

Course: CS522 - Software Quality Assurance and Test Automation
Faculty: Prof. Henry Chang

Project: Remote Calculator + Expect + Cron job + Email notice

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SSH setup mac Terminal

- Create .ssh directory in terminal
- Create the key.
- Command: `ssh-keygen -t dsa -f .ssh/id_dsa`
- Just press 'enter key' for “Enter passphrase”
- Change directory to .ssh Command: `cd .ssh`



SSH setup mac Terminal

```
chandra — -zsh — 80x24
Last login: Fri Nov  5 17:39:27 on console
chandra@ChandraanthsMBP ~ % ssh-keygen -t rsa -f .ssh/id_rsa
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in .ssh/id_rsa.
Your public key has been saved in .ssh/id_rsa.pub.
The key fingerprint is:
SHA256:sp50Ewdhfo++rPRKvqkwo1j1prMOul6CkbedvqaGSWg chandra@ChandraanthsMBP.attlo
cal.net
The key's randomart image is:
+---[RSA 3072]---+
|           o           |
|          o .          |
|         . + .         |
|        + . o          |
|+ . . o S . .          |
|oE + o + .             |
|+++.* = o .            |
|o+++oO = + .           |
|=+O+*==.*++           |
+---[SHA256]-----+
chandra@ChandraanthsMBP ~ %
```



SSH setup mac Terminal

- Successful login to remote server without password.

```
.ssh — ssh 19579@35.167.127.201 — 80x38
[chandra@ChandraanthsMBP .ssh % cat id_rsa.pub | ssh 19579@35.167.127.201 "mkdir
~/ .ssh; cat >> ~/.ssh/authorized_keys"
[19579@35.167.127.201's password:
[chandra@ChandraanthsMBP .ssh % ssh 19579@35.167.127.201
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 5.4.0-1058-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Mon Nov  8 08:03:50 PST 2021

System load:  0.05               Processes:    100
Usage of /:   15.4% of 58.10GB   Users logged in:  0
Memory usage: 28%               IP address for eth0: 172.26.3.73
Swap usage:   0%

 * Ubuntu Pro delivers the most comprehensive open source security and
   compliance features.

   https://ubuntu.com/aws/pro

Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

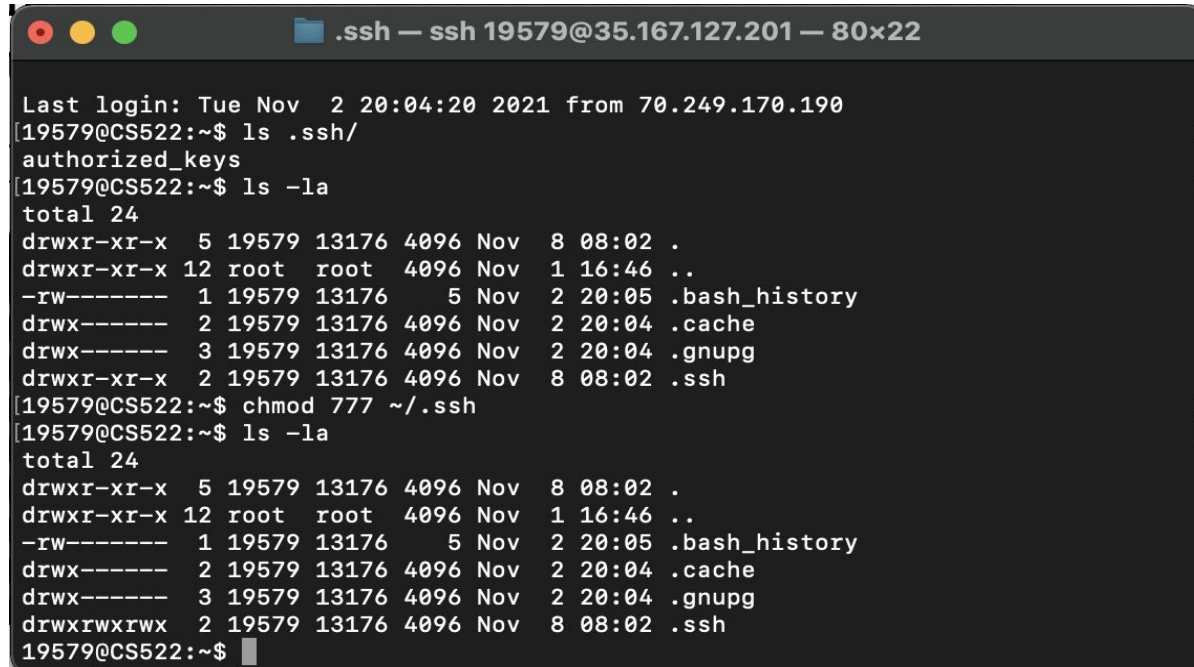
76 packages can be updated.
1 update is a security update.

New release '20.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Tue Nov  2 20:04:20 2021 from 70.249.170.190
19579@CS522:~$
```

