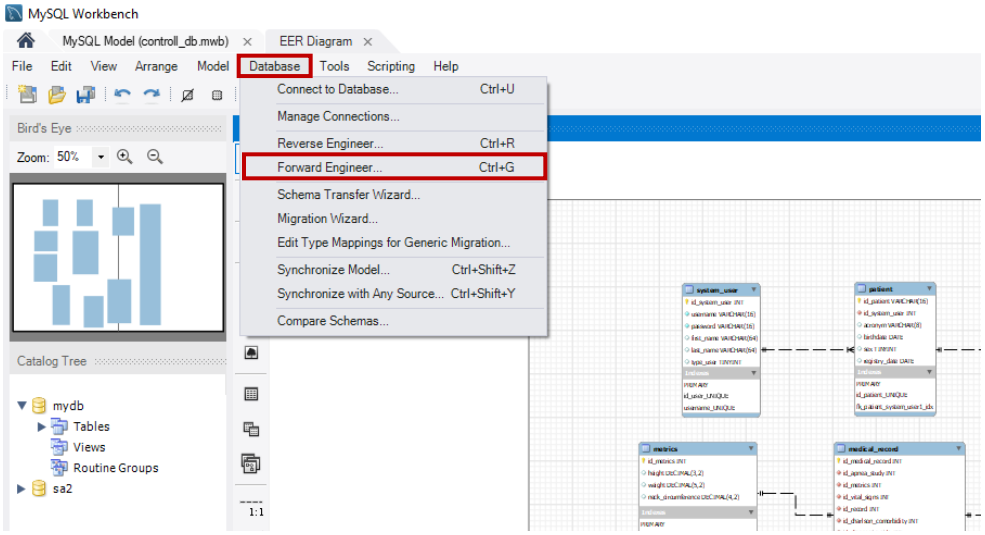
Then, hover the mouse on the “File” tab and click on the “Open Model” option.



This display a “Select Window”, go to where the system is located and find the database model (in this guide is on “Admin” -> “iOSA-main” -> “db”) and open the “control_db” file.

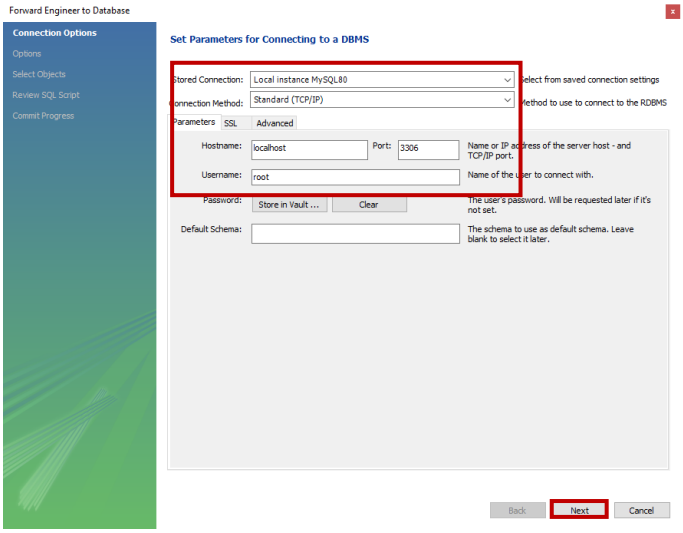


This will open the database model, this can help to comprehend how the system stores the data, but for now, select the “Database” tab option and click on the “Forward Engineer” option.

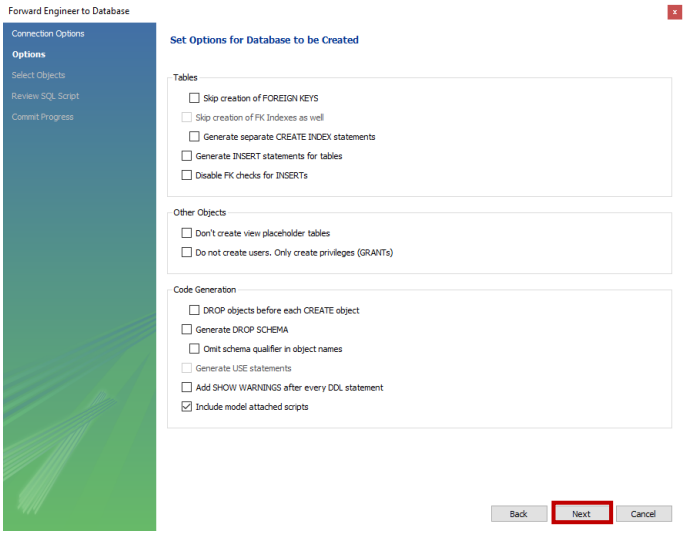


This will start a “step to step” guide. It doesn’t require to change any value but be sure to verify all the values are correct.

