



UNIVERSITY OF
WOLLONGONG
AUSTRALIA



School of Computer Science & Software Engineering

Bachelor of Computer Science (Digital Systems Security)

CSCI321- Project

User Manual

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Table of Contents

Document Control.....	3
Roles	3
Record of Revision	3
Application Summary	4
Getting Started	4
Installation.....	4
<i>WampServer</i>	4
<i>Tesseract</i>	12
<i>OpenCV</i>	17
Starting the Program	19
<i>Manage Website Content</i>	19
<i>Manage Admins</i>	25
<i>Manage Critical Section</i>	30
<i>Authentication: Visual Cryptography</i>	32

Document Control

Title: Secure Remote Authentication using Visual Cryptography

Owner	Current Version	Last Modified	
Hidir Ibrahim	1.0	Date	Time
Nitisha Venkatachari		31/12/2018	1700
Eustacia Lim You Yan			

Roles

Name	Role
Hidir Ibrahim	Project Leader
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Record of Revision

Revision Date	Description	Section Affected	Changes Made By	Version
31/12/2018	Document Created	All	Everyone	1.0
1/3/2019	Modification of Document	All	Everyone	1.1

Application Summary

This user manual provides a walkthrough of the program and how each function works. This program provides a two-factor authentication using password as primary authentication and Visual Cryptography as the second authentication if the user required to access critical sections of the system.

Getting Started

The following items should be present before running the program:

WampServer – A local server package for Windows, allowing you to install and host web applications that use Apache, PHP and MySQL.

Tesseract – An Optical Character Recognition (OCR) tool that recognize and “read” the text embedded in images.

PHPMailer – An opensource PHP libraries to send emails.

BulletProof – A single-class library to upload images in PHP with security.

Pytesseract 0.2.6 – Allow to access Tesseract OCR program through the web using Python.

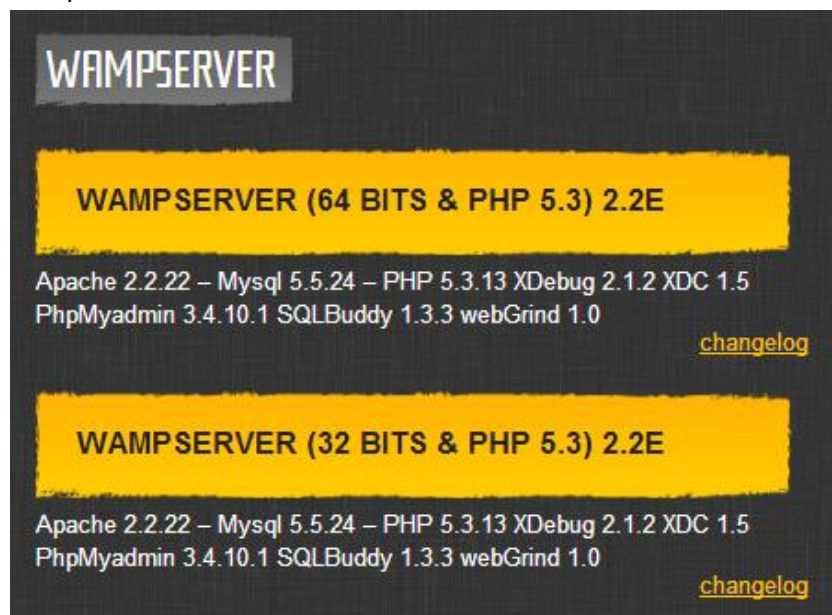
OpenCv – A python library that supports image processing.

Installation

WampServer

Step 1: Download WampServer

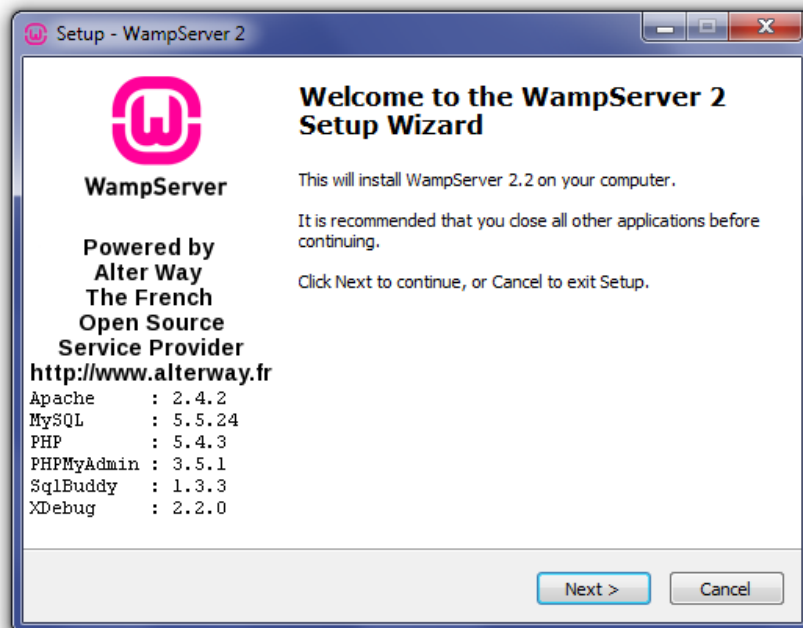
The newest installation version currently available can be downloaded from <http://www.wampserver.com/en/#download-wrapper> which should be installed on the computer.



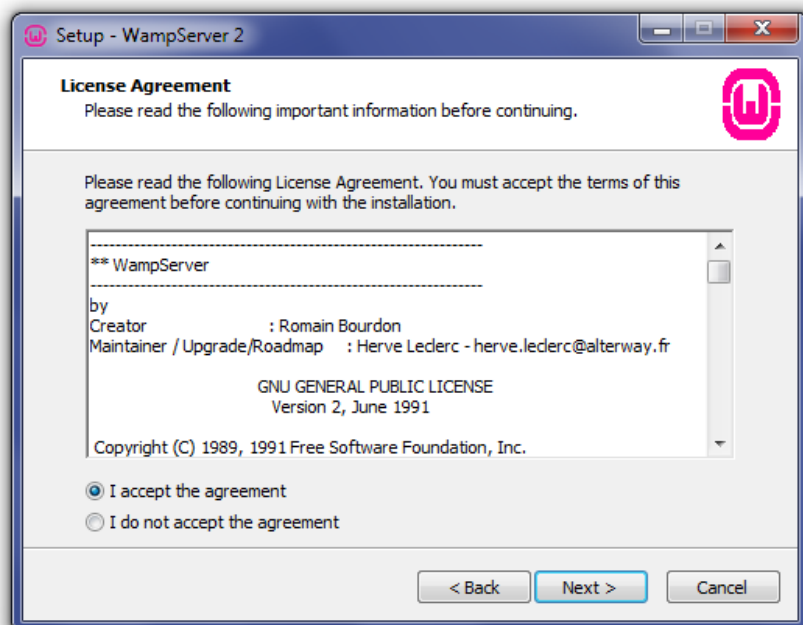
Step 2: Install WampServer

To start the installation process, you need to open the folder where you saved the file and double-click the installer file. A security warning window will open, asking if you are sure you want to run this file. Click **Run** to start the installation process.

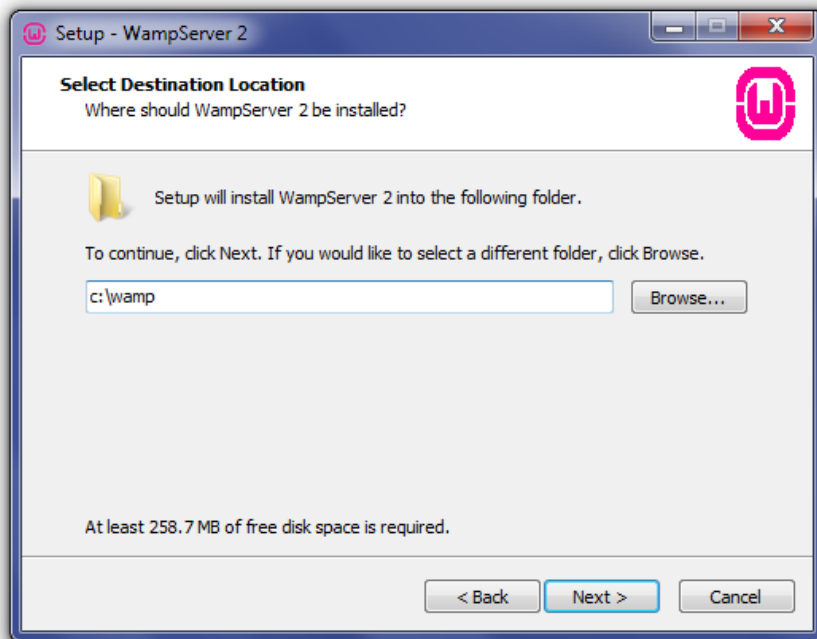
Next you will see the Welcome to the WampServer setup Wizard screen. Click **Next** to continue the installation.



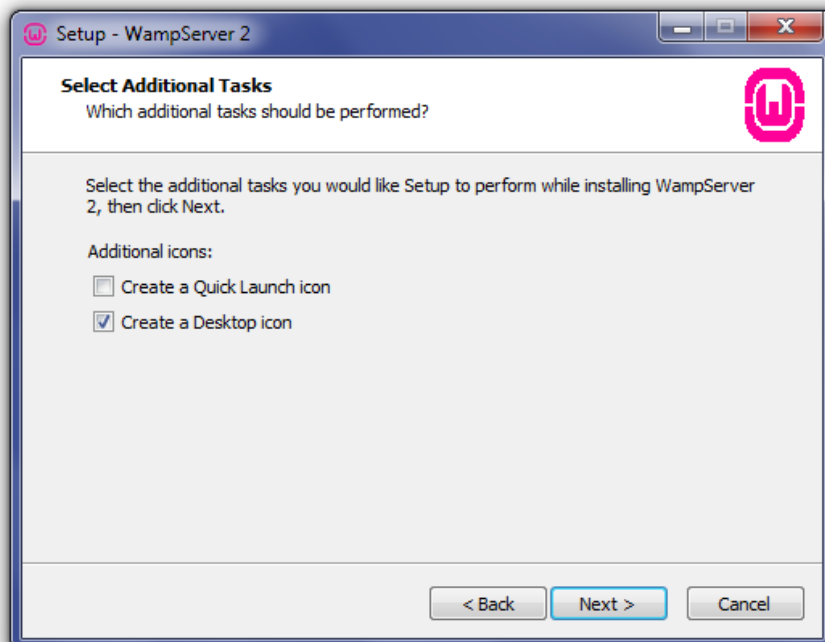
You will then be presented with is the License Agreement on the next screen. Read the agreement, check the radio button next to **I accept the agreement**, then click **Next** to continue the installation.



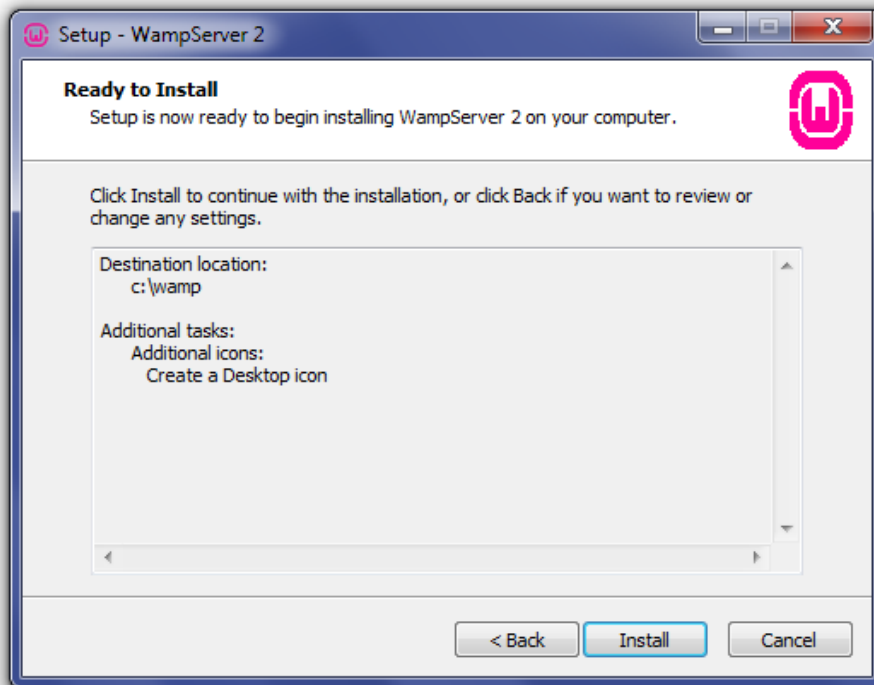
Next, you will see the Select Destination Location screen. Select where you want to install the WampServer. Click **Next** to continue.