SSH setup mac Terminal

- Check the file permissions.

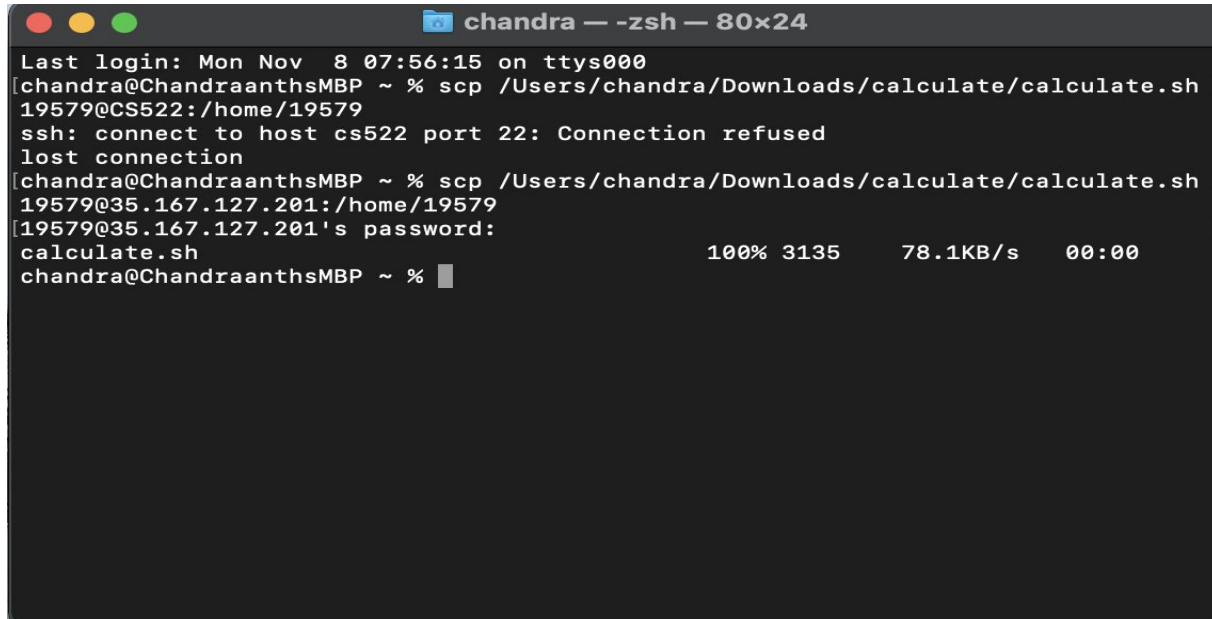
A screenshot of a Mac Terminal window titled ".ssh — ssh 19579@35.167.127.201 — 80x22". The terminal shows the user's last login and then runs two 'ls' commands to check file permissions in the .ssh directory. The first 'ls' command shows the directory contents, and the second 'ls -la' command shows the permissions for each file. The permissions for the .ssh directory are drwxr-xr-x. The permissions for the files are: authorized_keys (drwxr-xr-x), .bash_history (-rw-----), .cache (drwx-----), .gnupg (drwx-----), and .ssh (drwxr-xr-x). The user then runs 'chmod 777 ~/.ssh' to change the permissions of the .ssh directory to 777. The final 'ls -la' command shows the updated permissions for the .ssh directory as drwxrwxrwx.

```
.ssh — ssh 19579@35.167.127.201 — 80x22

Last login: Tue Nov  2 20:04:20 2021 from 70.249.170.190
[19579@CS522:~$ ls .ssh/
authorized_keys
[19579@CS522:~$ ls -la
total 24
drwxr-xr-x  5 19579 13176 4096 Nov  8 08:02 .
drwxr-xr-x 12 root   root   4096 Nov  1 16:46 ..
-rw-----  1 19579 13176   5 Nov  2 20:05 .bash_history
drwx-----  2 19579 13176 4096 Nov  2 20:04 .cache
drwx-----  3 19579 13176 4096 Nov  2 20:04 .gnupg
drwxr-xr-x  2 19579 13176 4096 Nov  8 08:02 .ssh
[19579@CS522:~$ chmod 777 ~/.ssh
[19579@CS522:~$ ls -la
total 24
drwxr-xr-x  5 19579 13176 4096 Nov  8 08:02 .
drwxr-xr-x 12 root   root   4096 Nov  1 16:46 ..
-rw-----  1 19579 13176   5 Nov  2 20:05 .bash_history
drwx-----  2 19579 13176 4096 Nov  2 20:04 .cache
drwx-----  3 19579 13176 4096 Nov  2 20:04 .gnupg
drwxrwxrwx  2 19579 13176 4096 Nov  8 08:02 .ssh
19579@CS522:~$
```

