# ECE297 Quick Start Guide
# VNC

*"Long distance, it's the next best thing to being there."*
- Bell telephone ad from the 1970's

## 1 Remote Access

This guide describes how to use VNC (**V**irtual **N**etwork **C**omputing) and SSH (**S**ecure **Sh**ell) to remotely access the UG lab machines with a graphical interface. This will allow you to work on your project from another internet connected computer (such as a machine at home).

Using VNC you get the same graphical interface and programming environment you would get sitting in front of one of the UG lab machines. This allows you to focus on developing your project, and not on making it compile correctly on your own machine.

## 2 Starting and Stopping a VNC session

The first step is to *start* a VNC session using `ece297vnc`. This starts-up a desktop environment on one of the UG machines, which you can then connect to remotely.

```
ug170:~> ece297vnc start
Starting new session

Machine:  ug170.eecg.toronto.edu
Display:  1

To Connect via Windows
======================
  PuTTY:
    Host Name: ug170.eecg.toronto.edu
    Connection -> SSH -> Tunnels:
      Source port: 5901
      Destination: 127.0.0.1:5901
  VNC:
    Remote Host: 127.0.0.1:1

To Connect via Mac/Linux
========================
  vncviewer -via username@ug170.eecg.toronto.edu :1
#NOTE: many of the above values (e.g. 'username', 'ug170', ':1', '5901') will
#      differ when you run this command
```

Listing 1: Starting a VNC session

`ece297vnc` will print out all the information you need to connect the VNC session, as described in Section 3. In the example above the VNC session is running on the machine `ug170.eecg.toronto.edu` and is display (session) number `1`.

You can also ask ece297vnc to list any running VNC sessions:

```
ug170:~> ece297vnc list
Running Sessions:
  ug170.eecg.toronto.edu:1
```

Listing 2: Starting a VNC session

`ece297vnc` can also be used to stop/kill a VNC session:

```
ug170:~> ece297vnc stop ug170.eecg.toronto.edu:1
Killing VNC session ug170.eecg.toronto.edu:1
```

Listing 3: Starting a VNC session

Be careful killing sessions, as any work not saved to disk may be lost.

# 3 Connecting to a VNC session

How you connect to a VNC session depends on your operating system.

## 3.1 Connecting to VNC from Windows

### 3.1.1 Initial Setup

This only needs to be done once from your home machine.

1. Install the SSH client PuTTY, available at: http://www.chiark.greenend.org.uk/~sgtatham/putty/
2. Install a free VNC client, such as Tight VNC: http://www.tightvnc.com/download.php. Note that only the *client* component needs to be installed.
3. Launch PuTTY and create a profile for ugXXX[1]:
   (a) Type `ugXXX.eecg.toronto.edu` in the Host Name field.
   (b) Type `ugXXX` in the "Saved Sessions" field.
   (c) Click "Save".

### 3.1.2 Starting a VNC Session Remotely

Connect to a `ugXXX` machine using PuTTY and start a VNC session:

1. Launch PuTTY to make an initial connection to ugXXX and start a VNC session
   (a) SSH to ugXXX by selecting the profile "ugXXX" and clicking "Open".
   (b) If asked to accept the hosts "key fingerprint" verify you are connected to the correct machine, and then select "Yes".

[1]Note that ugXXX must be replaced by a machine in the range ug132-ug180 or ug201-ug249 as described here.

(c) Enter your UG username and password when prompted.

(d) Start a VNC session with `ece297vnc start` as shown in Listing 1.

(e) Note the *Host Name*, *Source Port*, *Destination* and *Remote Host* reported by `ece297vnc`.

#### 3.1.3 Connecting to a VNC Session

1. Launch PuTTY

   (a) Enter the *Host Name* provided by `ece297vnc`
   For the example in Listing 1 this would be:
   - *Host Name*: `ug170.eecg.toronto.edu`

   (b) On the left panel, go to Connection → SSH → Tunnels.

   (c) Set the *Source port* and *Destination* to those specified by `ece297vnc`.
   For the example in Listing 1 this would be:
   - *Source port*: `5901`
   - *Destination*: `127.0.0.1:5901`

   (d) Click "Add" to create the source to destination port tunnel.

   (e) Click "Open".

   (f) If asked to accept the hosts "key fingerprint" verify you are connected to the correct machine, and then select "Yes".

   (g) Enter your UG username and password when prompted.

2. Launch the VNC client

   (a) Enter the VNC *Remote Host* provided by `ece297vnc`
   For the example in Listing 1 this would be:
   - *Remote Host*: `127.0.0.1:1`

   (b) Click "Connect".

   (c) Enter the VNC password you created the first time you ran `ece297vnc`.

### 3.2 Connecting to VNC from Linux

Connect to a `ugXXX` machine using ssh and start a VNC session:

```
#Initially we have a terminal on our local machine (e.g. at home)
my_local_machine:~>

#Next we connect to a UG machine.
#NOTE: 'username' should be replaced with your UG username, and
#      'ugXXX' with a valid UG machine
my_local_machine:~> ssh username@ugXXX.eecg.toronto.edu

#We are now on a UG machine
ugXXX:~>

#Start a VNC server
```

```
ugXXX:~> ece297vnc start
#Output trimmed...
To Connect via Mac/Linux
========================
  vncviewer -via username@ugXXX.eecg.toronto.edu :1
```

Listing 4: Connecting to a UG machine with SSH

`ece297vnc` shows that command-line we use to connect to the VNC server. We run that command in another terminal on our *local* machine

```
#On a local terminal (e.g. at home)
my_local_machine:~> vncviewer -via username@ugXXX.eecg.toronto.edu :1
```

Listing 5: Connecting to VNC from Linux

Note the above commands are examples, *username*, *ugXXX* and *:1* will be different when you run these commands.