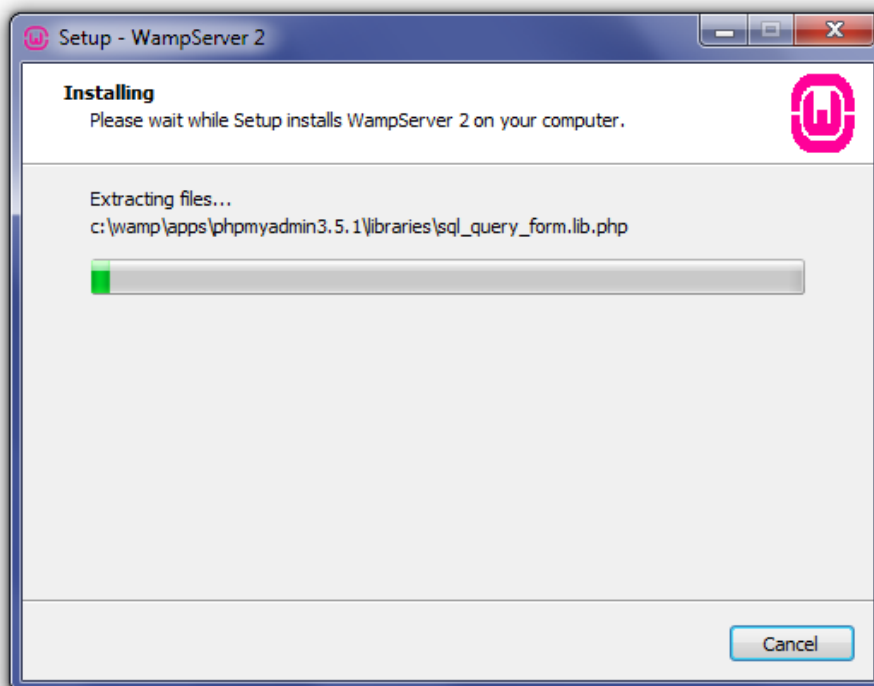
The next screen you are presented with is the Select Additional Tasks screen. You will be able to select whether you would like a Quick Launch icon added to the taskbar or a Desktop icon created once installation is complete. Mark your selections, then click **Next** to continue.



Next you will see the Ready to Install screen. You can review your setup choices and change any of them by clicking Back to the appropriate screen, if you choose to. Once you have reviewed your choice, click **Install** to continue.



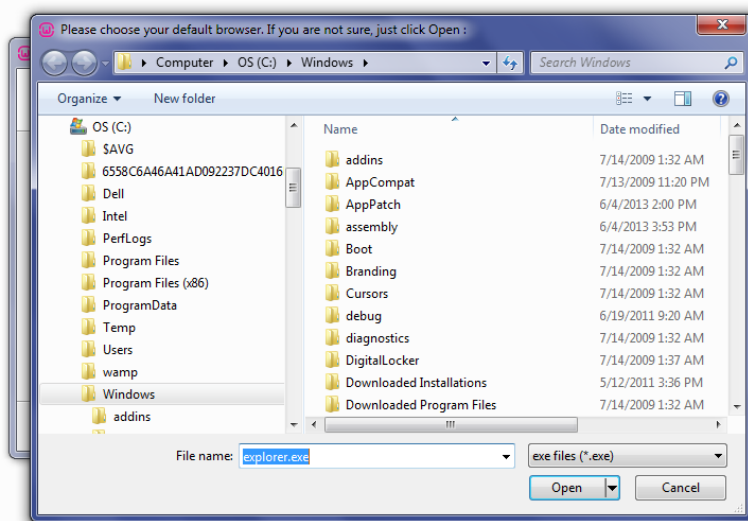
WampServer will begin extracting files to the location you selected.



Once the files are extracted, you will be asked to select your default browser. WampServer defaults to Internet Explorer upon opening the local file browser window. If your default browser is not IE, then look in the following locations for the corresponding .exe file.

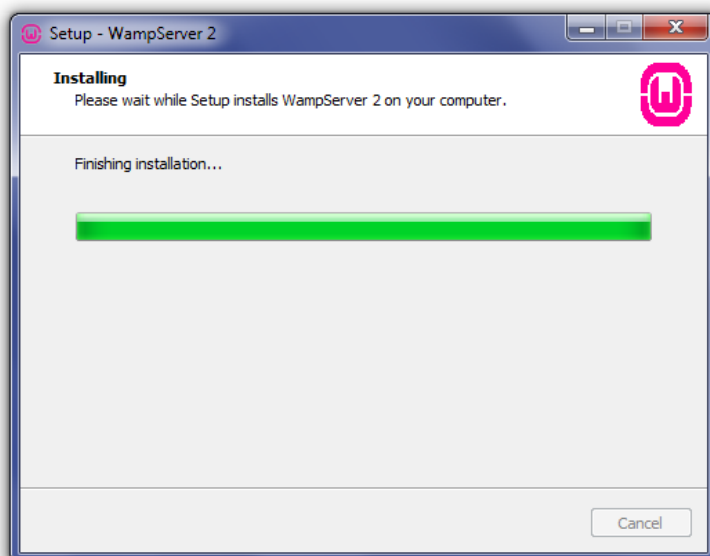
- **Opera:** C:\Program Files (x86)\Opera\opera.exe
- **Firefox:** C:\Program Files (x86)\Mozilla Firefox\firefox.exe
- **Safari:** C:\Program Files (x86)\Safari\safari.exe
- **Chrome:** C:\Users\xxx\AppData\Local\Google\Chrome\Application\chrom.exe

Select your default browser's exe file, then click **Open** to continue.

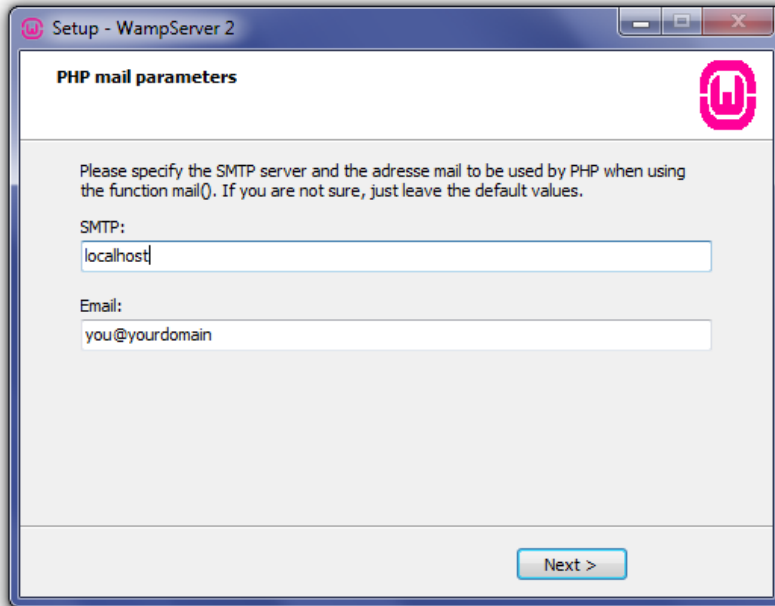


A Window Security Alert window will open, saying that Windows Firewall has blocked some features of the program. Check whether you want to allow Apache HTTP Server to communicate on a private or public network, then click **Allow Access**.

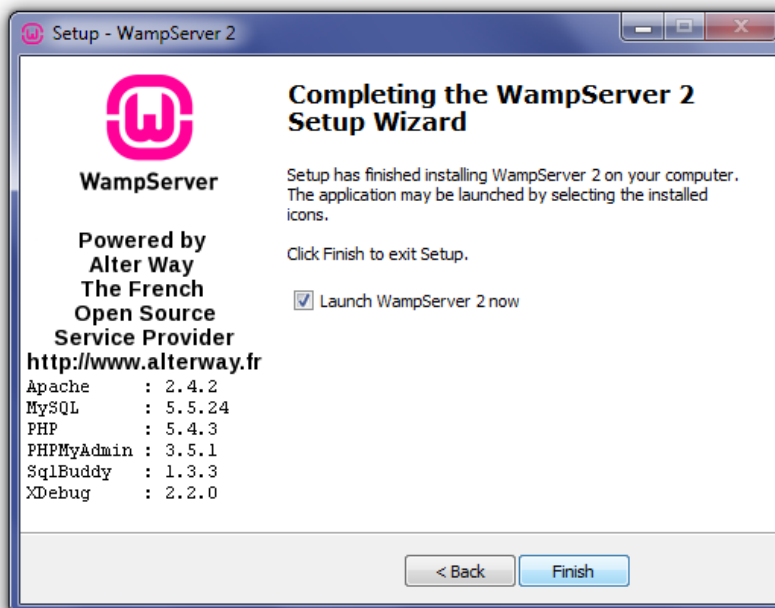
The Setup screen will appear next, showing you the status of the installation process.



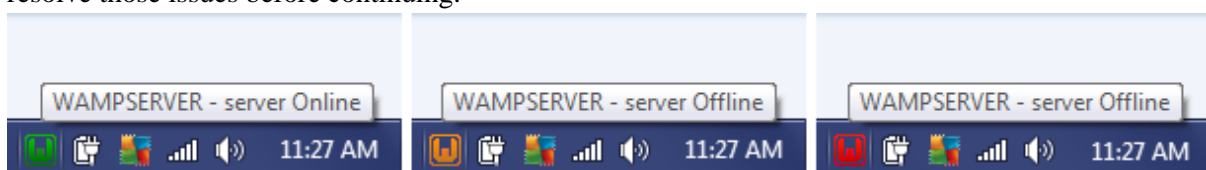
Once the progress bar is completed, the PHP Mail Parameters screen will appear. Leave the SMTP server as **localhost** and change the email address to one your choosing. Click **Next** to continue.



The Installation Complete screen will now appear. Check the **Launch WampServer Now** box, then click **Finish** to complete the installation.

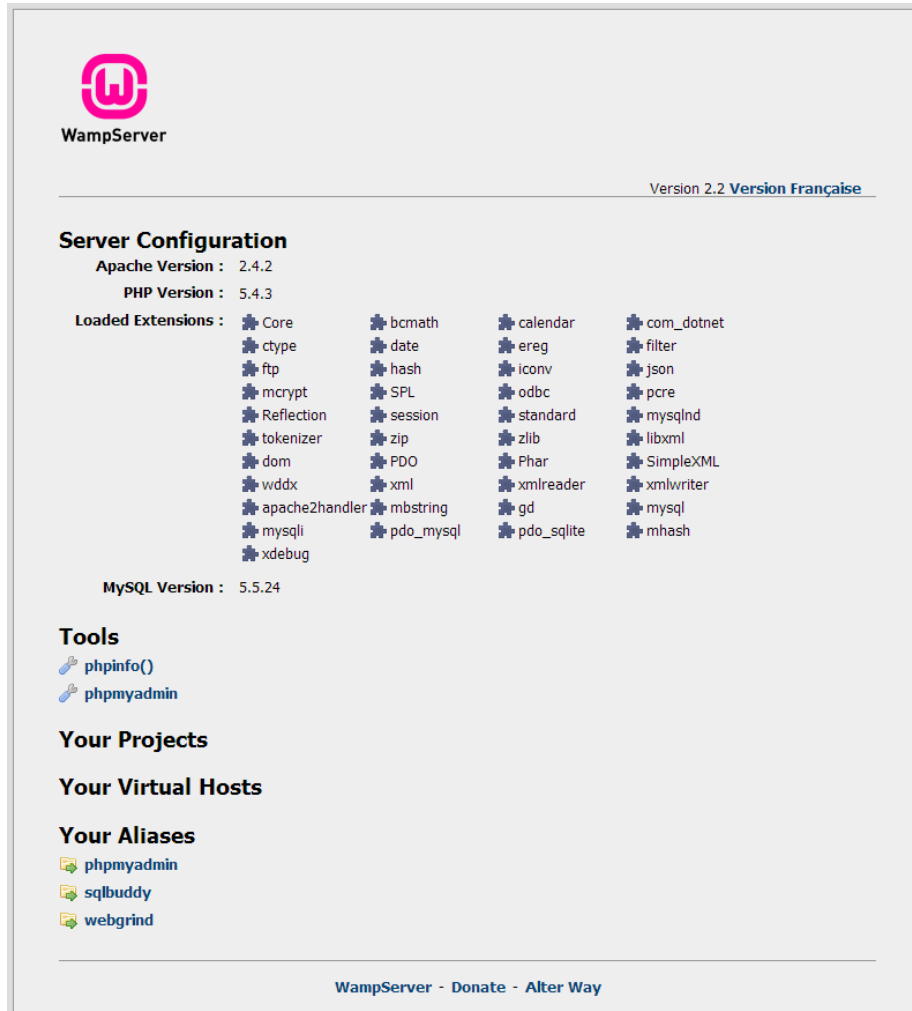


The WampServer icon should appear in the system tray on the right side of your taskbar. If the icon is green, then everything is working properly. If the icon is orange, then there are issues with one of the services. If the icon is red, then both Apache and MySQL services aren't running. You will need to resolve those issues before continuing.



Step 3: Run WampServer

Once the installation process is completed, run your installation by going to <http://localhost/> in your browser. You should see the WampServer homepage displayed.