Server side: Interactive Calculator

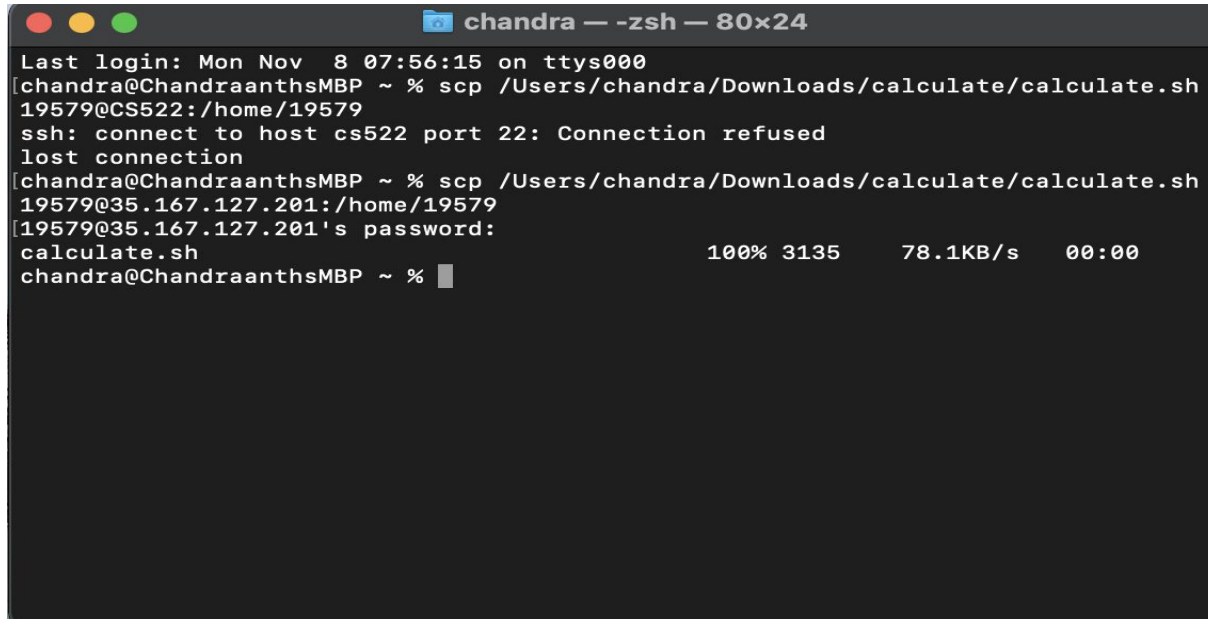
- Using scp command copied calculate file to server.

