

Git Hub Via SSH :

Here we are going to learn how to communicate github with ssh protocol.

SSH means secure shell also known as secure socket shell and it is unix based command interface and protocol for securely access to a remote computer.

Ssh keys :

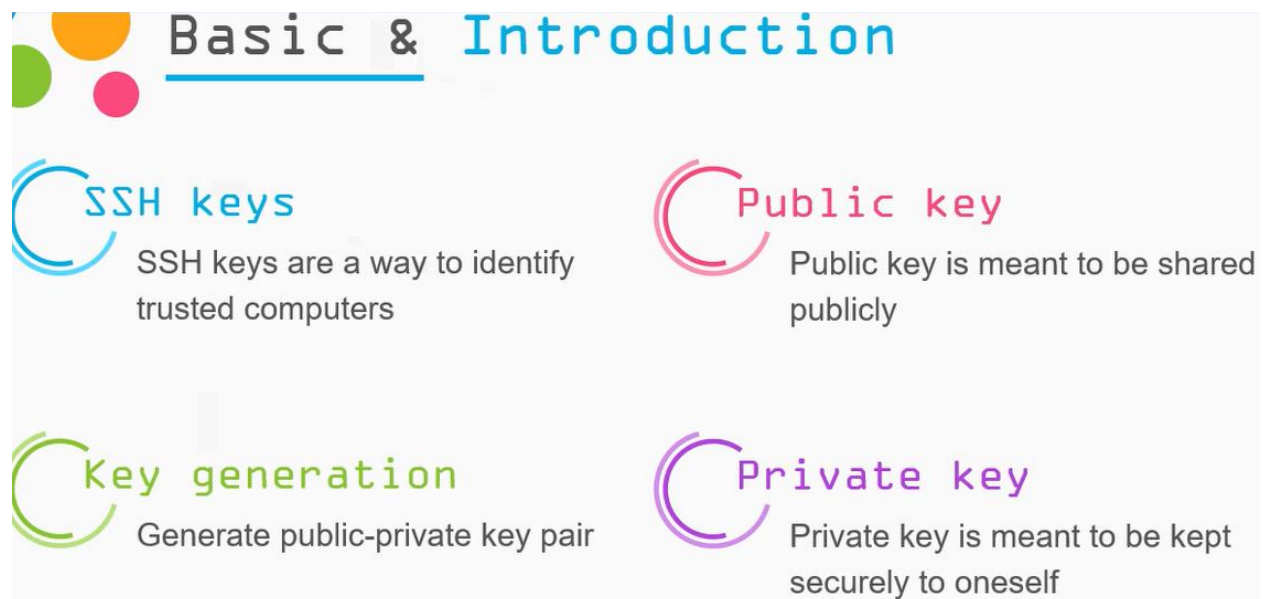
ssh keys are a way to identify trusted computers

Now this identification process does not involve passwords and is more secure than a password based authentication.

To achieve this ssh authentication we need to generate public and private key pair.

Key Generation :

Generate Public and private key pair



This is a public key looks like

```
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAQCAQDfOw4OXPTMQ4NCrdh9w2q9Y/n4Hoa4SEjJN2EKbHdYdfUpAPVmnzCWXsxLKssGmsAtSfAGaxlPdli6Z0
pLiBvYszCy39gy7pfgIsY40PGFNSAq3q0wFwhFYjTV+NeH9xnXUakkeoYVW0QL+a/EVYjQZVI7X0pmxY2ML/6vWQit9Lh+ZDVsoEE/Y/t7d/0JVUg30tQdrI
7Xhk5yxEq6/SJITBqdo2kDxj9m3wGylfcFQpJl06XqlEZB25k51tpAwCYiTr4BVtdmP9x7L0rzJK4flaH+tI0S0RN/xmsrfmgwLJHNRkrLFU4f5F8Dl11b5G+vsI
NqzIqEL0tXhaZxxqmyQAbfea8zED5d46cz5GyQgLPtSe1YKY5lbnNWcXWqGBuPhLyBCTUGIIyBHdxszFcLzdRLHEu2KwKhJlel3PFnJNc+vMkVkpdk2+kr
Yn97g/rPI9PDmFAS/qE/+MSbMRuFIXz+zSsxpl2HYCioWWcl08fHr5mi7AWWB3fuOIct4ofruxeqILs+idLw6P5rxXVR3amYvmKlpTvPQqN3VbaaPauCK0I
K2cOOcS3LowrbuIN7SE5Zil+4oWFLT0hUFZPBj0X2zI4N8gKe7hkTw7GMsjopJR7Rt8+4vyow8CDsoUylWRQhf76xTSANYFqFP2qpn881FIPEpsQmkKw
= home machine
```