If the WampServer homepage does not display, you will want to check that your hosts file has **localhost mapped to 127.0.0.1**, and you aren't running any other services on port 80, such as another local server (XAMPP, DesktopServer, etc), WebDAV, or Skype.

Step 4: Importing a MySQL Database with WampServer

Creating a database in WampServer is done via phpMyAdmin. You can access phpMyAdmin by entering <http://localhost/phpmyadmin/> in your web browser.

The main phpMyAdmin screen will appear. On the left is a list of databases that already exist: **information_schema**, **mysql**, and **performance_schema**. Do not delete these, as they are necessary for WampServer and phpMyAdmin to run properly.

To import a database, click **Import** in the main navbar at the top.



On the importing screen, you will need to choose the .sql file to import from your computer, then click **Go**.

Importing into the current server

File to import:

File may be compressed (gzip, bzip2, zip) or uncompressed.

A compressed file's name must end in `.[format].[compression]`. Example: `.sql.zip`

Browse your computer: No file chosen (Max: 128MiB)

You may also drag and drop a file on any page.

Character set of the file:

You will see a success message once the database has been imported, and the imported database will appear in the list on the left.

The screenshot shows the phpMyAdmin console output for a successful import. It consists of several green status bars and SQL query logs. The first green bar states: "Import has been successfully finished, 24 queries executed. (fyp_portal.sql)". Subsequent green bars indicate "MySQL returned an empty result set (i.e. zero rows). (Query took 0.0003 seconds.)". The SQL logs show various queries including a phpMyAdmin SQL Dump header, a SET SQL_MODE query, a SET AUTOCOMMIT query, a START TRANSACTION query, a SET time_zone query, and a /*!40101 SET @OLD_CHARACTER_SET_CLIENT=@@CHARACTER_SET_CLIENT */ query. Each log entry is followed by links for [Edit inline], [Edit], and [Create PHP code]. At the bottom, there is a "Console" tab icon.

The default phpMyAdmin user, **root**, is automatically assigned to the database upon creation, and has no password.

```
/** The name of the database for WordPress */
define('DB_NAME', 'root_databasename');

/** MySQL database username */
define('DB_USER', 'root');

/** MySQL database password */
define('DB_PASSWORD', '');

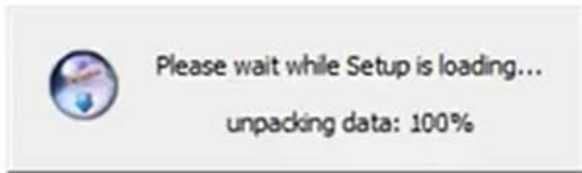
/** MySQL hostname */
define('DB_HOST', 'localhost');
```

Tesseract

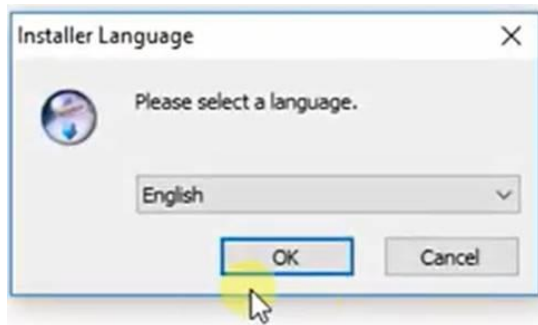
Step 1: Download Tesseract

The newest installation version currently available can be downloaded from <https://github.com/tesseract-ocr/tesseract/wiki/Downloads> which should be installed on the computer.

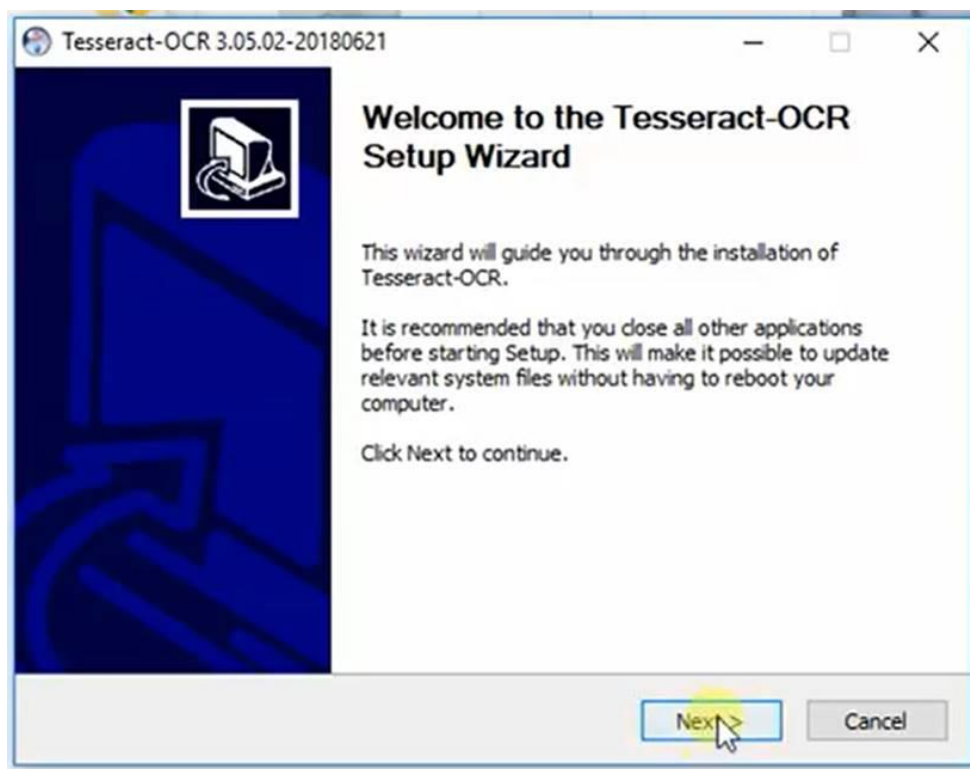
Step 2: Load Setup

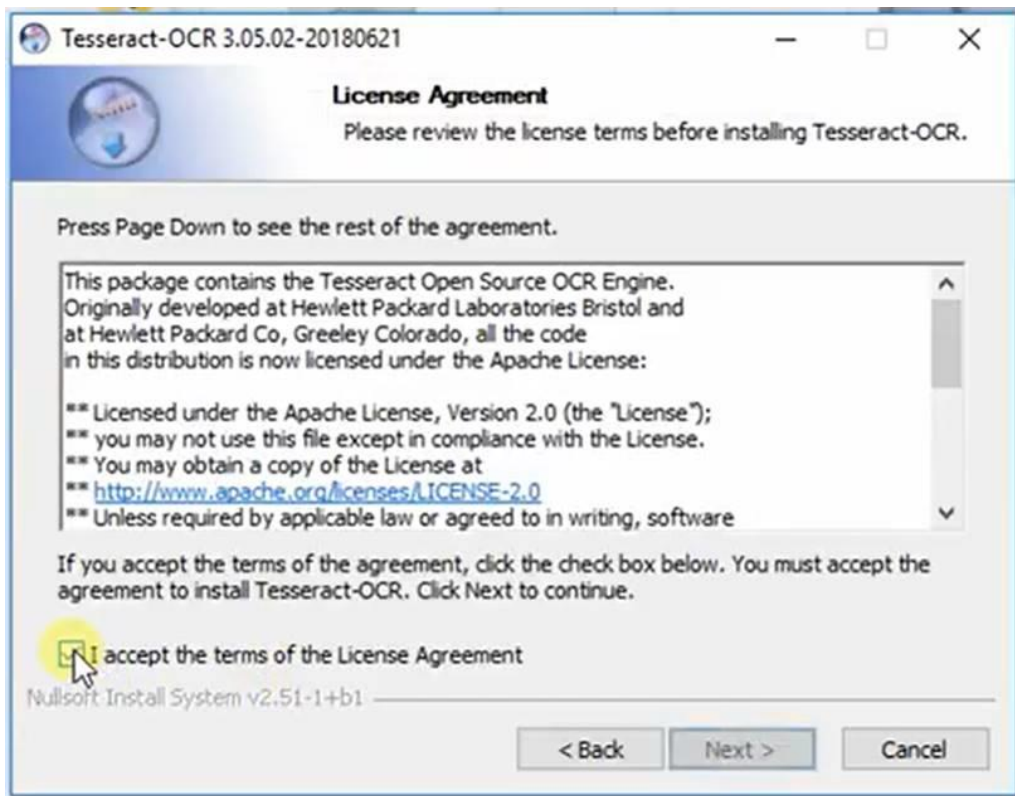
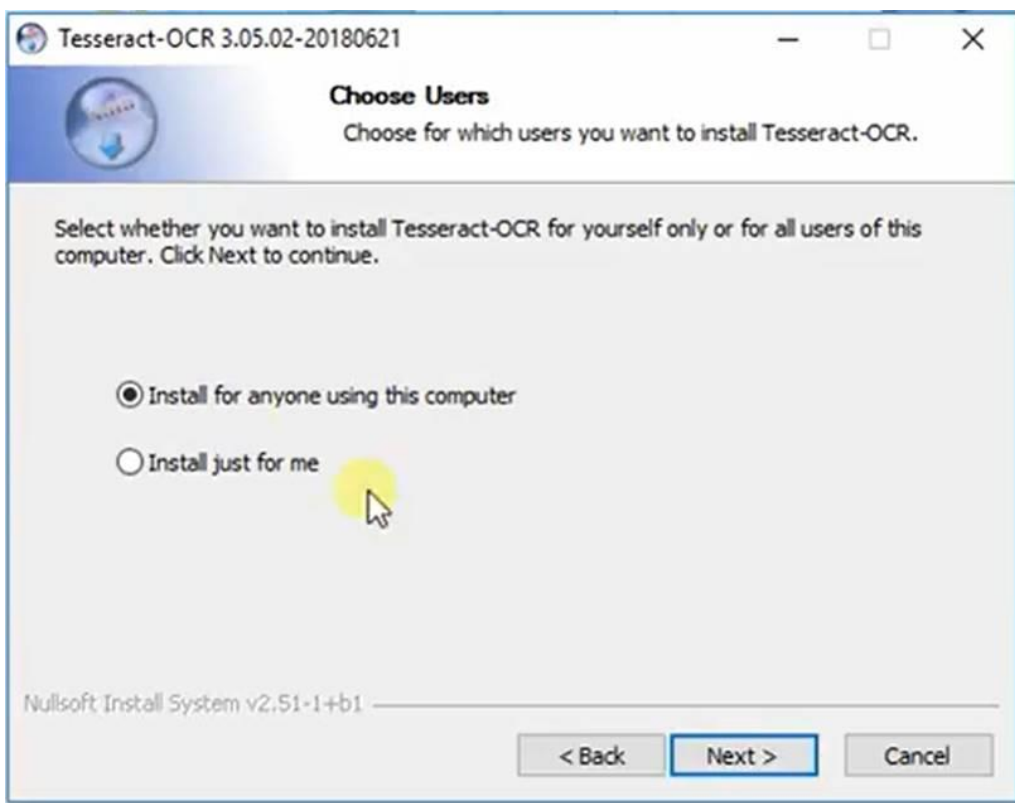