### 3.3 Connecting to VNC from Mac

#### 3.3.1 With `vncviewer`

If you have `vncviewer` installed, use the instructions for Linux (Section 3.2).

#### 3.3.2 With TigerVNC

An alternative is to download the binary distribution of TigerVNC (http://www.tigervnc.org) for Mac. Then:

1. Start a VNC session over ssh as in Listing 4
2. Manually forward the VNC port:

```
#On a local terminal (e.g. at home)
my_local_machine:~> ssh -L 5901:127.0.0.1:5901 username@ugXXX.eecg.toronto.edu
```

Listing 6: Manual Port Forwarding

3. Connect with TigerVNC:
   - **Server:** 127.0.0.1:1

Note the above commands are examples, *username*, *ugXXX*, *5901* and *:1* will be different when you run these commands.

## 4 Transferring Files

It can also be useful to transfer files between your home computer and the remote (ug*XXX*) computer.

### 4.1 Transferring files between ug*XXX* and a Windows computer

1. Download and install a file transfer program such as WinSCP: http://winscp.net/eng/download.php

2. Launch WinSCP and drag files between the window panes representing your local (home) computer and the remote (ug*xxx*) computer.

### 4.2 Transferring files between ug*XXX* and a Linux/Mac computer

```
#Copy myfile from your local computer to ugXXX
my_local_machine:~> scp myfile ugXXX:myfile
#Copy myfile2 from ugXXX to your local computer
my_local_machine:~> scp ugXXX:myfile2 .
```

Listing 7: Using scp to transfer files

## 5 Troubleshooting

1. **I previously connected to a VNC session, but now get 'Connection has been gracefully closed' when I try to re-connect.**

   Your previous VNC session has likely been stopped.[2]

   Start a new VNC session (e.g. Section 3.1.2) and then connect to it (e.g. Section 3.1.3).

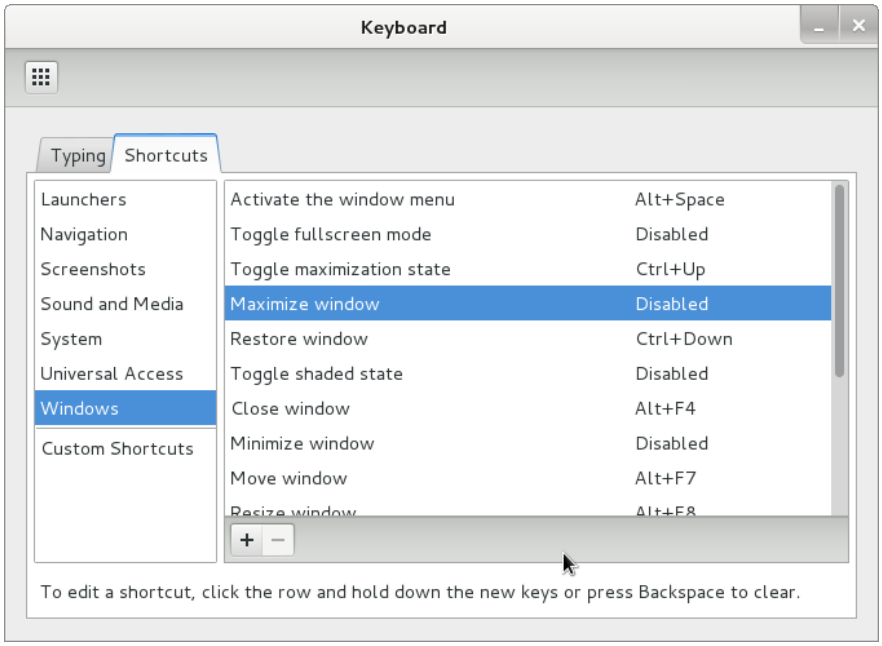
   Running `ece297vnc start` each time before you connect will ensure there is always a running session.[3]

2. **The up and down arrow keys don't work in VNC; they are making the current window maximize and shrink instead of moving my cursor.**

   On the remote ug*xxx* machine (i.e. in the VNC client window) click on your name in the top right corner of the window. Select System Settings ⇒Keyboard ⇒Shortcuts ⇒ Windows. Select some other key combination for "Maximize Window" and "Restore Window" than "Super+Up" and "Super+Down".

[2] The UG system administrator stops long-running VNC sessions (they are assumed to have been abandoned). Alternately the machine could have been restarted.

[3] `ece297vnc start` either returns a running VNC session if it exists, or start a new session.




3. **I went to full screen mode in VNC and now I can't get out of it.**

   In TightVNC press `Ctrl+Alt+Shift+f`

4. **I can't connect to the VNC server or it doesn't display anything.**

   VNC prints any error messages that occur when it tries to start up a display in files ending in .log in directory `~/.vnc/` . For example, if you are running on machine ug185 on display 3, any error messages will be in `~/.vnc/ug185.eecg:3.log`. Read this file carefully to see what the problem might be. Unfortunately, there are quite a few harmless warnings printed to this file even when VNC is running normally, which makes it harder to interpret.

5. **I forgot my VNC password.**

   Run the command `ece297vnc password` (from any `ugXXX` command prompt) to set a new VNC password.

# 6 Acknowledgements

This document draws heavily upon instructions developed by David Han for ECE451.