This is a private key looks like

-----BEGIN RSA PRIVATE KEY-----

MIIJKAIBAAKCAgEA3zsODIz0zEODQq3YfcNqvWP5+B6GuEhIySTdhCmx3WHX1KQD  
lZp8wll7MSyrLBprALUnwBmsZT3dYumdkS4gb2LMwst/YMu6X4CLGONDxhTUgKt6  
EMBcIRWI01fjXh/cZ1lGpJHqGFtEC/mvxFVY0GVSO19KZsWNjC/+r1kIk/S4fmQ1  
bKBBP2P7e3f9CVVIN9LUHaz+14ZOcsRHquv0iZUwanaNpA8SfZt8BsiH3BUKSZdO  
l6pRGQduZOdbaQMAMlk6+AVU3Zj/cey9K8ySuJX9Wh/rSNEtETf8ZrK35oMCyRzU  
ZKyxVOH+RfA5ddW+Rvr7ATasyKhC9LV4WmccapskAG33mvMxA+XeOnM+RskICz7U  
ntWCmOZW4zVnFlqhgbj4S8gQklBiCMgR3cbMxXC83USxxLtisCoSZXpdzxZyTXPr  
zJFZKXStvpK44mJ/e4P6zyPTw5hQEv6hP/jEmzEbhSF8/s0rMaZdnyGAoqFlnJdP  
Hx6+ZouwFlgd37jiHLeKH67sXqiC7PonS8Oj+a8V1Ud2pmL5ipaU7z0Kjd1W2mj2  
rgitCymDjnEty6MK27iDe0hOWYpFuKfH509IVBWTwYiaF9syODfICnu4ZE8OxjL  
I6KayUe0bfPuL8qMPAg7KFMpVkUIX++sU0gDWBahT9qqZ/PNRZTxKbEJpCsCAwEA  
AQKCAgB69oizmLivm7C+Fgzembo+QMf8yLPk5sxRICF1H5J+I9tDomUKUGLQm4Gk  
gLP5PMQcS6ltv7aavg0o4w5TFLmBIacwle+AXjh3StNUdjvS7L5xcgPRdPRKtRX9  
dLglrN83gMXc+RM9/2foQM1lFJ4rjORTGBZfrgpeYkGkTSLQfUjzNjfHci7+wBBS  
3rFfZr6lIUj+X8Cw76ZeyYfAuuCkuKlGt68l47eHwRH8mpFbxas5BkOgf4zUgKdq  
pZZQrfqyC0WUQTuSJSjwIDtP2Qwo6VX5QwPTxIVSqsG5udBbBWEpaHYGTqoP27y4  
wa6lHewGJVIGRRvAHA9lxGBbS9j2SDBPLW+LuK9Hxvgnlf3L9CJSITYIBRMQS/FQ  
yGtIGCe6cf4ixo+b9zOAT/DrC0/b0QyOyKV87CqZ+4zqDbxH4PUrFIEQ+uPUv3Sb  
bT0NR8ozkreF7T+iVPOVx20puK2v+q3aGbBWfGDCfN94EQ13/QDq5tzh6wAjlcsd

Do you have already Keys in your system :

```
Home@welcome MINGW64 /c/gitbranches/new/firstrepo (master)
$ ls -l ~/.ssh
total 13
-rw-r--r-- 1 Home 197121 1766 Apr 13 16:37 id_rsa
-rw-r--r-- 1 Home 197121 397 Apr 13 16:08 id_rsa.pub
-rw-r--r-- 1 Home 197121 6415 Apr 13 16:38 known_hosts
```