Step 3: Choose Language

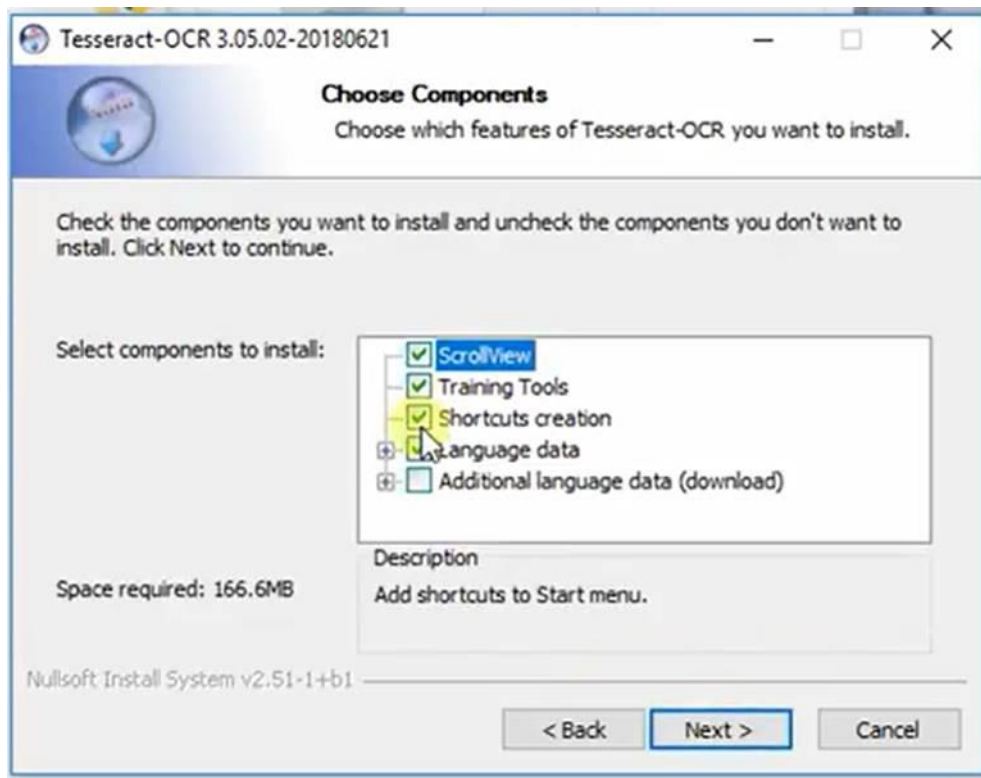


Step 4: Start Setup Wizard



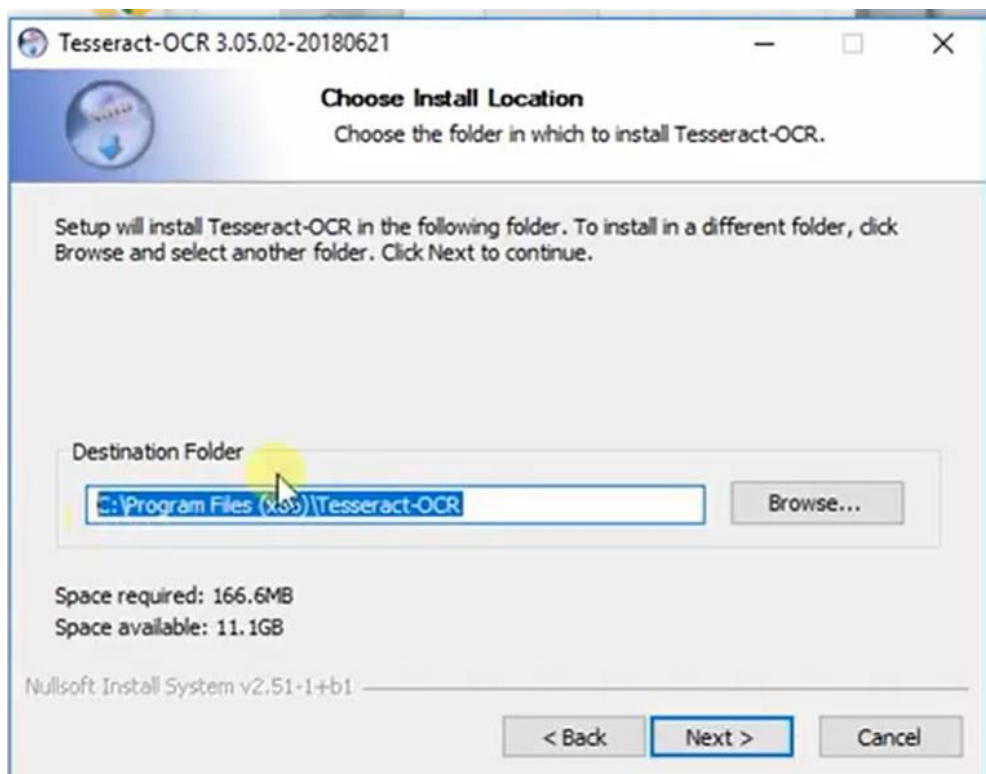
Step 5: Accept License AgreementStep 6: Choose Users

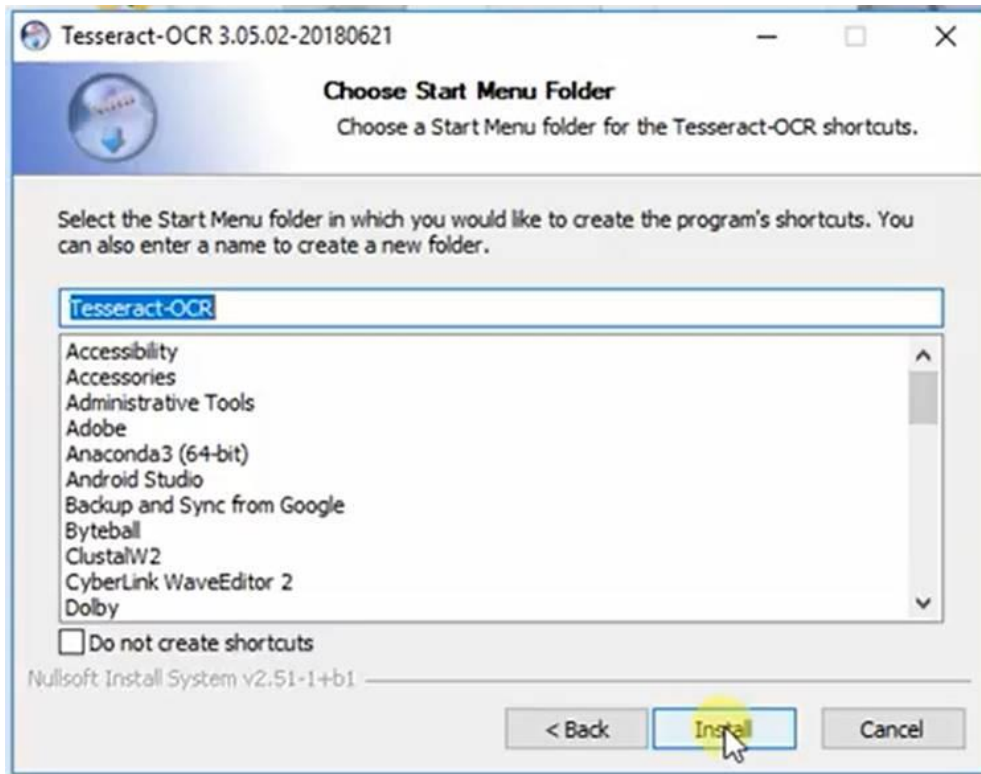
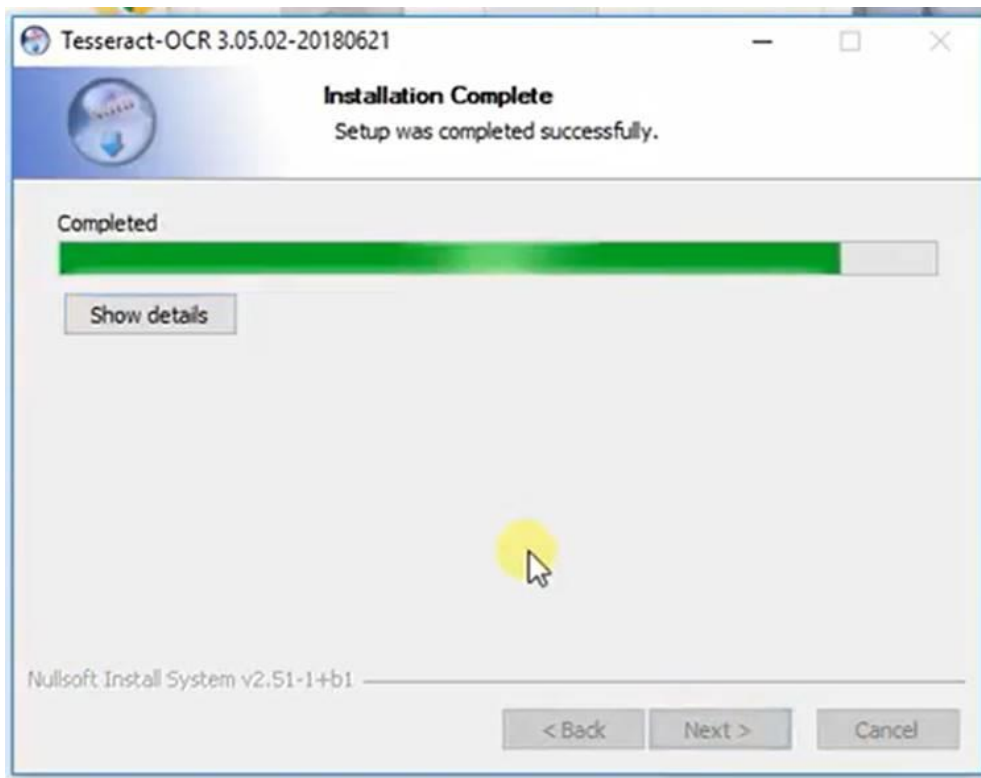
Step 7: Select Components

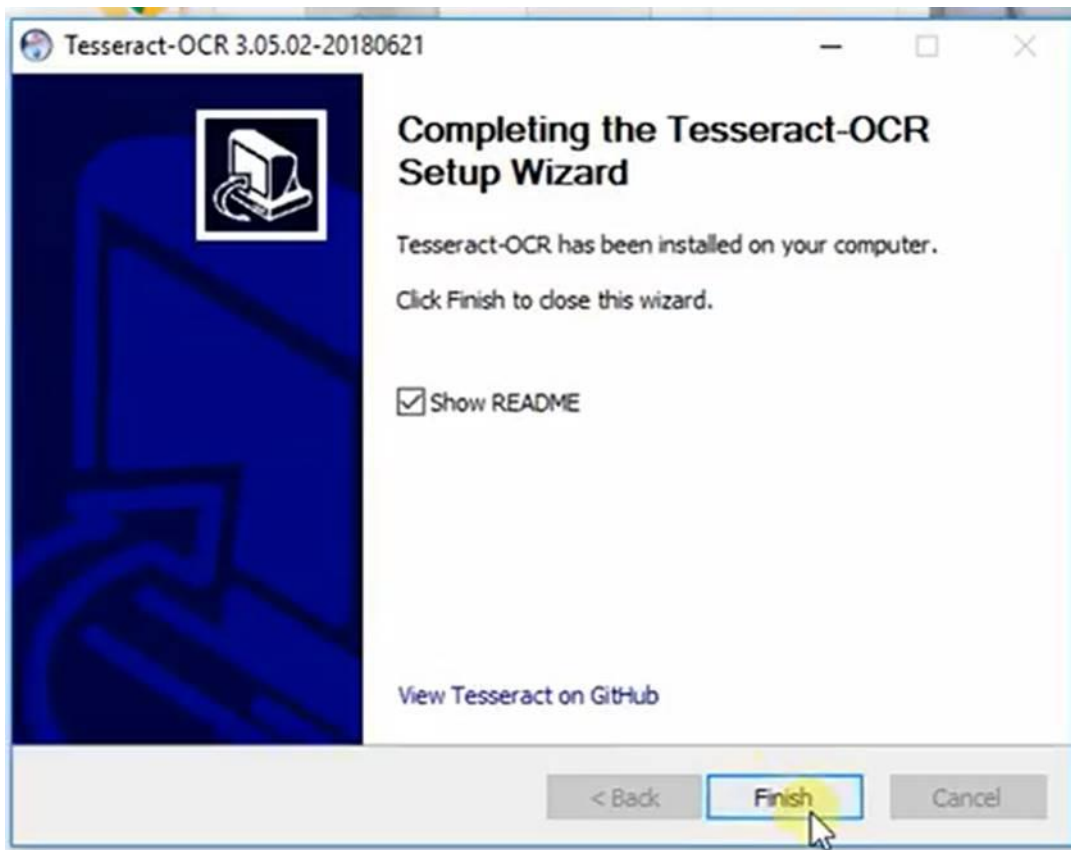


Step 8: Choose Install Location

Default location is usually C:\Program Files (x86) \ Tesseract-OCR



Step 9: Choose Start Menu FolderStep 10: Installation Complete

Step 11: Complete Setup Wizard

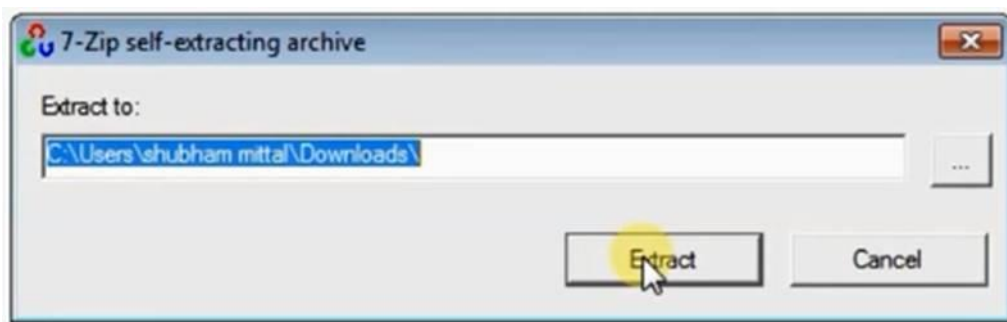
OpenCV

Step 1: Download OpenCV

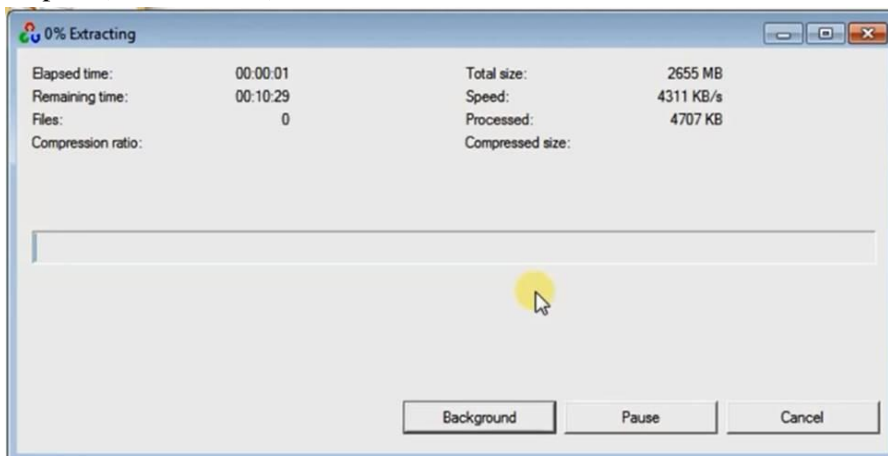
The newest installation version currently available can be downloaded from <https://opencv.org/releases.html> which should be installed on the computer.