A terminal window titled 'chandra — -zsh — 80x24' with standard macOS window controls (red, yellow, green buttons). The terminal shows the execution of an scp command to copy a file to a remote server. The first attempt fails due to a connection refusal. The second attempt succeeds after providing a password. The progress bar shows 100% completion with a transfer size of 3135 bytes at 78.1KB/s.

```
chandra — -zsh — 80x24
Last login: Mon Nov  8 07:56:15 on ttys000
[chandra@ChandraanthMBP ~ % scp /Users/chandra/Downloads/calculate/calculate.sh 19579@CS522:/home/19579
19579@CS522:/home/19579
ssh: connect to host cs522 port 22: Connection refused
lost connection
[chandra@ChandraanthMBP ~ % scp /Users/chandra/Downloads/calculate/calculate.sh 19579@35.167.127.201:/home/19579
19579@35.167.127.201's password:
calculate.sh                               100% 3135      78.1KB/s   00:00
chandra@ChandraanthMBP ~ %
```

Server side: Interactive Calculator

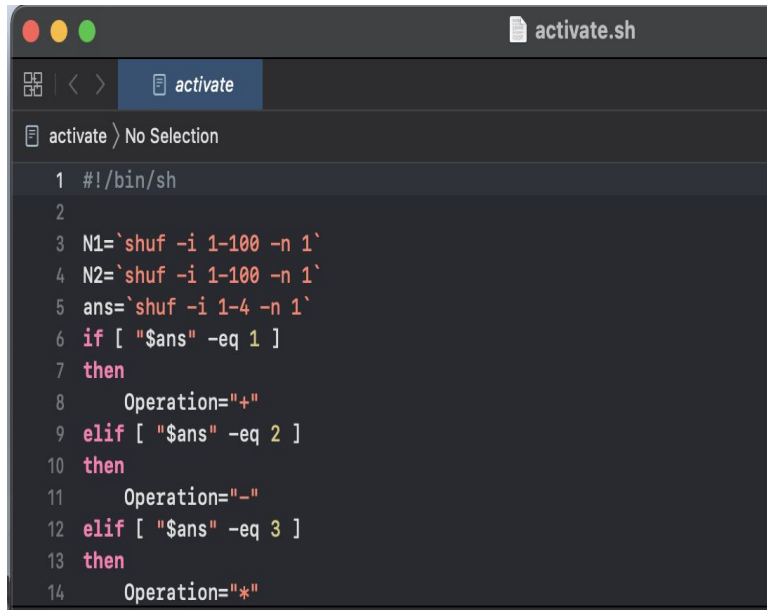
- Using scp command copied calculate file to server and changed the file permissions to executable.



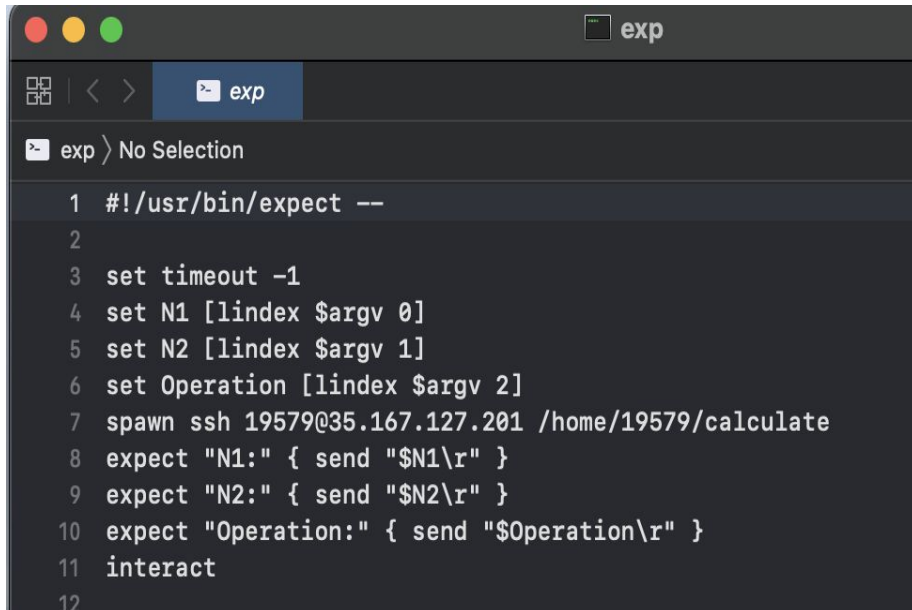
```
chandra — -zsh — 80x24
Last login: Mon Nov  8 07:56:15 on ttys000
[chandra@ChandraanthsMBP ~ % scp /Users/chandra/Downloads/calculate/calculate.sh 19579@CS522:/home/19579
19579@CS522:/home/19579
ssh: connect to host cs522 port 22: Connection refused
lost connection
[chandra@ChandraanthsMBP ~ % scp /Users/chandra/Downloads/calculate/calculate.sh 19579@35.167.127.201:/home/19579
19579@35.167.127.201's password:
calculate.sh                               100% 3135      78.1KB/s   00:00
chandra@ChandraanthsMBP ~ %
```


