

## [1. Chat Program 설치 및 customizing]

### a. 새 사용자 계정 및 홈디렉터리 설정

```
sudo useradd -m chatuser
```

```
sudo passwd chatuser
```

```
cd /home/chatuser
```

```
sudo mkdir html
```

```
pi@raspberrypi:~ $ sudo username -m chatuser
sudo: username: command not found
pi@raspberrypi:~ $ sudo useradd -m chatuser
pi@raspberrypi:~ $ sudo passwd chatuser
New password:
Retype new password:
passwd: password updated successfully
pi@raspberrypi:~ $ cd /home/chatuser
pi@raspberrypi:/home/chatuser $ sudo mkdir html
pi@raspberrypi:/home/chatuser $ cd html
pi@raspberrypi:/home/chatuser/html $ ls
pi@raspberrypi:/home/chatuser/html $
```

### b. MYSQL 데이터베이스 및 계정 생성

```
sudo mysql -uroot -p
```

```
create database chatdb default character set utf8;
```

```
grant all on chatdb.* to chatuser@localhost identified by '1234';
```

```
flush privileges;
```

```
exit;
```

```
sudo mysql -u chatuser -p
```

```
show database;
```

```
pi@raspberrypi:/home/chatuser/html $ sudo mysql -u chatuser -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 39
Server version: 10.3.27-MariaDB-0+deb10u1 Raspbian 10

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

```
MariaDB [(none)]> show databases;
```

```
+-----+  
| Database |  
+-----+  
| chatdb   |  
| information_schema |  
+-----+
```

```
2 rows in set (0.002 sec)
```

### c. Virtual Host 설정 (php 사용, phpMyAdmin 설정)

```
cd /etc/nginx/sites-a*
```

```
sudo cp default hguchat.com
```

```
sudo vim hguchat.com
```

```
cd /home/chatuser/html
```

```
sudo vim index.php
```

```
sudo ln -s /usr/share/phpmyadim myadmin
```

```
cd ..
```

```
sudo chown -R chatuser:www-data html
```

```
cd /etc/nginx/sites-e*
```

```
sudo ln -s ../sites-a*/hguchat.com hguchat.com
```

```
sudo nginx -t
```

```
sudo service nginx restart
```

```
pi@raspberrypi:/home/chatuser/html $ cd  
pi@raspberrypi:~ $ cd /etc/nginx/sites-a*  
pi@raspberrypi:/etc/nginx/sites-available $ ls  
default goodrpi.com mybatflat.com mywp2.com mywp.com  
pi@raspberrypi:/etc/nginx/sites-available $ sudo cp default hguchat.com  
pi@raspberrypi:/etc/nginx/sites-available $ sudo vim hguchat.com
```

```
pi@raspberrypi:/etc/nginx/sites-available $ cd /home/chatuser/html  
pi@raspberrypi:/home/chatuser/html $ ls  
pi@raspberrypi:/home/chatuser/html $ sudo vim index.php  
pi@raspberrypi:/home/chatuser/html $ pi@raspberrypi:/home/chatuser/html $  
pi@raspberrypi:/home/chatuser/html $ sudo ln -s /usr/share/phpmyadmin myadmin  
pi@raspberrypi:/home/chatuser/html $ ls  
index.php myadmin  
pi@raspberrypi:/home/chatuser/html $ ls -al  
total 12  
drwxr-xr-x 2 root root 4096 Jun 8 03:46 .  
drwxr-xr-x 3 chatuser chatuser 4096 Jun 8 03:33 ..  
-rw-r--r-- 1 root root 42 Jun 8 03:46 index.php  
lrwxrwxrwx 1 root root 21 Jun 8 03:46 myadmin -> /usr/share/phpmyadmin  
pi@raspberrypi:/home/chatuser/html $ cd ..  
pi@raspberrypi:/home/chatuser $ sudo chown -R chatuser:www-data html  
pi@raspberrypi:/home/chatuser $ cd html  
pi@raspberrypi:/home/chatuser/html $ ls -al  
total 12  
drwxr-xr-x 2 chatuser www-data 4096 Jun 8 03:46 .  
drwxr-xr-x 3 chatuser chatuser 4096 Jun 8 03:33 ..  
-rw-r--r-- 1 chatuser www-data 42 Jun 8 03:46 index.php  
lrwxrwxrwx 1 chatuser www-data 21 Jun 8 03:46 myadmin -> /usr/share/phpmyadmin
```