Step 2: Extract Contents

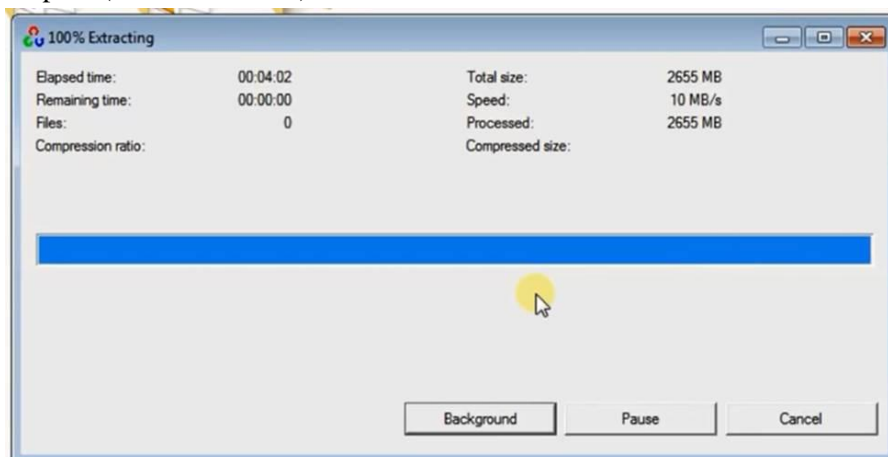
Default folder is usually in C:\Users\ (nameOfUser'sComputer) \Downloads\



Step 1a (0% Extracted)

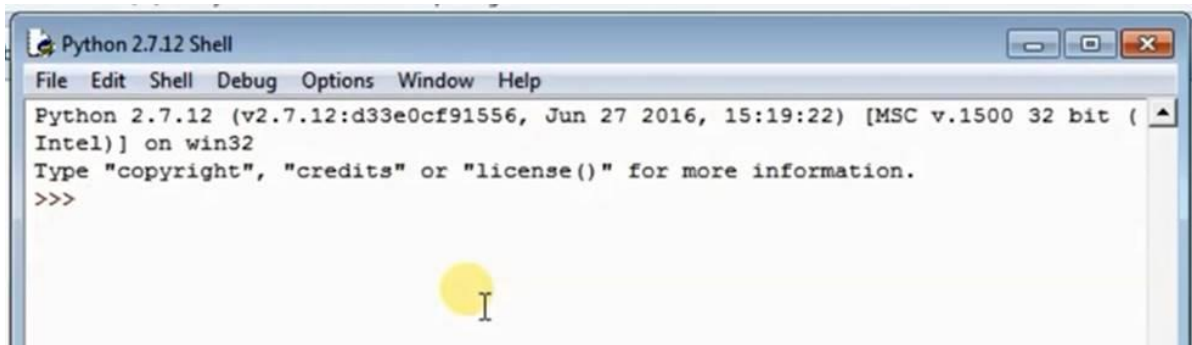


Step 1b (100% Extracted)



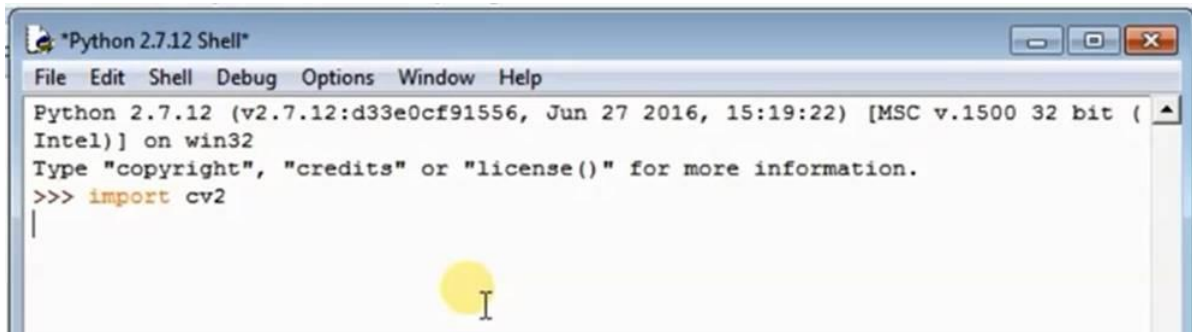
Step 2: Go to Python Shell

Version used in sample installation is Python 2.7.12.



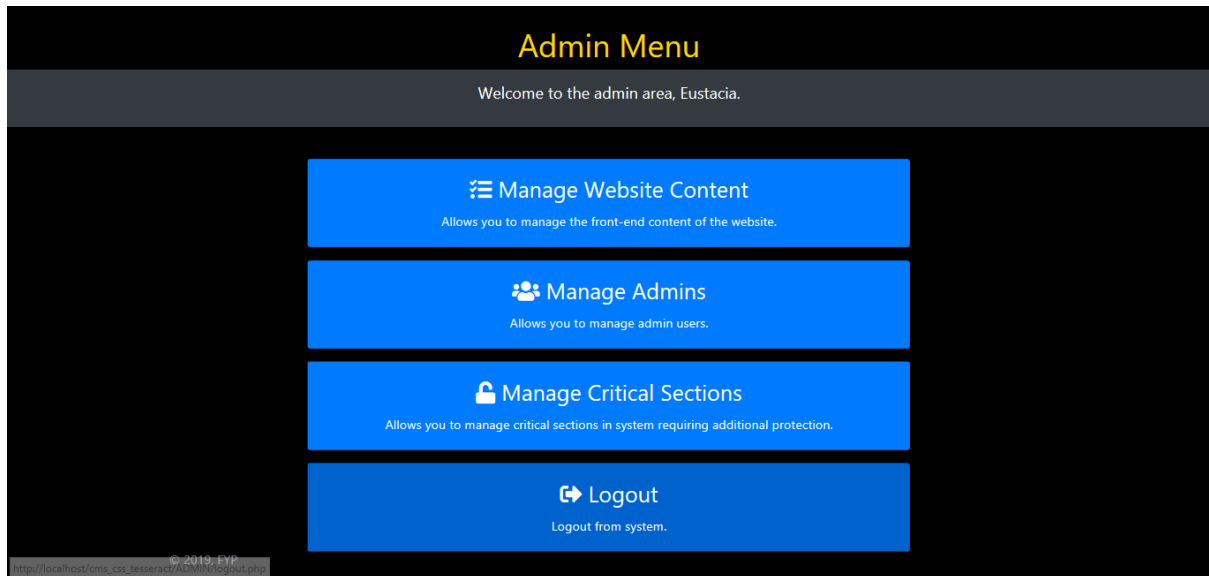
Step 3: Import cv2

This is to test and verify that the installation is successful.



Starting the Program

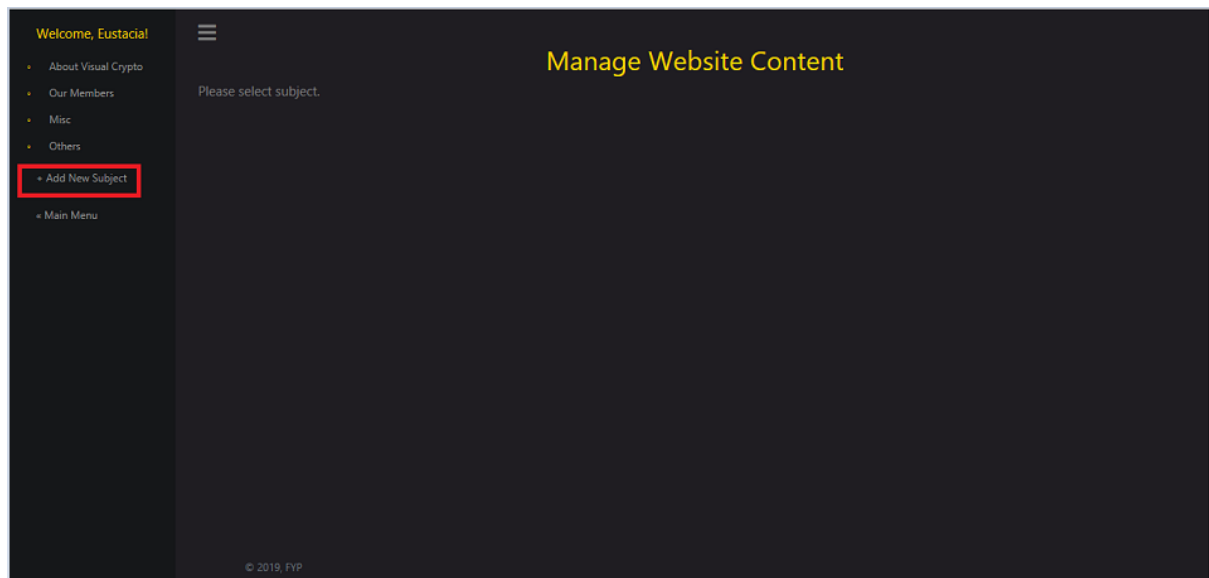
Run WampServer on the computer and open browser (e.g. Google Chrome, Firefox). In the browser, type in <http://127.0.0.1/> to run the localhost. Under Your Project, you can see that file *package* is included. Then run http://127.0.0.1/cms_css_tesseract/. The home page will be displayed.



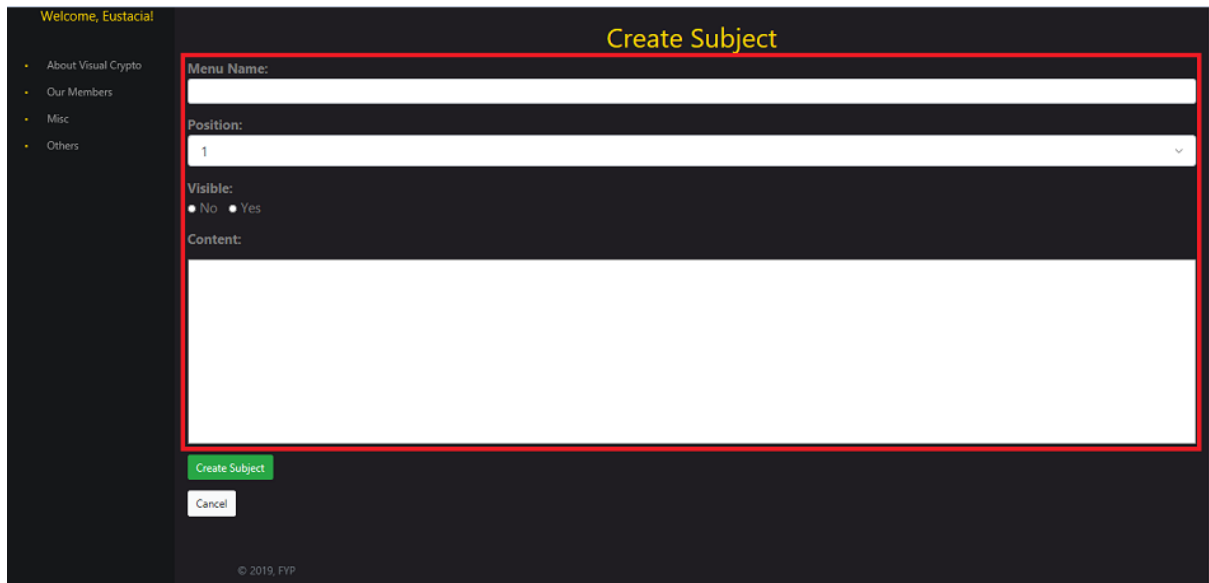
Manage Website Content

Add Subject

Step 1: Click on Add New Subject from the sidebar.