Client side: activate.sh and expect

- Create exe and activate.sh files on client side.



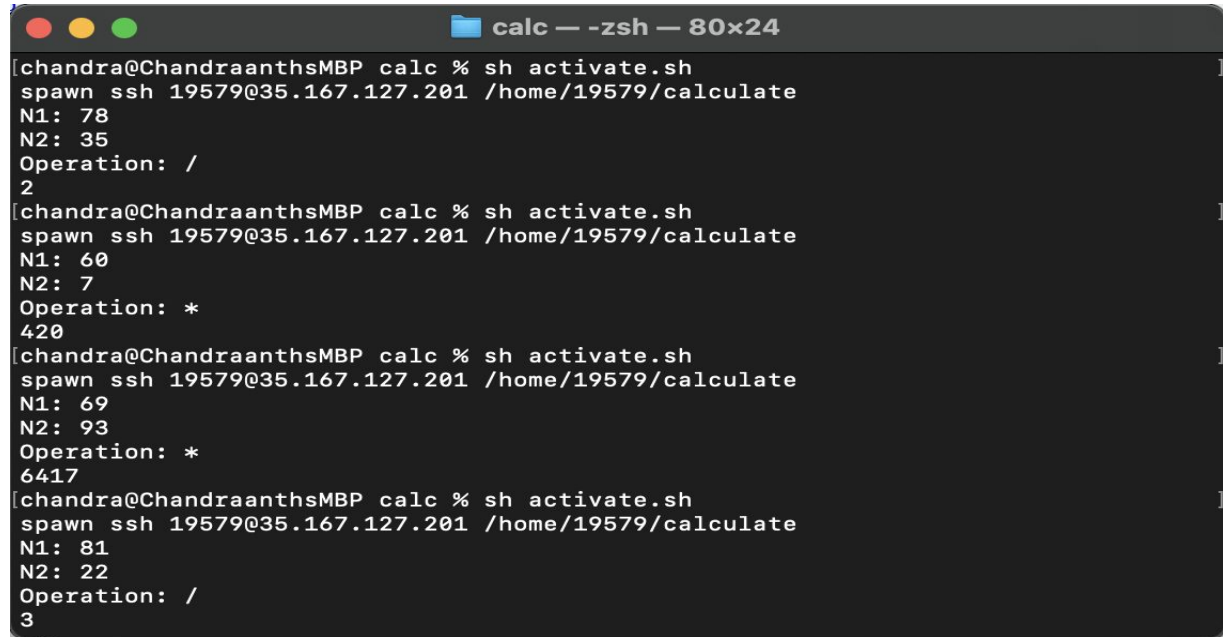
```
activate.sh
activate
activate > No Selection
1  #!/bin/sh
2
3  N1=`shuf -i 1-100 -n 1`
4  N2=`shuf -i 1-100 -n 1`
5  ans=`shuf -i 1-4 -n 1`
6  if [ "$ans" -eq 1 ]
7  then
8      Operation="+"
9  elif [ "$ans" -eq 2 ]
10 then
11     Operation="-"
12 elif [ "$ans" -eq 3 ]
13 then
14     Operation="*"
```



```
exp
exp > No Selection
1  #!/usr/bin/expect --
2
3  set timeout -1
4  set N1 [lindex $argv 0]
5  set N2 [lindex $argv 1]
6  set Operation [lindex $argv 2]
7  spawn ssh 19579@35.167.127.201 /home/19579/calculate
8  expect "N1:" { send "$N1\r" }
9  expect "N2:" { send "$N2\r" }
10 expect "Operation:" { send "$Operation\r" }
11 interact
12
```