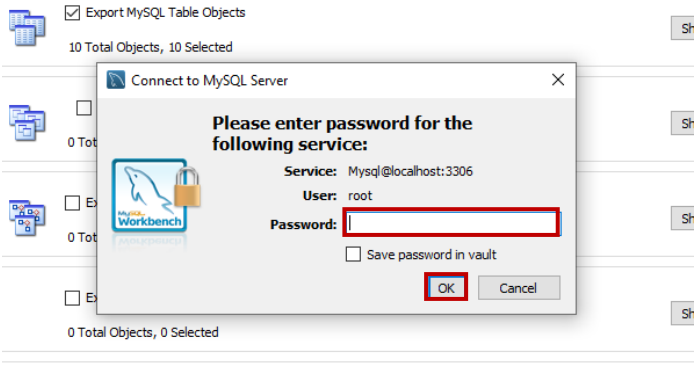
First select the “Local instance MySQL80”, leave the “Standard (TCP/IP)” connection method, the “localhost” hostname, “3306” port and the “root” user.



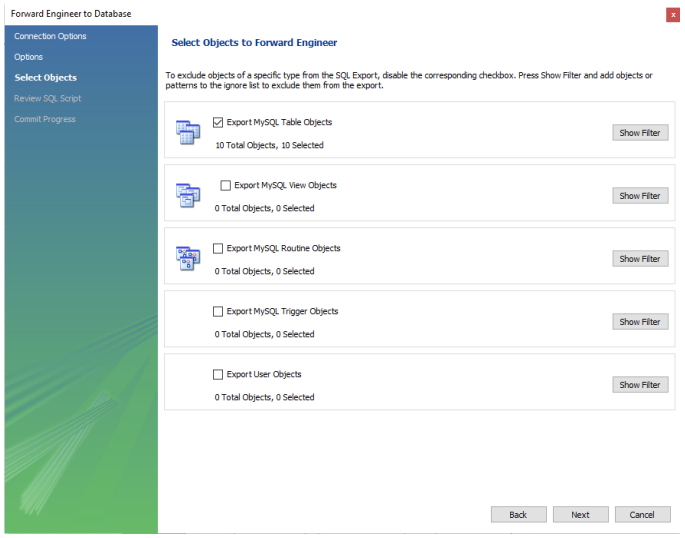
Don’t mark any checkbox, just click on the “Next” button.



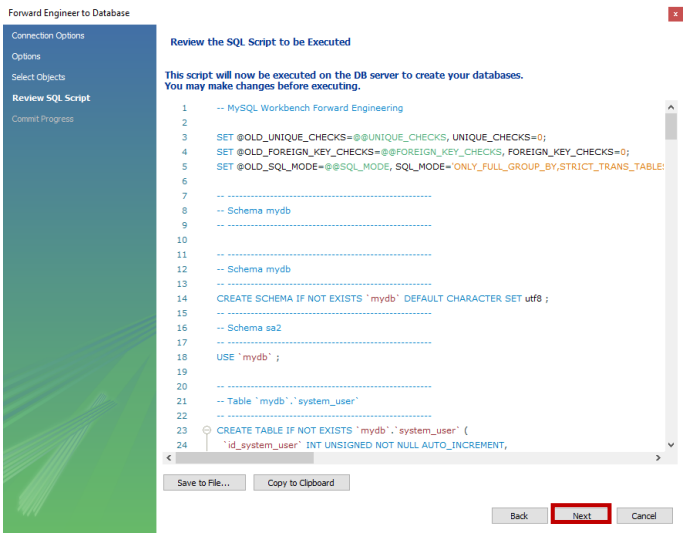
This will display a login dialog, so enter the “root” password (admin) and click on the “OK” button.