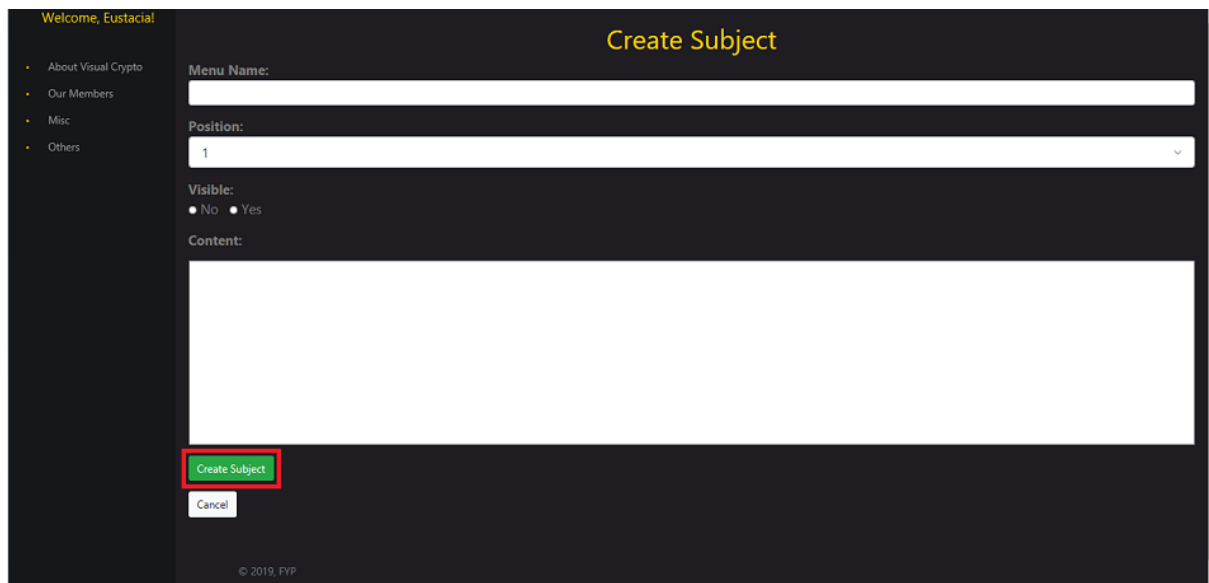


Step 2: Fill in the Menu Name, Position, Visibility Option and Content.



The screenshot shows a web interface with a dark sidebar on the left containing a 'Welcome, Eustacial!' message and a list of menu items: 'About Visual Crypto', 'Our Members', 'Misc', and 'Others'. The main content area has a title 'Create Subject' in yellow. Below the title is a form with the following fields: 'Menu Name:' with a text input, 'Position:' with a dropdown menu showing '1', 'Visible:' with radio buttons for 'No' and 'Yes', and 'Content:' with a large text area. A red rectangular box highlights the 'Menu Name', 'Position', 'Visible', and 'Content' sections. At the bottom of the form are two buttons: 'Create Subject' (green) and 'Cancel' (white). A copyright notice '© 2019, FYP' is visible at the very bottom.

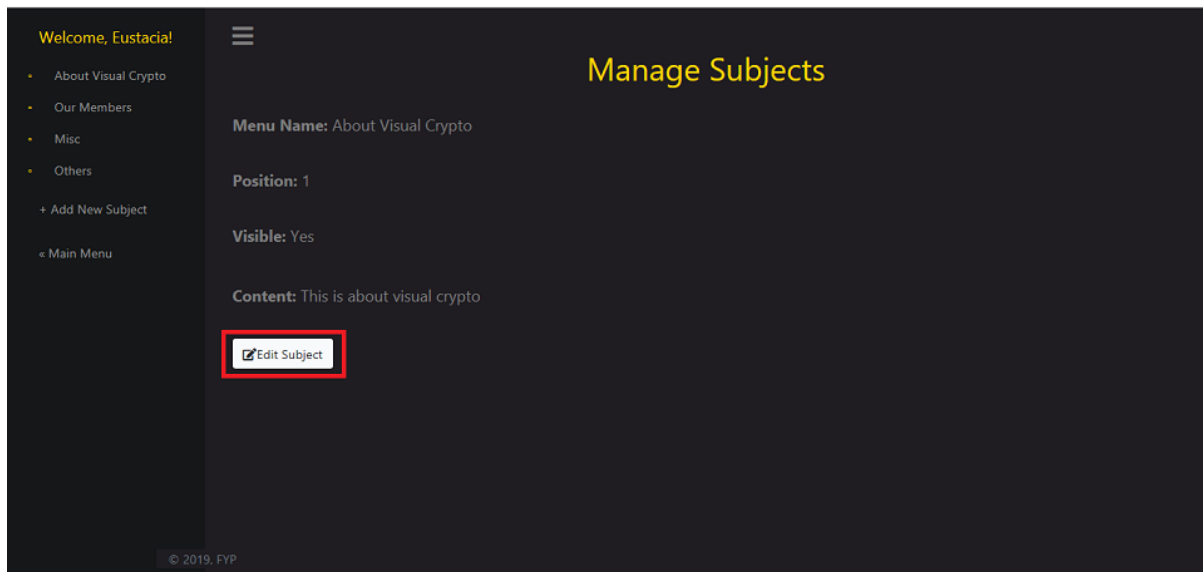
Step 3: Click on Create Subject button.



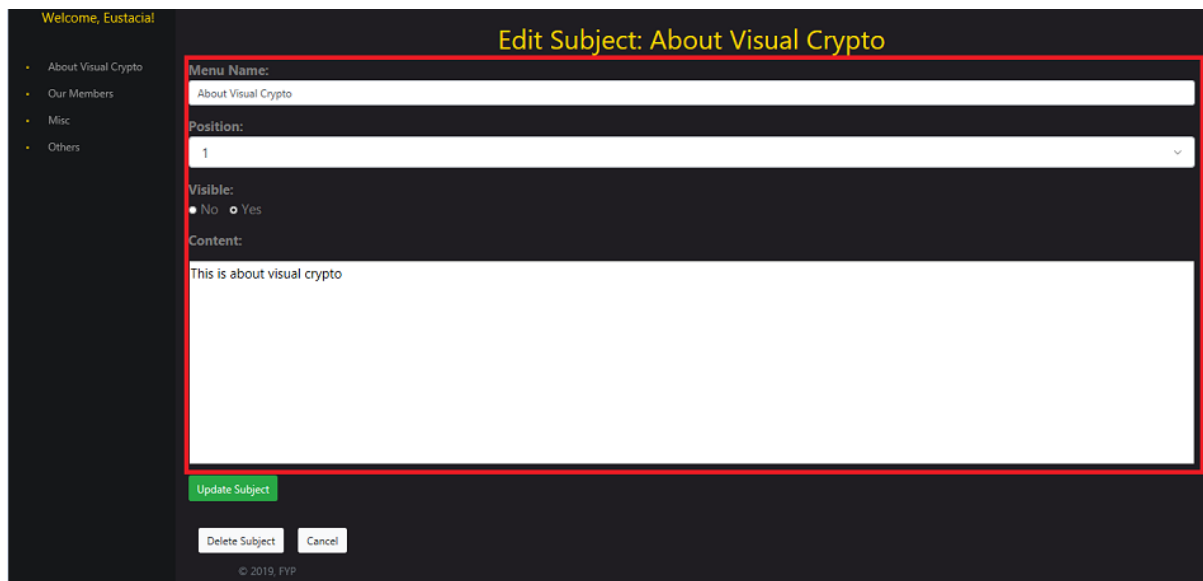
This screenshot is identical to the previous one, showing the 'Create Subject' form. However, in this image, a red rectangular box highlights the 'Create Subject' button at the bottom of the form, indicating the next step in the process. The sidebar, main title, and other form fields remain the same.

Edit Subject

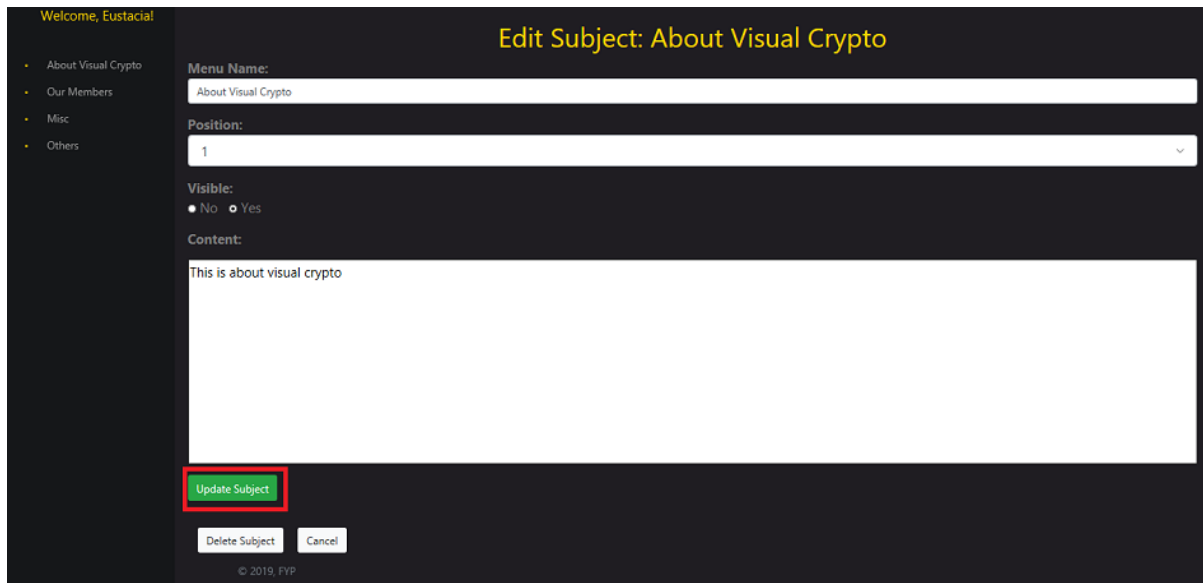
Step 1: Click on the Edit Subject button.



Step 2: Edit Menu Name, Position, Visibility or Content.



Step 3: Click on Update Subject button.



Welcome, Eustacia!

- About Visual Crypto
- Our Members
- Misc
- Others

Edit Subject: About Visual Crypto

Menu Name:

Position:

Visible: ☒ No ☐ Yes

Content:

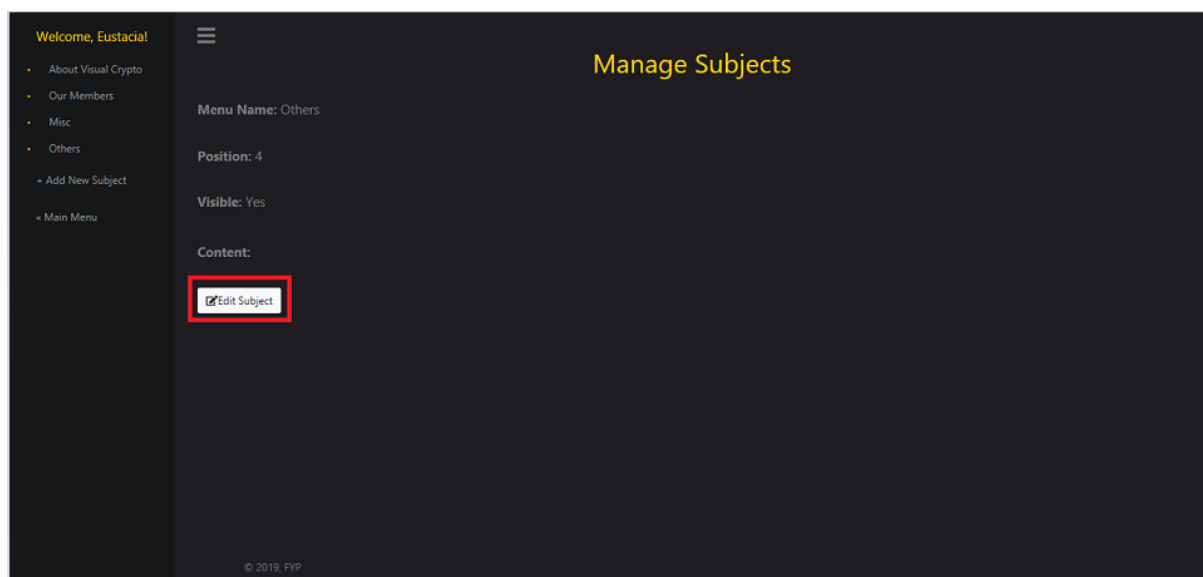
Update Subject

Delete Subject Cancel

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Delete Subject

Step 1: Click on the Edit Subject button.



Welcome, Eustacia!