Client side: Execution of activate.sh

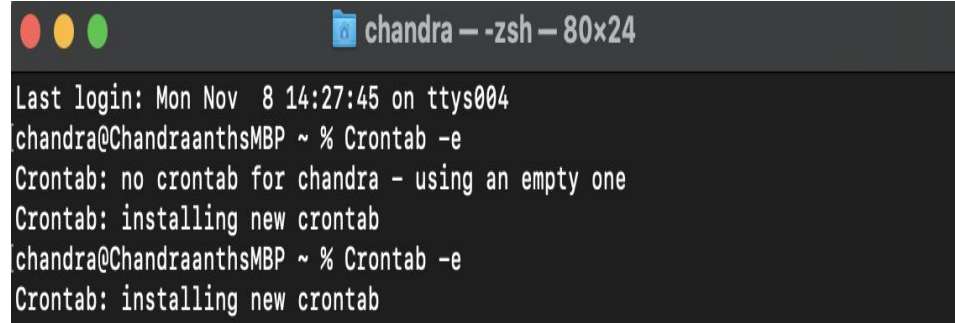
- Create shell script to automatically execute the server side interactive Calculator automatically.

A terminal window titled 'calc — -zsh — 80x24' showing the execution of a shell script 'activate.sh'. The script runs four iterations of an SSH connection to a server at 19579@35.167.127.201, where a calculator is used. Each iteration shows the input of two numbers (N1 and N2) and an operation, followed by the result.

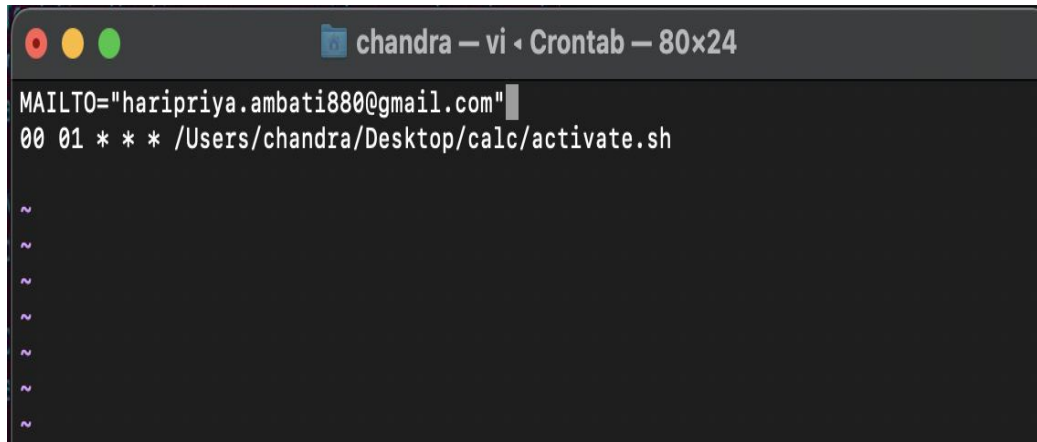
```
[chandra@ChandraanthsMBP calc % sh activate.sh
spawn ssh 19579@35.167.127.201 /home/19579/calculate
N1: 78
N2: 35
Operation: /
2
[chandra@ChandraanthsMBP calc % sh activate.sh
spawn ssh 19579@35.167.127.201 /home/19579/calculate
N1: 60
N2: 7
Operation: *
420
[chandra@ChandraanthsMBP calc % sh activate.sh
spawn ssh 19579@35.167.127.201 /home/19579/calculate
N1: 69
N2: 93
Operation: *
6417
[chandra@ChandraanthsMBP calc % sh activate.sh
spawn ssh 19579@35.167.127.201 /home/19579/calculate
N1: 81
N2: 22
Operation: /
3
```