```

pi@raspberrypi:/home/chatuser/html $ cd /etc/nginx/sites-e*
pi@raspberrypi:/etc/nginx/sites-enabled $ sudo ln -s ../sites-a*/hguchat.com hguchat.com
pi@raspberrypi:/etc/nginx/sites-enabled $ ls -al
total 8
drwxr-xr-x 2 root root 4096 Jun  8 03:49 .
drwxr-xr-x 8 root root 4096 May 30 09:51 ..
lrwxrwxrwx 1 root root 34 May 30 09:51 default -> /etc/nginx/sites-available/default
lrwxrwxrwx 1 root root 30 May 30 10:09 goodrpi.com -> ../sites-available/goodrpi.com
lrwxrwxrwx 1 root root 30 Jun  8 03:49 hguchat.com -> ../sites-available/hguchat.com
lrwxrwxrwx 1 root root 32 Jun  3 13:01 mybatflat.com -> ../sites-available/mybatflat.com
lrwxrwxrwx 1 root root 28 Jun  4 02:57 mywp2.com -> ../sites-available/mywp2.com
lrwxrwxrwx 1 root root 27 Jun  3 13:11 mywp.com -> ../sites-available/mywp.com
pi@raspberrypi:/etc/nginx/sites-enabled $ sudo nginx -t
nginx: [warn] conflicting server name "" on 0.0.0.0:80, ignored
nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
nginx: configuration file /etc/nginx/nginx.conf test is successful
pi@raspberrypi:/etc/nginx/sites-enabled $ sudo service nginx restart

```

#### d. 웹사이트 테스트(PC)

The screenshot shows a web browser with the address bar displaying "hguchat.com". The page content says "Hello World!!!!!!!!!!". Below this, the browser shows the phpMyAdmin interface. The URL bar indicates the page is "hguchat.com/myadmin/index.php?token=d19c84d9cb8b6aca61bfed6436357c05". The phpMyAdmin interface includes a language selection dropdown set to "한국어 - Korean" and a "로그인" (Login) button. The main content area shows the "일반 설정" (General Settings) tab, with a dropdown menu for "utf8mb4\_unicode\_ci" selected. On the left sidebar, the "chatdb" database is highlighted with a red box.

## e. 오픈소스 다운로드

```
cd /home/chatuser/html
```

```
sudo git clone https://github.com/jerry10004/Chat-Room
```

```
sudo mv Chat-* chat
```

```
sudo chown -R chatuser:www-data chat;
```

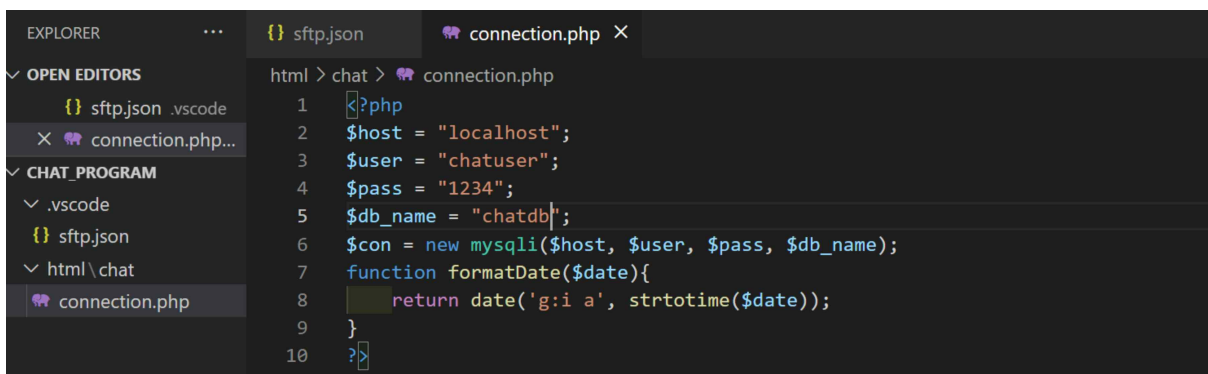
```
pi@raspberrypi:/etc/nginx/sites-enabled $ cd /home/chatuser/html
pi@raspberrypi:/home/chatuser/html $ ls
index.php  myadmin
pi@raspberrypi:/home/chatuser/html $ sudo git clone https://github.com/jerry10004/Chat-Room
Cloning into 'Chat-Room' ...
remote: Enumerating objects: 28, done.
remote: Counting objects: 100% (1/1), done.
remote: Total 28 (delta 0), reused 0 (delta 0), pack-reused 27
Unpacking objects: 100% (28/28), done.
pi@raspberrypi:/home/chatuser/html $ ls
Chat-Room  index.php  myadmin
pi@raspberrypi:/home/chatuser/html $ sudo mv Chat-* chat
pi@raspberrypi:/home/chatuser/html $ sudo chown -R chatuser:www-data chat
pi@raspberrypi:/home/chatuser/html $ ls -al
total 16
drwxr-xr-x 3 chatuser www-data 4096 Jun  8 03:55 .
drwxr-xr-x 3 chatuser chatuser 4096 Jun  8 03:33 ..
drwxr-xr-x 7 chatuser www-data 4096 Jun  8 03:54 chat
-rw-r--r-- 1 chatuser www-data  42 Jun  8 03:46 index.php
-rwxrwxrwx 1 chatuser www-data  21 Jun  8 03:46 myadmin -> /usr/share/phpmyadmin
```

## f. DB 연결정보 수정



The screenshot shows the VS Code Explorer with the file `sftp.json` selected. The file contains the following JSON configuration:

```
{
  "name": "My Server",
  "host": "192.168.0.18",
  "protocol": "sftp",
  "port": 22,
  "username": "chatuser",
  "uploadOnSave": true
}
```



The screenshot shows the VS Code Explorer with the file `connection.php` selected. The file contains the following PHP code:

```
<?php
$host = "localhost";
$user = "chatuser";
$pass = "1234";
$db_name = "chatdb";
$con = new mysqli($host, $user, $pass, $db_name);
function formatDate($date){
    return date('g:i a', strtotime($date));
}
?>
```

## g. 필요 테이블 생성

The screenshot shows the phpMyAdmin interface. On the left, the database structure is shown with 'chatdb' selected, containing 'chat' and 'information\_schema' tables. The main panel shows the '데이터베이스' (Database) tab for 'chatdb'. It lists the 'chat' table with 'utf8\_general\_ci' collation and '사용권한 검사' (Check privileges) button. Below, the '테이블 구조' (Table structure) tab for the 'chat' table is shown. It displays a table with 5 rows and 4 columns: 'id', 'name', 'message', and 'date'. The table structure is as follows:

id	name	message	date
1	Nikhil	Hi there, Welcome to my Chat Room.	2018-04-09 01:09:36
3	사용자	안녕하세요	2021-06-08 04:10:49
4	김현욱	전산전자 공학부 2학년 김현욱입니다	2021-06-08 04:11:27
5	김현욱	OSS 수업 중입니다	2021-06-08 04:19:49

## h. 웹사이트 접속 chat program 테스트

The screenshot shows the 'CHAT ROOM' interface. It displays a list of messages from users in a chat room. The messages are as follows:

이름	메시지	시간
김현욱	전산전자 공학부 2학년 김현욱입니다	4:11 am
사용자	안녕하세요	4:10 am
Nikhil	Hi there, Welcome to my Chat Room.	1:09 am

## i. customizing 2가지 이상

The screenshot shows the chat room interface with customizations. The title bar is purple and contains the text 'OSS Chat Room'. The chat messages are displayed in a yellow box. The messages are as follows:

이름	메시지	시간
김현욱	OSS 수업 중입니다	4:19 am
김현욱	전산전자 공학부 2학년 김현욱입니다	4:11 am
사용자	안녕하세요	4:10 am
Nikhil	Hi there, Welcome to my Chat Room.	1:09 am

Below the chat messages, there is a form to enter a name and a message, and a 'Send it' button. The footer is purple and contains the text 'Developed by : Nikhil Amin'.

## [2. 서버 백업]

a. chat 소스와 DB를 백업하기 위해 필요한 과정 정리 및 Script 작성후 테스트

b. crontab을 사용하여 (본인이)정한 시간에 주기적으로 자동 백업 설정하기

1. 백업 대상 / 백업 주기 / 백업 위치 / 저장기간 계획

백업 대상: chatuser 계정 홈디렉토리

백업 주기: 매일 오전 6시

백업 위치: /backup 폴더

저장기간 계획: 백업본 10일 간 저장

2. 백업 디렉터리 생성 / 퍼미션 조정

```
root@raspberrypi:~# mkdir backup
root@raspberrypi:~# ls
backup
root@raspberrypi:~# chmod 700 backup
root@raspberrypi:~# ls -al
total 48
drwx----- 3 root root 4096 Jun 12 07:12 .
drwxr-xr-x 19 root root 4096 Jun 12 07:10 ..
drwx----- 2 root root 4096 Jun 12 07:12 backup
```

3. 백업 스크립트 작성

```
#!/bin/bash
CURDATE=`date +%Y%m%d%H%M%S`
SRC=/home/chatuser
TARDST=/backup/chatuser.$CURDATE.tar.gz
DBNAME=chatdb
DBDST=/backup/chatuser.'mysql'.$CURDATE.sql