- About Visual Crypto
- Our Members
- Misc
- Others
- + Add New Subject
- « Main Menu

Manage Subjects

Menu Name: Others

Position: 4

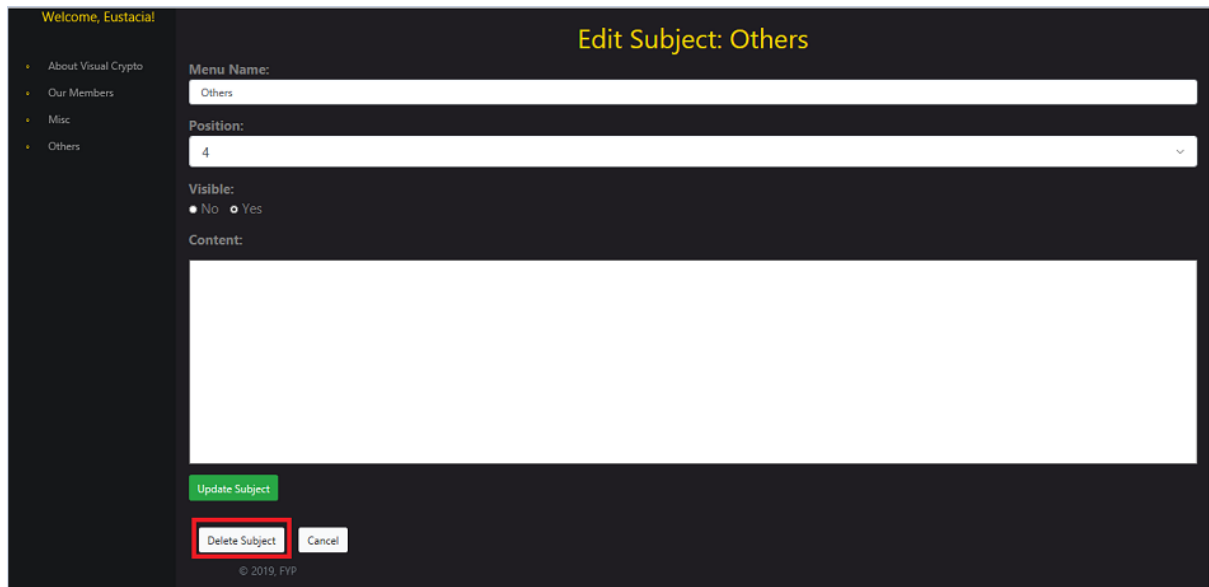
Visible: Yes

Content:

Edit Subject

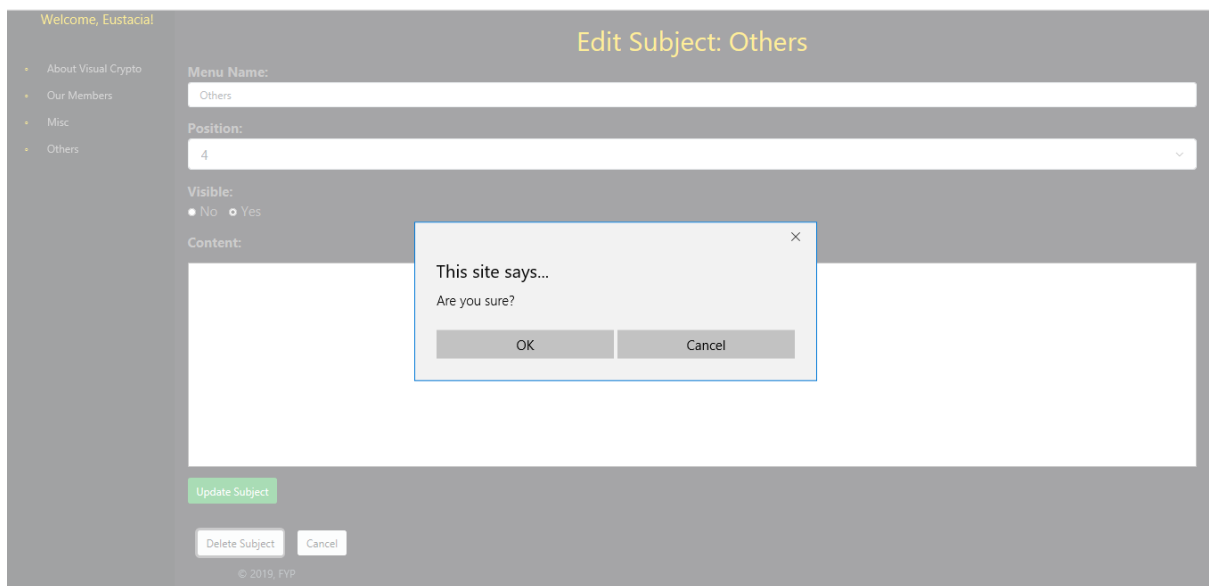
© 2019, FYP

Step 2: Click on the Delete Subject button.



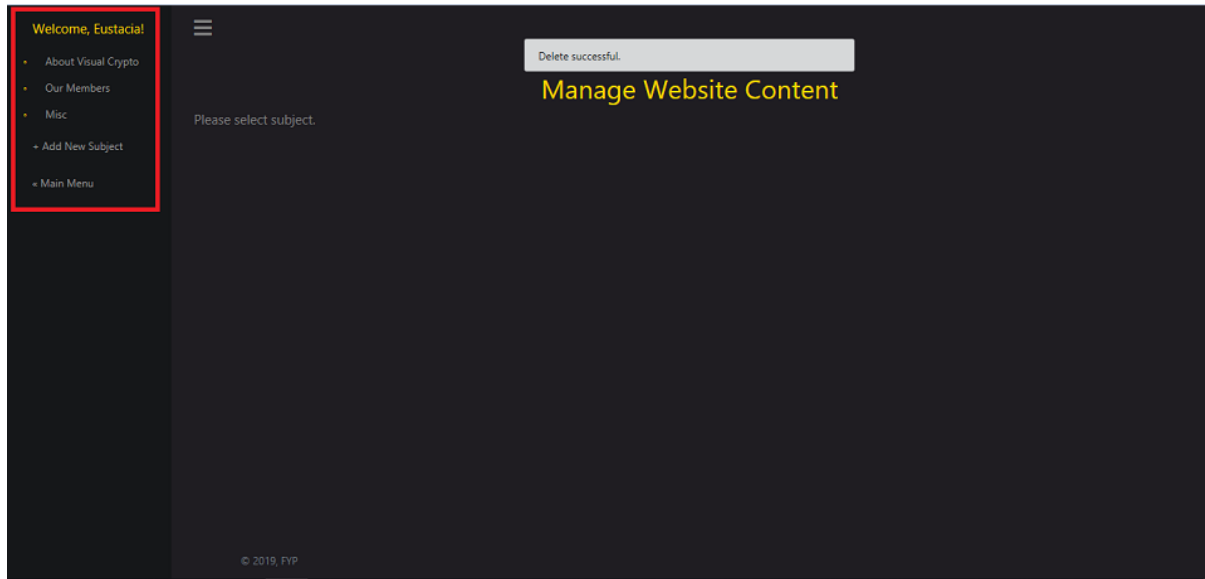
The screenshot shows a web interface with a dark theme. On the left is a sidebar with a welcome message and a list of menu items: 'About Visual Crypto', 'Our Members', 'Misc', and 'Others'. The main area is titled 'Edit Subject: Others' and contains a form with the following fields: 'Menu Name' (text input with 'Others'), 'Position' (dropdown menu with '4'), 'Visible' (radio buttons for 'No' and 'Yes', with 'Yes' selected), and 'Content' (a large text area). At the bottom of the form are three buttons: 'Update Subject' (green), 'Delete Subject' (white with a red border), and 'Cancel' (white). A copyright notice '© 2019, FYP' is at the very bottom.

Step 3: Click OK for the prompted message.



This screenshot shows the same 'Edit Subject: Others' form as the previous one, but with a confirmation dialog box overlaid in the center. The dialog box has a title bar with a close button (X) and contains the text 'This site says...' and 'Are you sure?'. At the bottom of the dialog are two buttons: 'OK' and 'Cancel'. The background form is dimmed, and the 'Delete Subject' button remains highlighted with a red border.

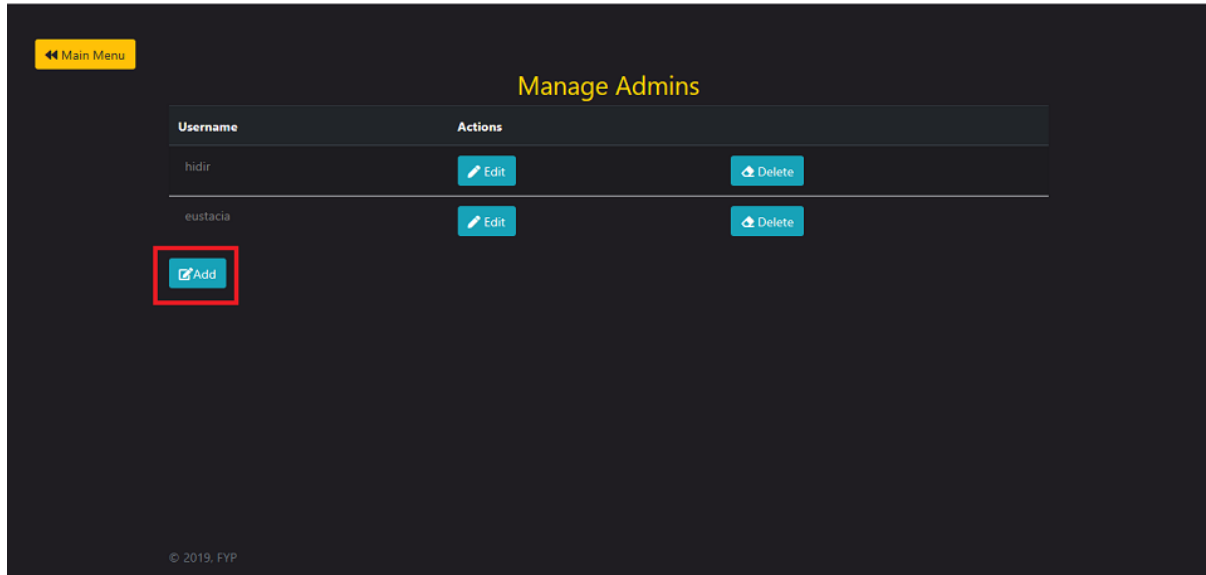
Step 4: The deleted subject will disappear from the sidebar menu.



Manage Admins

Add Admin

Step 1: Click on Add button.



Step 2: Fill up the username, password, first email and second email to create new admin.

The screenshot shows the 'Admin Menu : Create Admin' form. The title is centered at the top. Below it are four input fields: 'Username' (containing 'admin'), 'Password' (containing seven dots), 'First Email' (containing 'youstacia@gmail.com'), and 'Second Email' (containing 'yyelim001@mymail.sim.edu.sg'). At the bottom, there are two buttons: a green 'Create Admin' button and a white 'Cancel' button. At the bottom left, there is a copyright notice: '© 2019, FYP'.

Step 3: Click on Create Admin button.

Admin Menu : Create Admin

Username:
admin

Password:

First Email:
youstacia@gmail.com

Second Email:
yyelim001@mymail.sim.edu.sg

Create Admin Cancel

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Step 4: The Manage Admins page will show that new admin has been added.

◀ Main Menu

Manage Admins

Admin successfully added.

Username	Actions
hidir	Edit Delete
admin	Edit Delete
eustacia	Edit Delete

[Add](#)

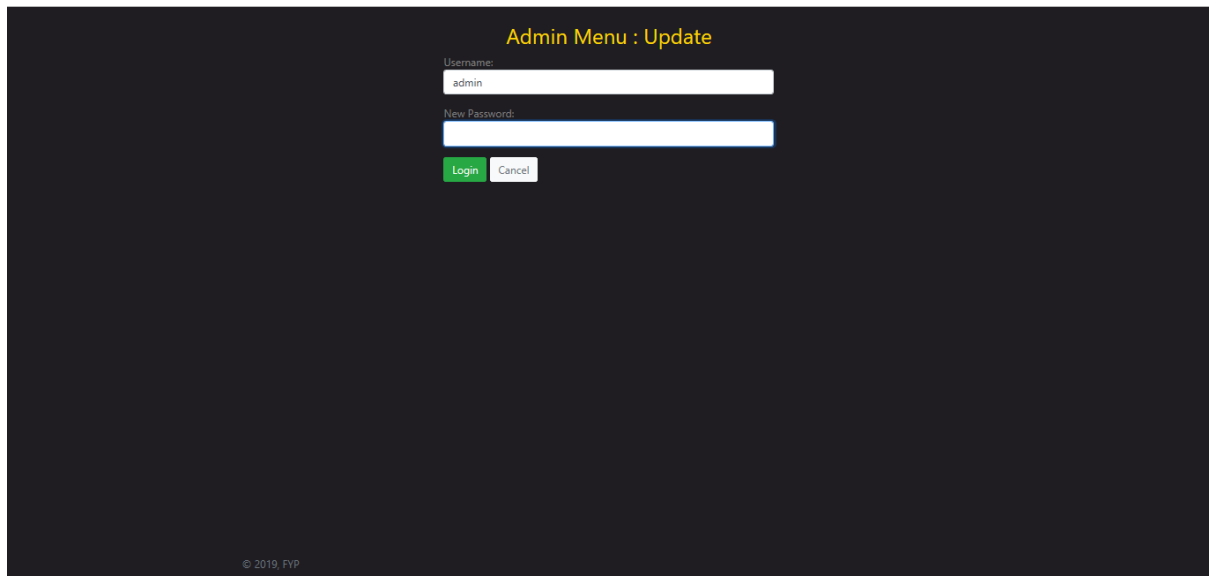
© 2019. FYP

Edit Admin

Step 1: Click on Edit button.