Cron Job

- Create cron job.
- Set to run at 1 am every day

A terminal window titled 'chandra - zsh - 80x24' showing the process of setting up a cron job. The user 'chandra' is at 'Chandraanth'sMBP'. The terminal shows the command 'crontab -e' being executed, which results in a message that no crontab exists and a new one is being installed.

```
chandra@Chandraanth'sMBP ~ % crontab -e
Crontab: no crontab for chandra - using an empty one
Crontab: installing new crontab
chandra@Chandraanth'sMBP ~ % crontab -e
Crontab: installing new crontab
```

A terminal window titled 'chandra - vi - Crontab - 80x24' showing the content of the crontab file being edited in vi. The first line sets the email recipient to 'haripriya.ambati880@gmail.com'. The second line sets a cron job to run '/Users/chandra/Desktop/calc/activate.sh' at 00:01 every day. The rest of the file is empty, indicated by tilde characters.

```
MAILTO="haripriya.ambati880@gmail.com"
00 01 * * * /Users/chandra/Desktop/calc/activate.sh
~
~
~
~
~
~
~
```

Configuring Email Notice

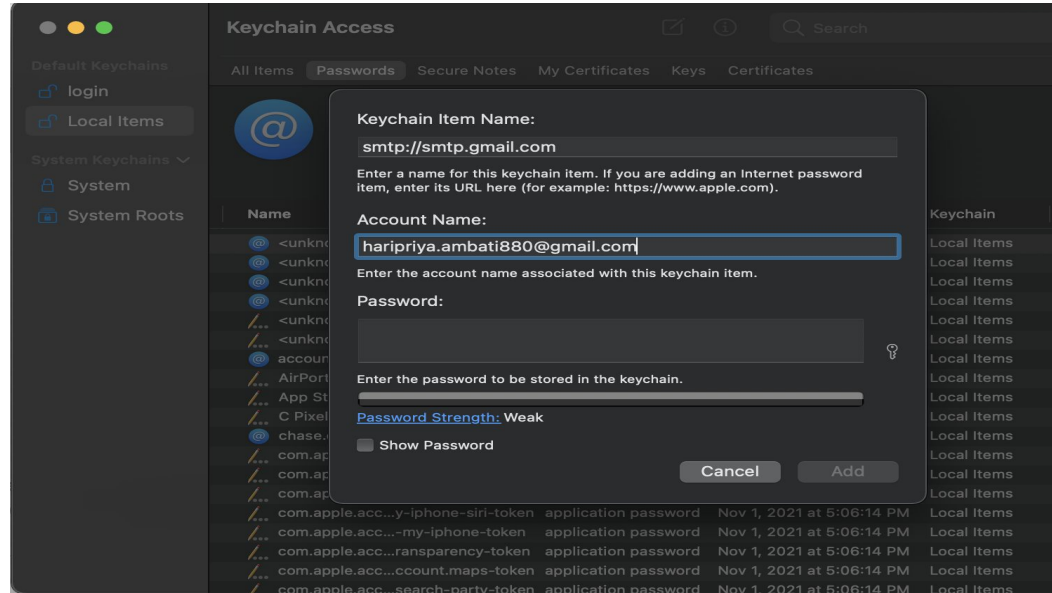
- Setup smtp on your Mac and send mail from the command line
- Install msmtplib using brew install and create a directory which will hold the ssl-certificates
- Reference link: <https://pauledenburg.com/setup-smtp-on-your-mac-and-send-mail-from-the-command-line/>

```
bin — zsh — 112x24
chandra@ChandraanthsMBP ~ % brew install msmtplib
Updating Homebrew...
==> Auto-updated Homebrew!
Updated 1 tap (homebrew/cask).
==> Updated Casks
Updated 12 casks.

==> Downloading https://ghcr.io/v2/homebrew/core/ca-certificates/manifests/2021-
##### 100.0%
==> Downloading https://ghcr.io/v2/homebrew/core/ca-certificates/blobs/sha256:1b
==> Downloading from https://pkg-containers.githubusercontent.com/ghcr1/blobs/sh
##### 100.0%
==> Downloading https://ghcr.io/v2/homebrew/core/bdw-gc/manifests/8.0.6
##### 100.0%
==> Downloading https://ghcr.io/v2/homebrew/core/bdw-gc/blobs/sha256:e1657498c65
==> Downloading from https://pkg-containers.githubusercontent.com/ghcr1/blobs/sh
##### 100.0%
==> Downloading https://ghcr.io/v2/homebrew/core/libffi/manifests/3.4.2
##### 100.0%
==> Downloading https://ghcr.io/v2/homebrew/core/libffi/blobs/sha256:a461f6ad21a
==> Downloading from https://pkg-containers.githubusercontent.com/ghcr1/blobs/sh
##### 100.0%
==> Downloading https://ghcr.io/v2/homebrew/core/readline/manifests/8.1.1
##### 100.0%
```