# file backup
tar -zcvf $TARDST $SRC 1>/dev/null 2>/dev/null

# DB backup (mysql or mariadb)
mysqldump --extended-insert=FALSE -uroot -proot $DBNAME > $DBDST

# delete backup files
find /backup/ -type f -mtime +10 | sort | xargs rm -f
~
~
~
```

#### 4. 백업 스크립트 테스트

```
root@raspberrypi:~# ./backup.sh
root@raspberrypi:~#

root@raspberrypi:/backup# ls -al
total 156
drwx----- 2 root root 4096 Jun 12 07:22 .
drwxr-xr-x 19 root root 4096 Jun 12 07:10 ..
-rw-r--r-- 1 root root 143755 Jun 12 07:22 chatuser.202106122234.tar.gz
-rw-r--r-- 1 root root 2356 Jun 12 07:22 chatuser.mysql.202106122234.sql
```


#### 5. Scheduler 설정

```
root@raspberrypi:~# date
Sat 12 Jun 07:28:59 BST 2021
root@raspberrypi:~# ln -sf /usr/share/zoneinfo/Asia/Seoul /etc/localtime
root@raspberrypi:~# date
Sat 12 Jun 15:29:26 KST 2021

#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow   command
0 2 * * * /root/backup.sh 1>/dev/null 2>/dev/null
```


```
root@raspberrypi:~# ps -df | grep cron
root    1056   926  0 15:32 pts/0    00:00:00 grep cron
```

### [3. 포트폴리오 제작]




**CRUD**

- CRUD 성격관리 프로그램
- typedef 데이터 타입 사용법
- Call by Value & Address
- 다중 데이터 처리
- 배열과 포인터 배열의 활용
- 동적할당 (malloc & free)
- scanf, fgets 문자열 입력
- getchar() 함수 사용
- FILE I/O
- string.h → strcpy 함수
- 정적 라이브러리 컴파일 (gcc -c / -o)




**PuTTY**

- Linux, PuTTY 사용법
- Shell
- Client - Server
- Shell Command (ls/pwd/cd/mkdir/rmdir)
- Absolute / Relative Path
- Rm / ln (Hard, Symbolic)
- IO Redirection
- Pipe / grep
- Ownership, Permission setting
- chmod / umask / chown / chgrp
- su / sudo




**Vim**

- Insert mode & Visual mode
- save / open / copy / paste
- delete / undo / redo / replace
- move / find / search / replace
- Makefile 사용법
- Macro/Target/Dependency
- Special Macros(\$@/\$\*/\$/\$/\$\_/\$?)




**git**

- 조건부 컴파일(Header file)
- #define/#if/#ifdef/#ifndef
- #endif
- GDB 컴파일
- CVCS / DVCS
- Git / GitHub 가입
- Git - VSCode 연동
- Add / Commit
- git rm / status / log / diff
- gitignore 지정
- git reset --soft --mixed --hard
- git revert
- git rm --cached -rf
- git clone / remote
- git push / pull / fetch
- git checkout / merge
- git merge --ff / --no-ff
- merge conflict 충돌 해결방법
- git reflow / rebase -i




# OSS Portfolio




**GitHub**

- GitHub Fork / PR
- 잔디심기 / WIKI 작성
- Markdown 정적 웹사이트 생성
- jekyil theme 사용
- http / https
- LAN / WAN
- TCP / IP
- Domain name / IP address
- ftp / sftp client-server
- VSCode ftp 사용
- TCP / IP 4계층
- SMTP / IMAP / POP3
- dothome.com 호스팅 신청




**Raspberry Pi**

- Raspberry pi OS 설치
- wifi 연결 및 ssh 접속 설정
- wpa\_supplicant.conf / ssh
- nmap -sn / ipconfig
- Nginx 설치
- 웹 서버 홈페이지 Index.html 생성
- meta charset="UTF-8"




**Filezilla**

- sudo 권한 설정
- Raspi-config / Hostname
- service / netstat
- dpkg
- apt-get / apt
- sudo apt purge
- Hosts 파일 수정(관리자 권한)
- 고정 IP / 유동 IP / DDNS
- Virtual Host 이름 기반 설정
- useradd / adduser
- /etc/nginx/sites-available 파일 수정
- /etc/nginx/sites-enabled
- Symbolic 링크 생성




**php-fpm**

- LEMP stack 설치
- MariaDB(MySQL) 설치
- DB 계정 및 권한 부여
- php-fpm / phpMyAdmin
- CMS Wordpress 설치
- php + SQLite 연동 모듈 설치
- php.ini 설정 변경



**MariaDB**

- APM 환경 구축
- ftp server 설치
- vscode sftp 설정
- MySQL utf8 setting
- Open source customizing
- ex) Chat program
- Back up
- 백업 위치 / 기간 / 주기 계획
- backup.sh 스크립트 작성
- cron / crontab



**MySQL**