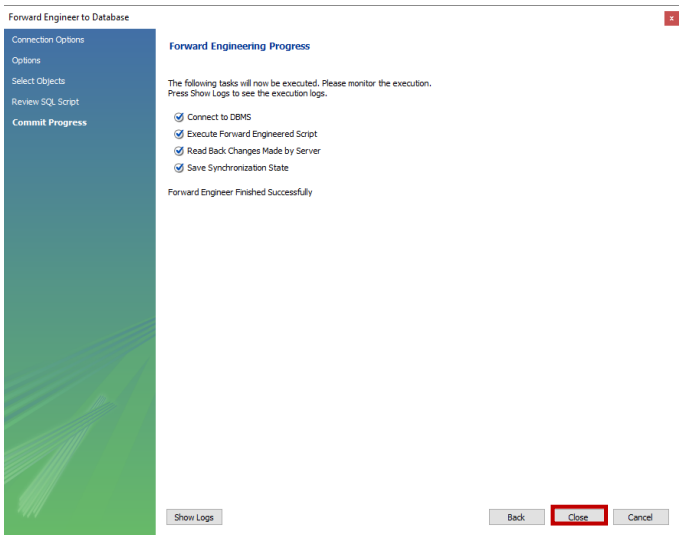
Again, leave all checkbox values and click on the “Next” button.



Lastly, an SQL file will be generated, it can be saved to another file but for now, click on the “Next” button.

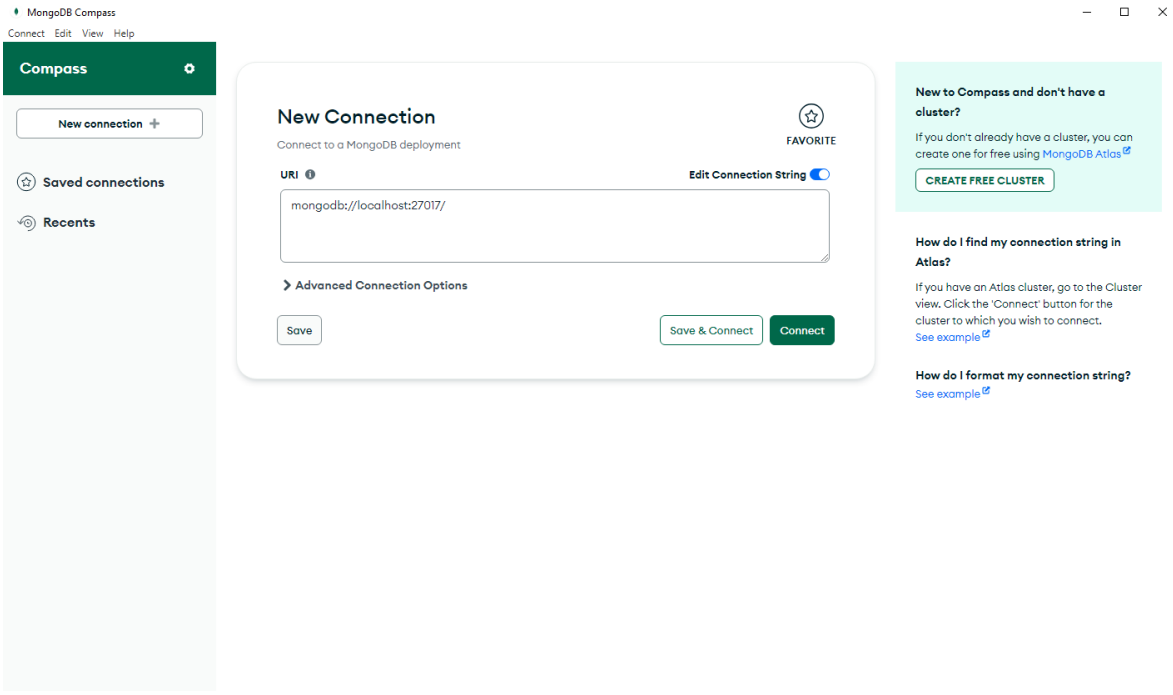


Finally, the model will generate a MySQL database so the system can safely store all the patient data. Once it finishes, click on the “Close” button.