To remove your old keys execute below commands

```
Home@welcome MINGW64 /c/gitbranches/new/firstrepo (master)
$ rm -rf ~/.ssh

Home@welcome MINGW64 /c/gitbranches/new/firstrepo (master)
$ ls -l ~/.ssh
ls: cannot access '/c/Users/Home/.ssh': No such file or directory

Home@welcome MINGW64 /c/gitbranches/new/firstrepo (master)
$
```

## Let's generate an SSH Keys - RSA



### RSA Acronym

RSA stands for "Ron Rivest, Adi Shamir, and Leonard Adleman"



### Cryptosystem

RSA is one of the first practical public-key cryptosystems



### RSA Key length

Minimum length: 768 bits; default length: 2048 bits



## Let's generate an SSH Keys - DSA



### DSA Acronym

DSA stands for Digital Signature Algorithm



### DSA Key length

The key length for DSA is always 1024 bits

```
Home@welcome MINGW64 ~  
$ pwd  
/c/Users/Home  
  
Home@welcome MINGW64 ~  
$
```

I am going to generate keys with no default values adding my own parameters

Without parameters ---- ssh-keygen

With parameters

```
Home@We1come MINGW64 ~
$ ssh-keygen -t rsa -b 2048 -C "myfirstkey pair"
Generating public/private rsa key pair.
Enter file in which to save the key (/c/Users/Home/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /c/Users/Home/.ssh/id_rsa.
Your public key has been saved in /c/Users/Home/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:XLlWDB2PgQnB0CT7yvCAPpNazkVwLxyGZOI5SokQDRA myfirstkey pair
The key's randomart image is:
+---[RSA 2048]-----+
|E=o      o=+o.+o.    |
|+++      oo o+.+    |
|. *o + .  o + .    |
|o . * o o . o      |
|. . * . S o        |
|. o * . .          |
|* . +              |
|= +                |
|. o                |
+-----[SHA256]-----+

Home@We1come MINGW64 ~
$ ls -l ~/.ssh
total 13
-rw-r--r-- 1 Home 197121 1679 Apr 13 16:08 id_rsa
-rw-r--r-- 1 Home 197121 397 Apr 13 16:08 id_rsa.pub
-rw-r--r-- 1 Home 197121 4778 Apr 12 08:46 known_hosts
```

Enable ssh agent :

Here we are going to enable the ssh agent and adding the key to ssh agent

```
Home@We1come MINGW64 ~
$ eval "$(ssh-agent -s)"
Agent pid 2744

Home@We1come MINGW64 ~
$
```

This command will start the ssh agent and displayed process id above. Now we are adding key to running ssh agent

```
Home@We1come MINGW64 ~
$ ssh-add ~/.ssh/id_rsa.pub
Enter passphrase for /c/Users/Home/.ssh/id_rsa.pub:

Home@We1come MINGW64 ~
$
```