Step 2: Edit Username or Password.



Step 3: Click on Login button to update the information of the admin.

Admin Menu : Update

Username:
admin

New Password:

Login Cancel

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Delete Admin

Step 1: Click on Delete button.

Manage Admins

Username	Actions
hidir	Edit Delete
eustacia	Edit Delete
admin	Edit Delete

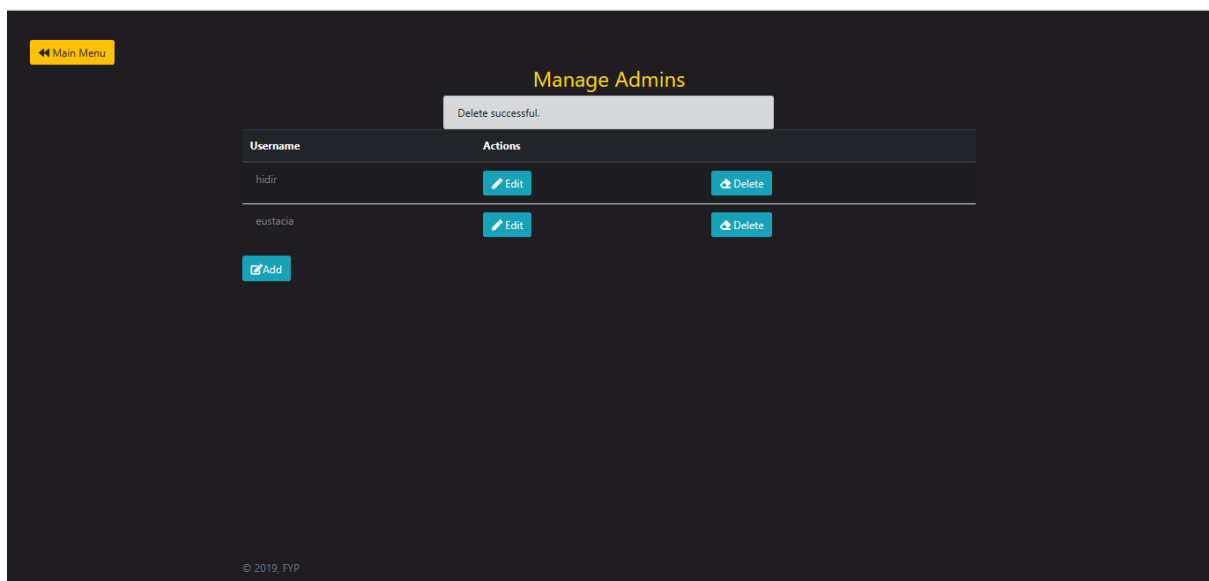
[Add](#)

© 2019, FYP

Step 2: Click OK for the prompted message.



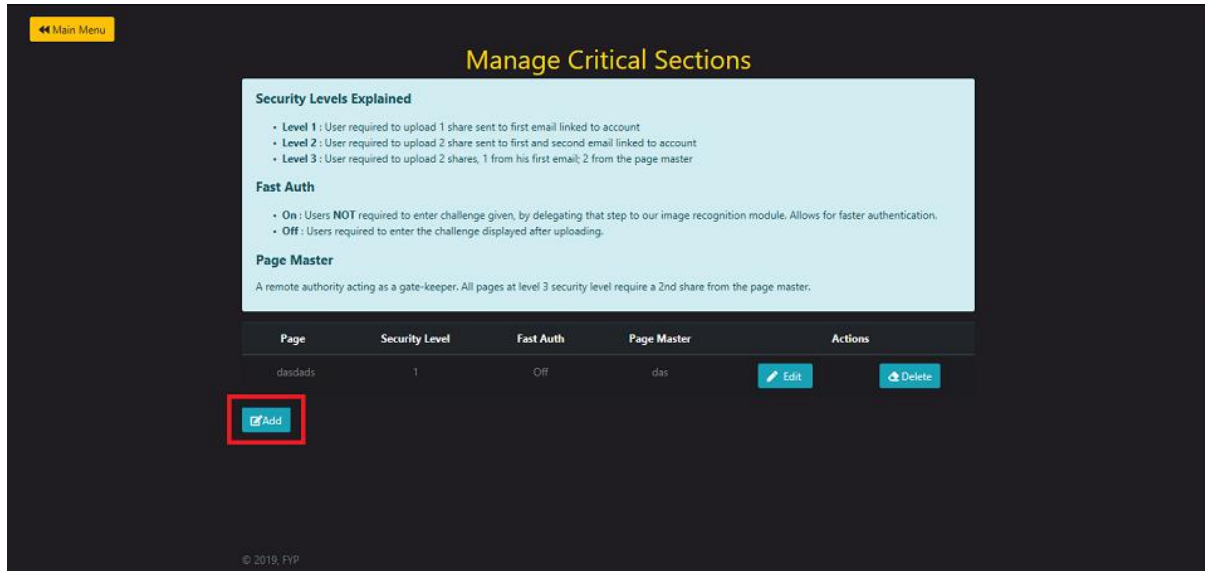
Step 3: The deleted admin will be removed.



Manage Critical Section

Add Critical Section

Step 1: Add a page as Critical Section (e.g. manage_admins.php). Click on Add button.



Step 2: Fill in the Page Name, Security Level, Fast Auth and Page Master.

Security Level:

Level 1: User required to upload 1 share sent to first email linked to account.

Level 2: User required to upload 2 shares sent to first and second email linked to account.

Level 3: User required to upload 2 shares, 1 from his first email; 2 from the page master

Fast Auth:

On: User NOT required to enter the challenge give, by delegating that step to the image recognition module. Allows for faster authentication

Off: Users required to enter the challenge displayed after uploading.

Step 3: The new critical section will be displayed as shown.

← Main Menu

Critical Section successfully added.

Manage Critical Sections

Security Levels Explained

- **Level 1** : User required to upload 1 share sent to first email linked to account
- **Level 2** : User required to upload 2 share sent to first and second email linked to account
- **Level 3** : User required to upload 2 shares, 1 from his first email; 2 from the page master

Fast Auth

- **On** : Users **NOT** required to enter challenge given, by delegating that step to our image recognition module. Allows for faster authentication.
- **Off** : Users required to enter the challenge displayed after uploading.

Page Master

A remote authority acting as a gate-keeper. All pages at level 3 security level require a 2nd share from the page master.

Page	Security Level	Fast Auth	Page Master	Actions
dasdads	1	Off	das	Edit Delete
manage_admins.php	1	Off	admin	Edit Delete

[Add](#)

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Manage_admins.php will need further authentication to be able to access the information.

If we try to access manage admin again, it will show the image as shown below.

Accessing Sensitive Page !

The page, `manage_admins.php`, you are trying to access contains sensitive functions.
We have sent a one-time share file to your email : `youstacia@gmail.com`
We require you to confirm your identity by uploading the file that has been sent to your email.

[Browse](#)

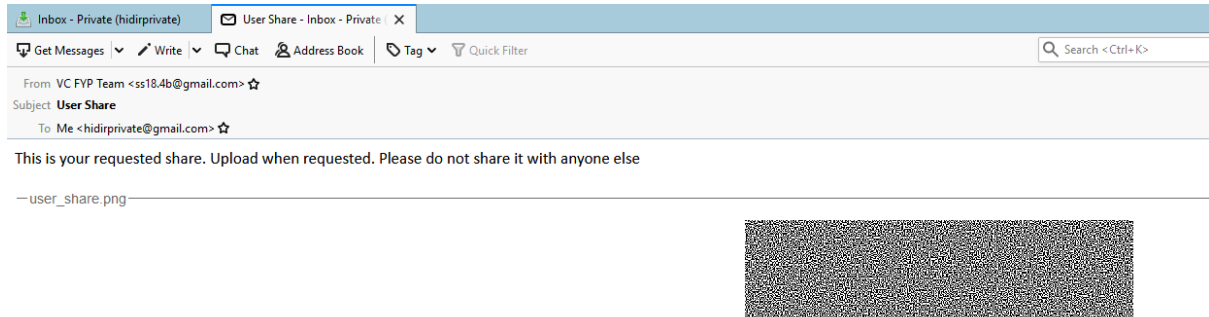
[Upload](#)

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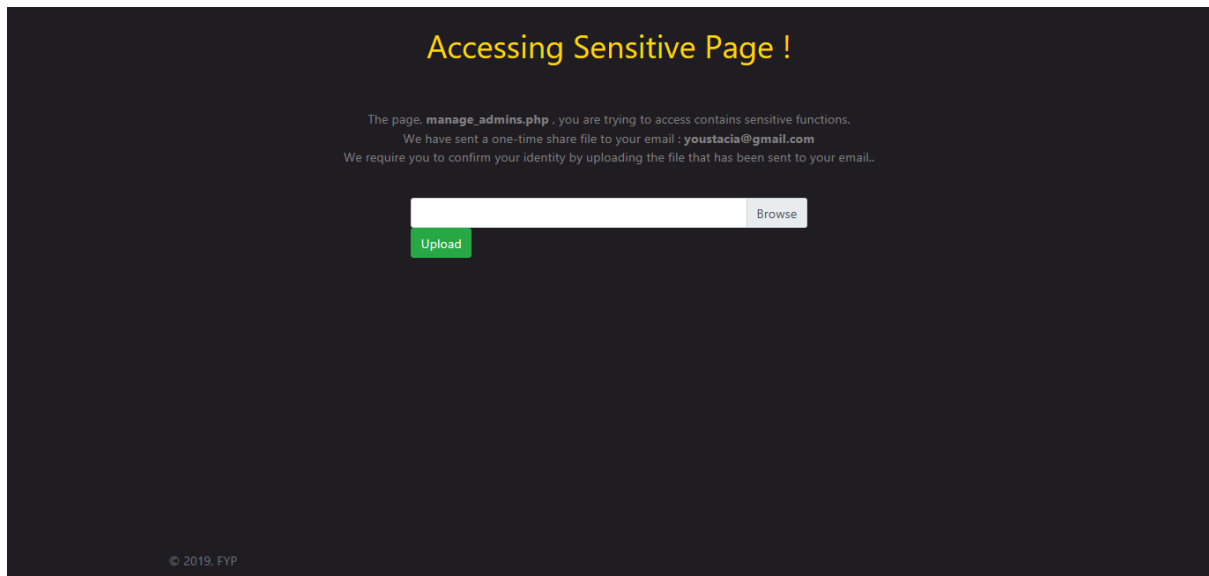
Authentication: Visual Cryptography

Step 1: If the existing admin is accessing a critical section of the program, the program will send an email to the admin to verify his identity.

Step 2: The existing admin will log into the email that the program had sent a one-time share file to the email.

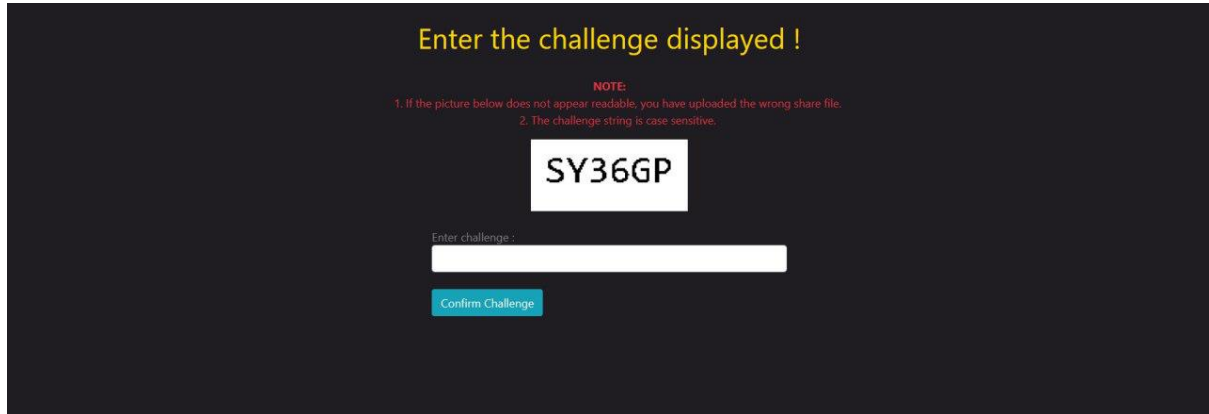


Step 3: The admin will upload his image share file from the email.



Step 4: If the uploaded shares is correct, the image will be readable if not the image will be unreadable.

Successful Verification



The screenshot shows a dark-themed web interface for challenge verification. At the top, the text "Enter the challenge displayed !" is written in yellow. Below this, a "NOTE:" section in red text provides instructions: "1. If the picture below does not appear readable, you have uploaded the wrong share file." and "2. The challenge string is case sensitive." In the center, a white box displays the challenge string "SY36GP". Below the box, there is a text input field with the placeholder "Enter challenge" and a teal "Confirm Challenge" button.