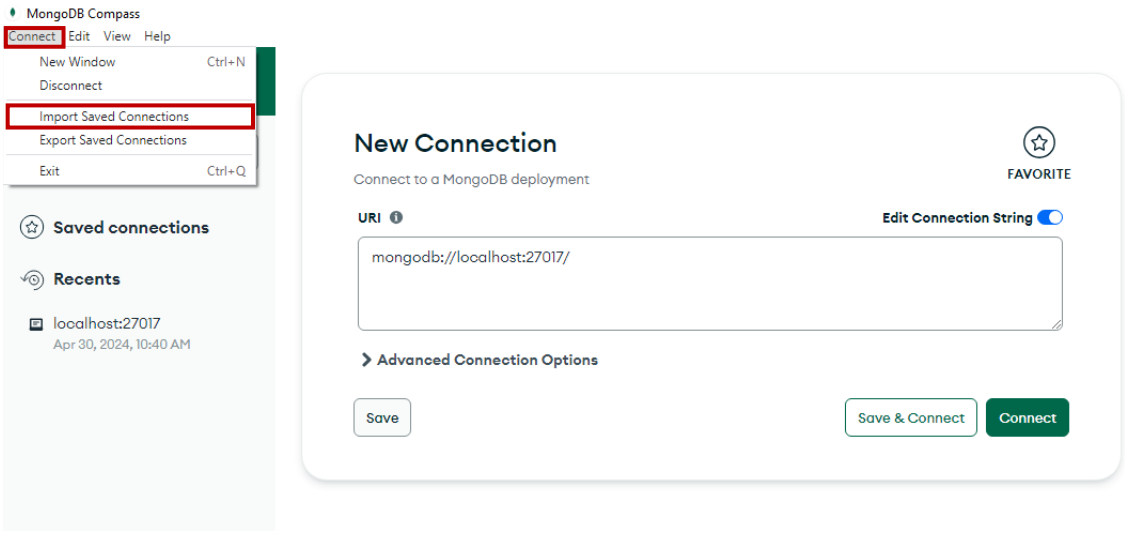


MongoDB Database

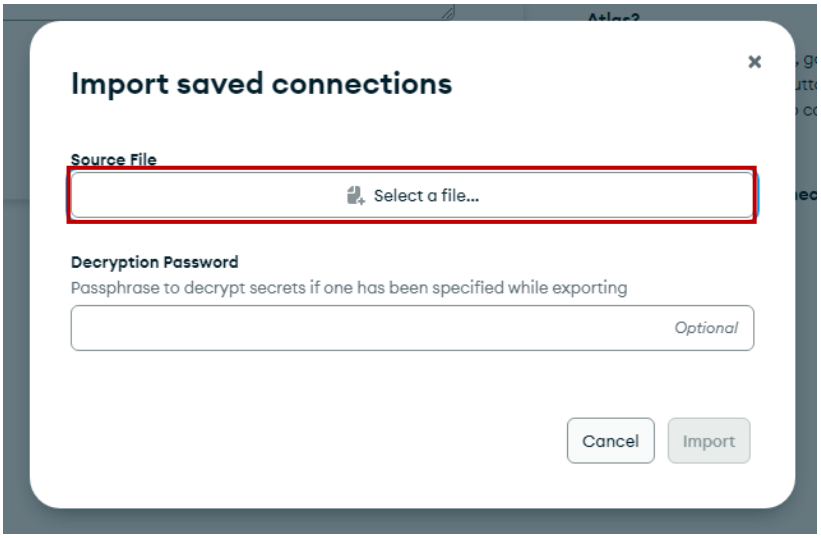
The system uses a second database using MongoDB and it also requires to be previously set up. So first, open “MongoDB Compass” application.



