Preface

*** For our project, the BeagleBone Arcade, we did not have many challenges utilizing any of the hardware. The hardware inputs we used were all located on the ZenCape, and were implemented for various assignments throughout the semester. We used a router (not connected to the web) to connect the BeagleBone boards via LAN in order to create a local network. The router automatically assigned IP addresses to each BeagleBone that was connected. Finally we used the HDMI mini output to connect the BeagleBone to an external monitor. A Desktop screen is automatically generated by the board when the HDMI cable is plugged in and simply plugging in a mouse or keyboard to the USB port on the board gives the user access to the Desktop.

The only issue we encountered is that the debian Desktop does not allow for changing the screen resolution. When the HDMI is plugged in, the BeagleBone automatically determines the maximum resolution of the output monitor and sets its Desktop resolution to match the output monitor. The supported output resolutions of the BeagleBone are listed further below in the How to section of this document. Surprisingly, there is no simple way to change the output resolution as there the Desktop Manager that comes installed on the BeagleBone is extremely lightweight. Thus in order to specify the output screen resolution we must edit a file located in the /boot folder. The exact steps can be found below.

We developed our code using a mix of C and C++. The C code was adapted from our previous assignments and used mainly to handle the hardware while the C++ code was used to develop the console menu and handle games. We also built the project natively on the BeagleBone. The one external library we used was SDL2. Interestingly enough the BeagleBone includes the first SDL library prebuilt. In order to install the SDL2 library on the BeagleBone is extremely straightforward. One single `apt-get install` line was sufficient to install and build the library.

How to…

Set the force set the screen resolution

Supported BeagleBone Resolutions

Screen Resolution	Refresh Rate
1920x1080	24Hz
1324x768	60Hz
1280x768	60Hz
1280x1024	60Hz
1280x720	60Hz
1152x864	75Hz
1024x768	75Hz
1024x758	60Hz
800x600	60Hz
800x600	75Hz
640x480	75Hz

In order to set the screen resolution, have a terminal open to the BeagleBone. Change directory to /boot/uboot
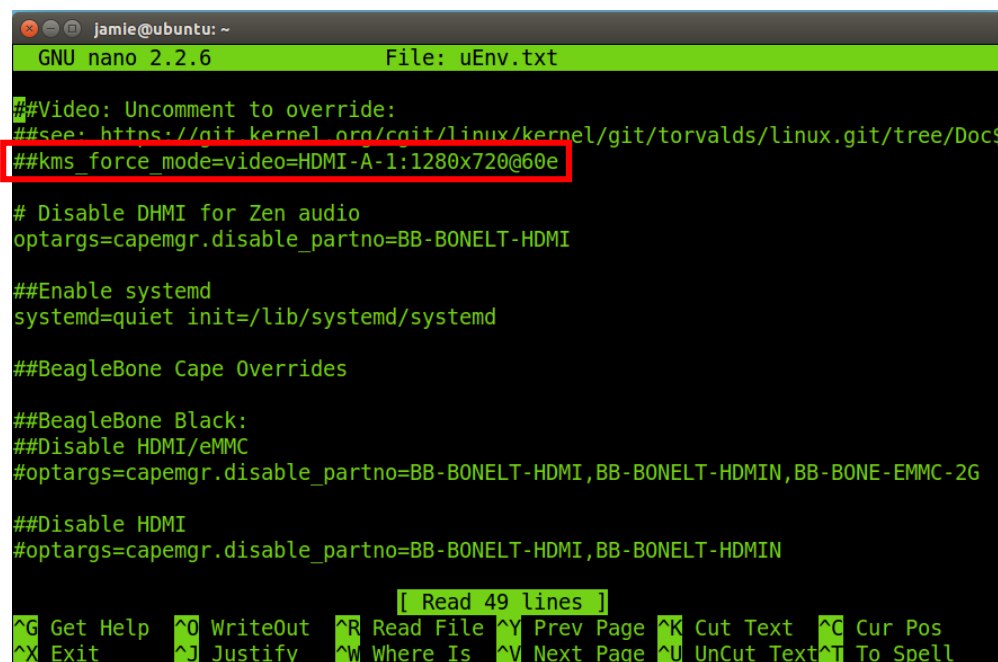
```
cd /boot/uboot
```

```
root@xujamesx-beagle:/boot/uboot# ls
App          dtbs         README.htm   System Volume Information  zImage
autorun.inf  ID.txt       README.md    u-boot.img
debug        initrd.img   scripts      uEnv.txt
Docs         LICENSE.txt  SOC.sh       uEnv.txt.bak
Drivers      MLO          START.htm    uInitrd
root@xujamesx-beagle:/boot/uboot#
```

In the uboot folder there should be a text file called 'uEnv.txt'. Edit the file by using the 'nano' command

```
nano uEnv.txt
```

Look for the line at the top of the file which is currently commented out. Change the resolution values to one of the resolution supported resolutions from the table above. Remove the (##) to uncomment the code

```
  jamie@ubuntu: ~
  GNU nano 2.2.6                    File: uEnv.txt

##Video: Uncomment to override:
##see: https://git.kernel.org/cgit/linux/kernel/git/torvalds/linux.git/tree/Doc$
##kms_force_mode=video=HDMI-A-1:1280x720@60e

# Disable DHMI for Zen audio
optargs=capemgr.disable_partno=BB-BONELT-HDMI

##Enable systemd
systemd=quiet init=/lib/systemd/systemd

##BeagleBone Cape Overrides

##BeagleBone Black:
##Disable HDMI/eMMC
#optargs=capemgr.disable_partno=BB-BONELT-HDMI,BB-BONELT-HDMIN,BB-BONE-EMMC-2G

##Disable HDMI
#optargs=capemgr.disable_partno=BB-BONELT-HDMI,BB-BONELT-HDMIN

                        [ Read 49 lines ]
^G Get Help   ^O WriteOut   ^R Read File   ^Y Prev Page  ^K Cut Text   ^C Cur Pos
^X Exit       ^J Justify    ^W Where Is    ^V Next Page  ^U UnCut Text ^T To Spell
```

Save the file and reboot your board. Once rebooted, the output resolution should be what you specified.

Installing SDL2

To install SDL2 libraries on the BeagleBone simply apt-get install the following packages: libsdl2-dev, libsdl2-image-dev, and libsdl2-mixer-dev. There are more SDL libraries however these were the ones that we used for our project.

```
sudo apt-get install libsdl2-dev libsdl2-image-dev libsdl2-mixer-dev
```