Key has been added into ssh key



# Git Fundamentals with GitHub

## Adding the SSH Key to GitHub account

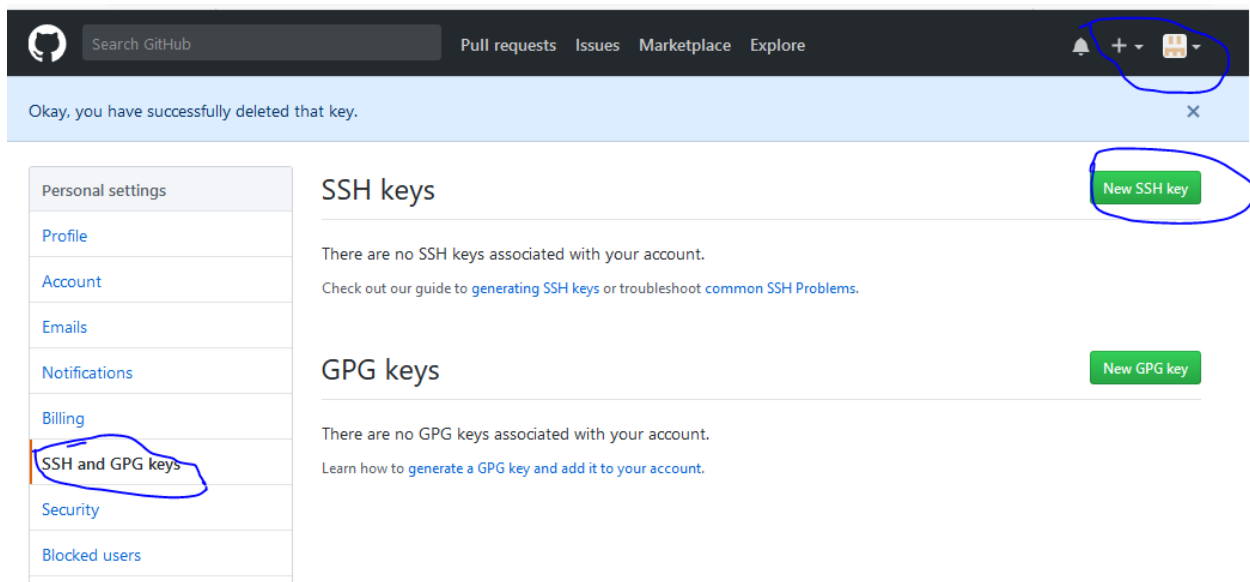
Next step is we have to add the public to github, here we are going to copy the public key using below command

```
Home@welcome MINGW64 ~  
$ clip < ~/.ssh/id_rsa.pub  
  
Home@welcome MINGW64 ~  
$
```

Just copied our public key now need to paste into git hub account. So please login into your account of github

Goto setting tab under your user id profile

Then select ssh keys like below



The screenshot shows the GitHub web interface. At the top, there's a navigation bar with the GitHub logo, a search bar, and links for Pull requests, Issues, Marketplace, and Explore. On the right side of the navigation bar, there are icons for notifications, a user profile dropdown, and a settings icon. A blue notification banner at the top states "Okay, you have successfully deleted that key." Below the navigation bar, the left sidebar contains a list of settings: Personal settings, Profile, Account, Emails, Notifications, Billing, SSH and GPG keys (which is circled in blue), Security, and Blocked users. The main content area is titled "SSH keys" and contains a green button labeled "New SSH key" (also circled in blue). Below this, it says "There are no SSH keys associated with your account." and provides a link to a guide on generating SSH keys. Further down, there's a section for "GPG keys" with a green button labeled "New GPG key" and a message stating "There are no GPG keys associated with your account."

## SSH keys / Add new

Title

My Keys

Key

```
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAQADf0GNL52iOtK9duVEF+UH3QiUefsuwFzt+40jJ+zA8HG4/4zVkhqeQnxM
vumfc7AFBvbluQeMY7MMc4+EtaTYVH1knQI8nktrlTTUxYoYVjaxEDgFfMFFVqgeZRZYvbKQ3NRNuGLnbHBa6CGTAPp
IMChT3DMnZWR9LoGJrNa5fAdTgD9FzKPW8ZVJP/f5sfDzohnVNP7eE0TLhBXbO1KvzioeqSwr+BqfiMYq6hvN2nTi
/D8mCJ4jqxCnRK4Lw1OSijANr4XjV7uAGehGIIYBuAtCp1Aj7pt6aA6DaJoSDf9sMikrLE5K1t2UjjkymeSnacnNK8IBJkOS
QbcO8fj myfirstkey pair
```

Add SSH key

Personal settings

Profile

Account

Emails

Notifications

Billing

SSH and GPG keys

### SSH keys

New SSH key

This is a list of SSH keys associated with your account. Remove any keys that you do not recognize.