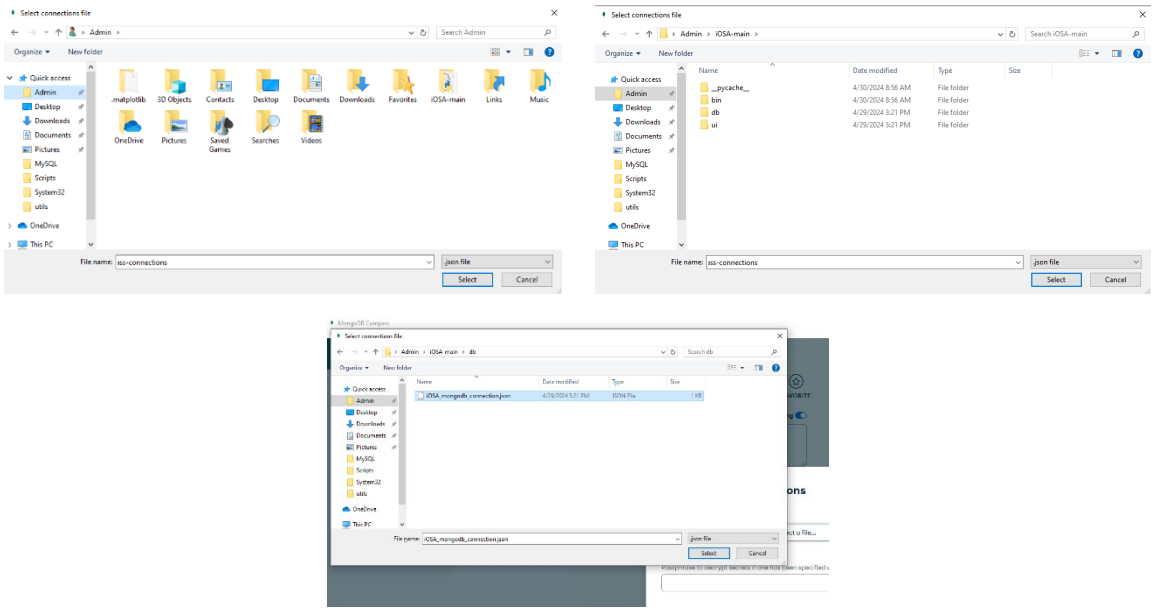
Hover on the “Connect” tab option and select the “Import Save Connections” option.



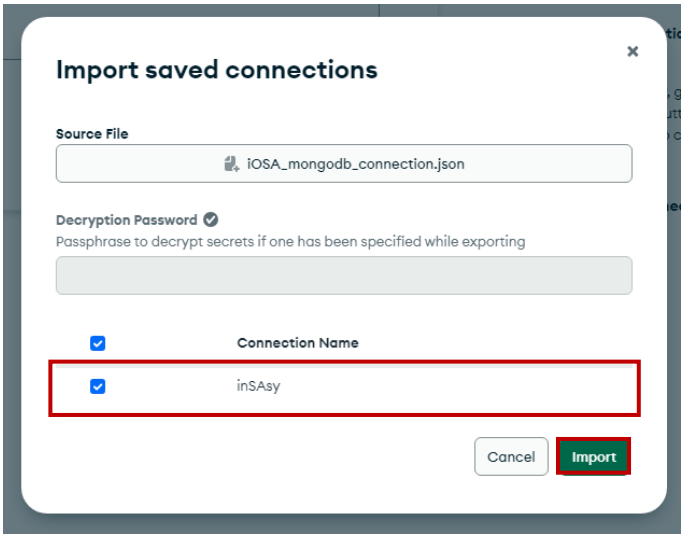
This will display a "Select file" dialog. Click on the "Select a file…" option



This display a "Select Window", go to where the system is located and find the database model (in this guide is on "Admin" -> "iOSA-main" -> "db") and open the "iOSA_mondodb_connection.json" file.



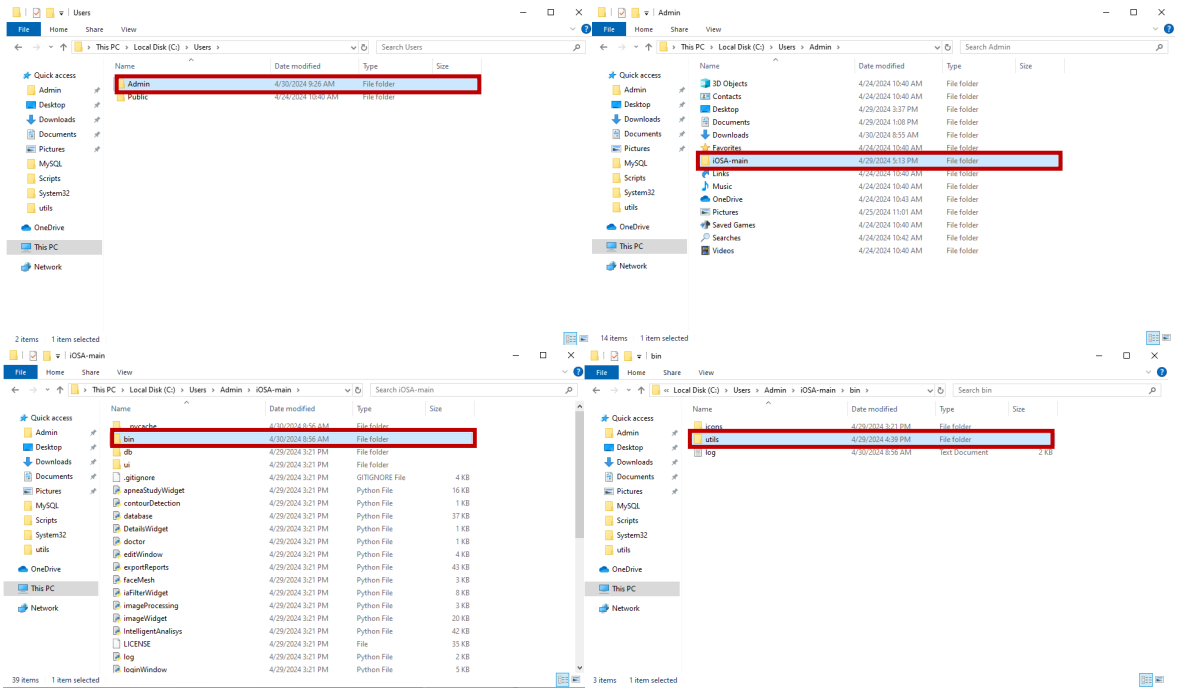
Select the inSAsy connection and click on the “Import” button. With this, the iOSA MondoDB database is set up and ready to store multimedia files.