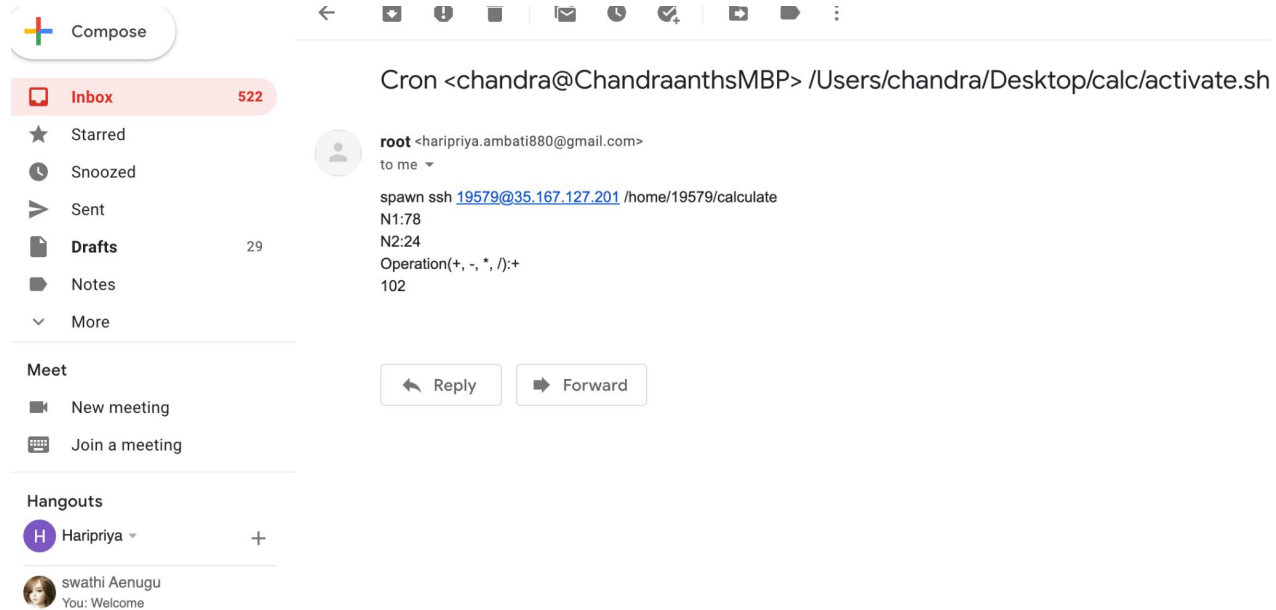
Configuring Email Notice

- Save your Gmail password in your keychain:



Configuring Email Notice

- Email notice received on gmail.



References

- https://npu85.npu.edu/~henry/npu/classes/shell_script/backup/slide/ssh_setup.html
- https://npu85.npu.edu/~henry/npu/classes/shell_script/backup/slide/expect.html#calculator
- https://npu85.npu.edu/~henry/npu/classes/qa/cron_job/slide/cron.html

Google slides URL :

<https://docs.google.com/presentation/d/1rJ2RmYnnBfJdwwBRKDZArTQdmQl2OkqlJ9J592uV54A/edit?usp=sharing>

GitHub:

<https://github.com/HaripriyaReddy880/Software-Quality-Assurance-and-Test-Automation/tree/main/Shell%20Script/Project/URL>