My Keys

Fingerprint: 43:4c:47:d6:2b:31:58:3f:73:4f:77:7f:2d:b1:a0:a7

SSH

Added on Apr 13, 2018

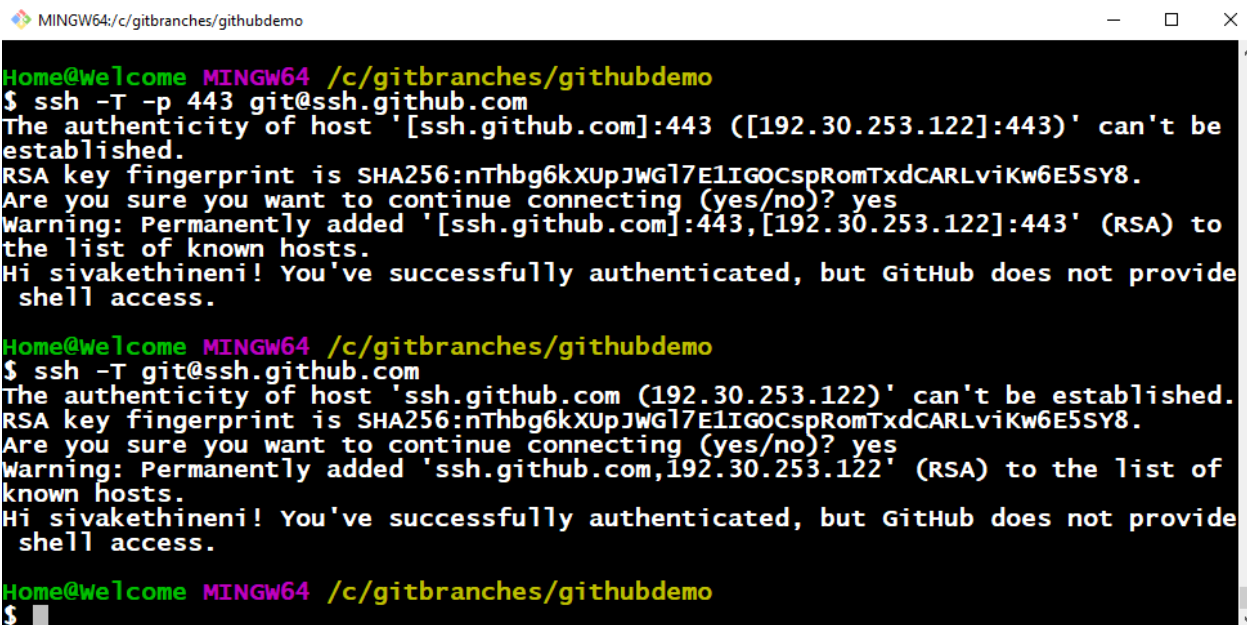
Never used — Read/write

Delete

Check out our guide to [generating SSH keys](#) or troubleshoot [common SSH Problems](#).

# Checking SSH connection

```
Home@welcome MINGW64 ~  
$ cd /c/gitbranches/  
  
Home@welcome MINGW64 /c/gitbranches  
$ mkdir githubdemo  
  
Home@welcome MINGW64 /c/gitbranches  
$ cd githubdemo/  
  
Home@welcome MINGW64 /c/gitbranches/githubdemo  
$ pwd  
/c/gitbranches/githubdemo  
  
Home@welcome MINGW64 /c/gitbranches/githubdemo  
$
```



```
MINGW64:/c/gitbranches/githubdemo  
Home@welcome MINGW64 /c/gitbranches/githubdemo  
$ ssh -T -p 443 git@ssh.github.com  
The authenticity of host '[ssh.github.com]:443 ([192.30.253.122]:443)' can't be  
established.  
RSA key fingerprint is SHA256:nThbg6kXUpJWG17ElIG0CspRomTxdCARLviKw6E5SY8.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '[ssh.github.com]:443,[192.30.253.122]:443' (RSA) to  
the list of known hosts.  
Hi sivakethineni! You've successfully authenticated, but GitHub does not provide  
shell access.  
  
Home@welcome MINGW64 /c/gitbranches/githubdemo  
$ ssh -T git@ssh.github.com  
The authenticity of host 'ssh.github.com (192.30.253.122)' can't be established.  
RSA key fingerprint is SHA256:nThbg6kXUpJWG17ElIG0CspRomTxdCARLviKw6E5SY8.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'ssh.github.com,192.30.253.122' (RSA) to the list of  
known hosts.  
Hi sivakethineni! You've successfully authenticated, but GitHub does not provide  
shell access.  
  
Home@welcome MINGW64 /c/gitbranches/githubdemo  
$
```

successfully authenticated

If you have any firewall issues don't use any port numbers then we have to use pure ssh command like second one above screen shot