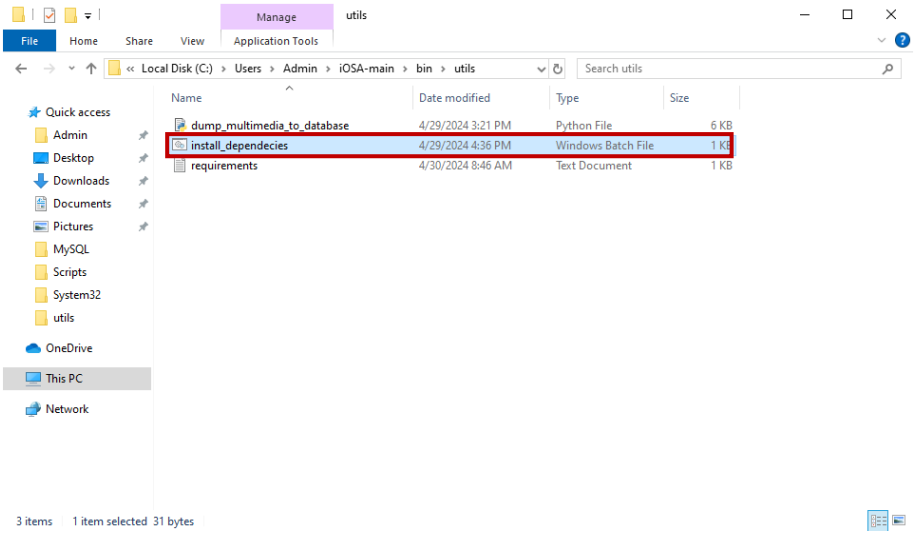
Python Dependencies

The system requires some specific python libraries to work correctly, so for this, the system has a script to install them. This is the last step for the system installation, so when this is finished the system will be ready to use.

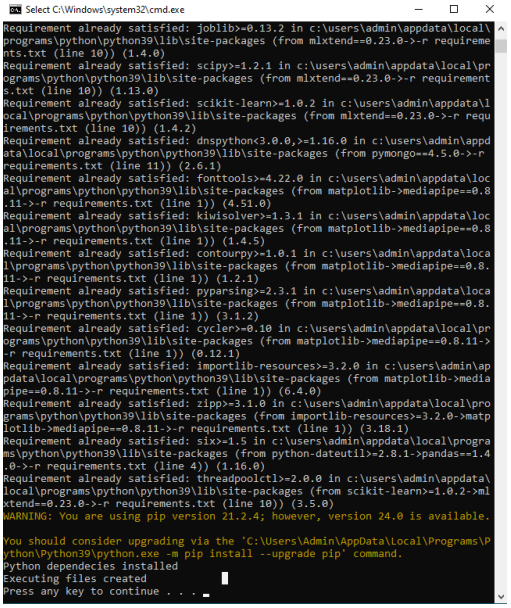
First, go to where the installation script is located. Following this guide would be on “admin” -> “iOSA-main" -> “bin” -> “utils”.



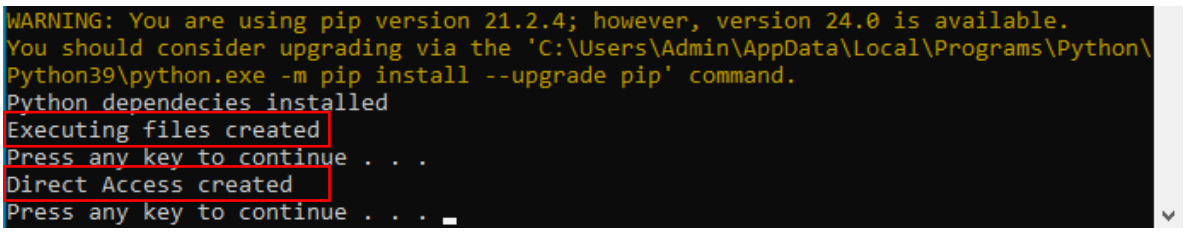
Double click on the “install_dependecies” file. This will open a “cmd” window.



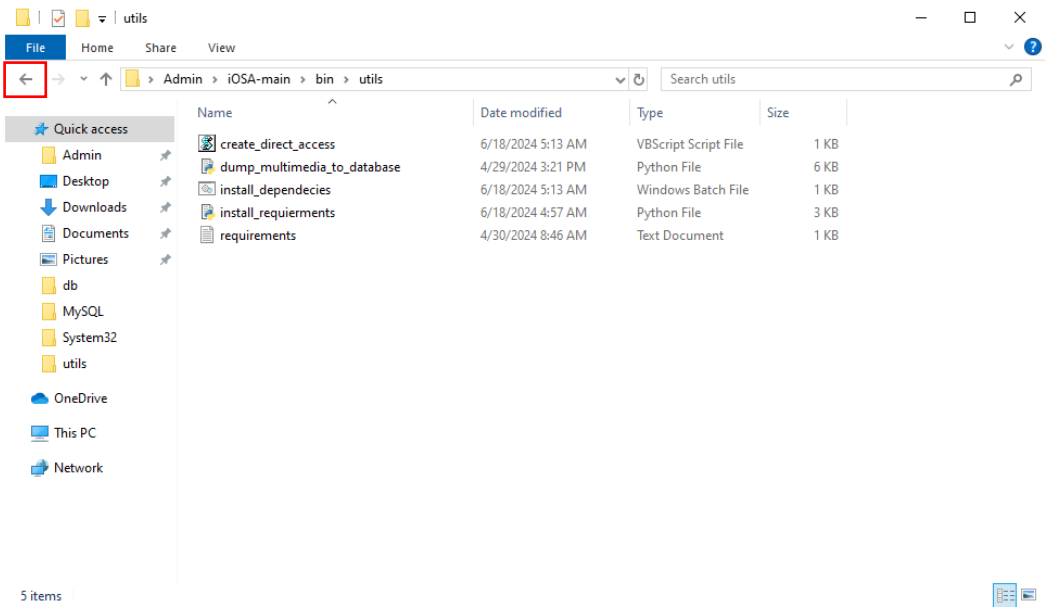
The script will automatically download all the require python libraries if the system already contains some libraries, they will be only copies, but if the doesn’t exist a download progress bar will appear. Depending on the internet bandwidth is the time it will take to finish this process.



The message “Press any key to continue” will appear. So, press any key on the keyboard. Then a message appears informing the “Direct Access” has been created. Press again any key on the keyboard to finalize the installation.