# Switching remote URL and SSH Push

```
Home@welcome MINGW64 /c/gitbranches/githubdemo
$ git remote -v
fatal: Not a git repository (or any of the parent directories): .git
```

```
Home@welcome MINGW64 /c/gitbranches/githubdemo
$ git clone https://github.com/sivakethineni/firstrepo.git
Cloning into 'firstrepo'...
remote: Counting objects: 11, done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 11 (delta 1), reused 8 (delta 1), pack-reused 0
Unpacking objects: 100% (11/11), done.
```

```
Home@welcome MINGW64 /c/gitbranches/githubdemo
$ cd firstrepo/
```

```
Home@welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote -v
origin https://github.com/sivakethineni/firstrepo.git (fetch)
origin https://github.com/sivakethineni/firstrepo.git (push)
```

```
Home@welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$
```

```
Home@welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote set-url origin git@github.com:sivakethineni/firstrepo.git
```

```
Home@welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote -v
origin git@github.com:sivakethineni/firstrepo.git (fetch)
origin git@github.com:sivakethineni/firstrepo.git (push)
```

```
Home@welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
```

```
Home@welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote -v
origin git@github.com:sivakethineni/firstrepo.git (fetch)
origin git@github.com:sivakethineni/firstrepo.git (push)

Home@welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git pull origin master
The authenticity of host 'github.com (192.30.253.112)' can't be established.
RSA key fingerprint is SHA256:nThbg6kXUpJWGl7E1IGOCspRomTxdCARLviKw6E5SY8.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'github.com,192.30.253.112' (RSA) to the list of known hosts.
From github.com:sivakethineni/firstrepo
* branch          master      -> FETCH_HEAD
Already up-to-date.
```



```

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ vi file6

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git add .
warning: LF will be replaced by CRLF in file6.
The file will have its original line endings in your working directory.

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git commit -m "message"
[master 1d105c7] message
 1 file changed, 1 insertion(+)
 create mode 100644 file6

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git push origin master
Warning: Permanently added the RSA host key for IP address '192.30.253.113' to t
he list of known hosts.
Counting objects: 3, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 275 bytes | 0 bytes/s, done.
Total 3 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To github.com:sivakethineni/firstrepo.git
   db7c41e..1d105c7  master -> master

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$

```

Now you go and check in github account for changes.

```

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote set-url origin https://github.com/sivakethineni/firstrepo.git

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote -v
origin https://github.com/sivakethineni/firstrepo.git (fetch)
origin https://github.com/sivakethineni/firstrepo.git (push)

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$

```

We can set back to https again like above.

# Change SSH password

```

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ ssh-keygen -p
Enter file in which the key is (/c/Users/Home/.ssh/id_rsa):
Enter new passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved with the new passphrase.

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote -v
origin https://github.com/sivakethineni/firstrepo.git (fetch)
origin https://github.com/sivakethineni/firstrepo.git (push)

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote set-url origin git@github.com:sivakethineni/firstrepo.git

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git remote -v
origin git@github.com:sivakethineni/firstrepo.git (fetch)
origin git@github.com:sivakethineni/firstrepo.git (push)

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)

```

```

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ ls
file1 file3 file4 file6 README.md

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ vi file6

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git add .
warning: LF will be replaced by CRLF in file6.
The file will have its original line endings in your working directory.

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git commit -m "committed"
[master caf350c] committed
1 file changed, 1 insertion(+), 1 deletion(-)

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)
$ git push origin master
Enter passphrase for key '/c/Users/Home/.ssh/id_rsa': 
Counting objects: 3, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 264 bytes | 0 bytes/s, done.
Total 3 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To github.com:sivakethineni/firstrepo.git
  1d105c7..caf350c master -> master

Home@Welcome MINGW64 /c/gitbranches/githubdemo/firstrepo (master)

```

We have set up our ssh keys with password authentication.

Thank you.

Siva