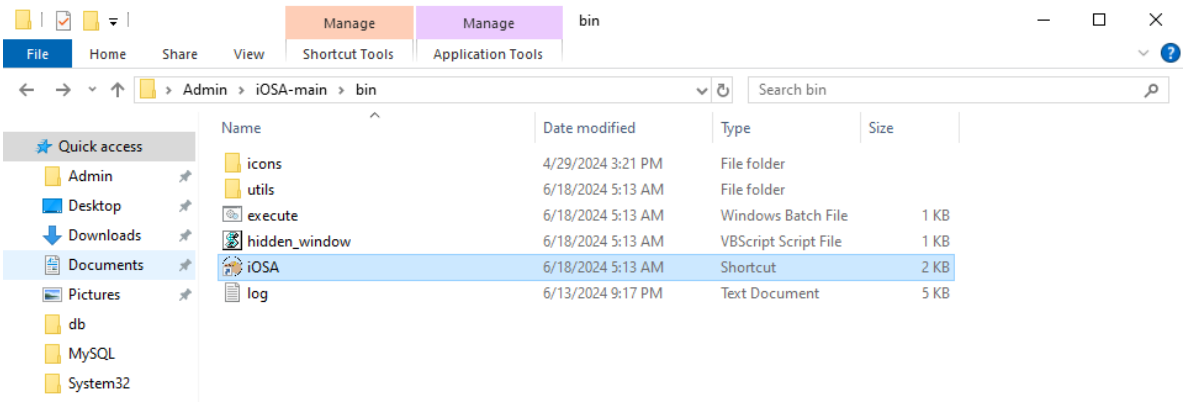


Now, go to the previous folder clicking on the upper left arrow.

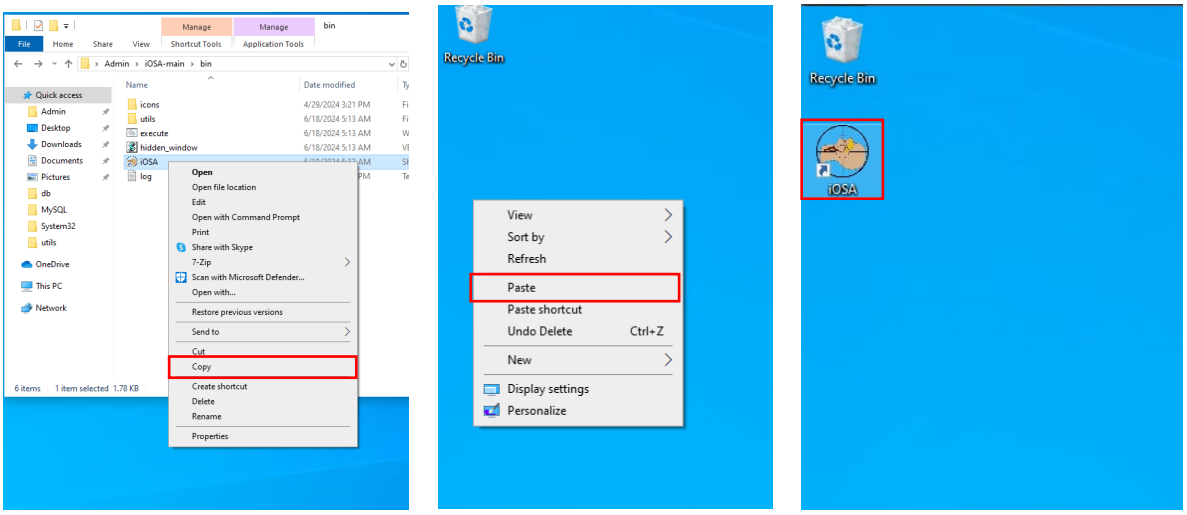


Finally, three files have been generated. The first one has (execute) is for starting the system in case an unreported problem occurs. The second one (hidden_window) is just to hide de CMD window that the execute file opens. The system can also be executed from this file, with the exception that no errors will be shown.

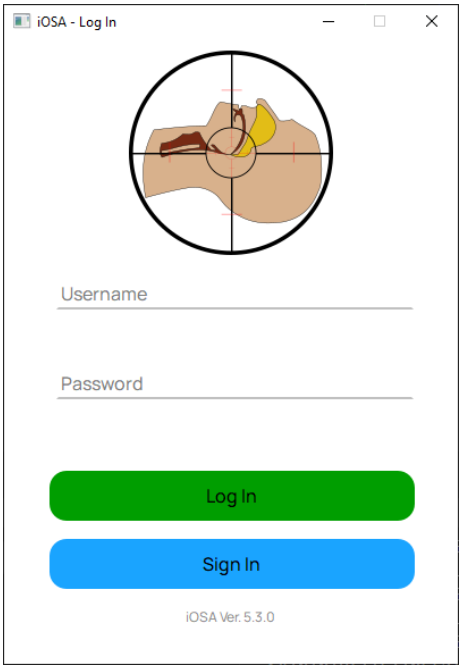
Lastly, the third file is direct access that can be copied to the desktop and start the iOSA system.



For more comfort, it is recommended to copy direct access to the desktop.



To start the iOSA system just double click on direct access.



Regarding how to use the system please read the “User Guide”.