School of Advanced Technology

CST8227 Lab 4: Keyboard and Mouse Emulation

Lab Objectives:

1. Confirm proper operation of the Teensy (and associated drivers!) for keyboard & mouse.
2. Learn a few new keystroke combinations to control MS Windows.
3. Customize Windows by adding shortcut keys for a number of applications
4. Create customized apps which use the Teensy keyboard and mouse modes
5. Experiment with other interesting ways of using a Teensy

Required Equipment:

- The Arduino IDE installed and verified functional
- A working network connection.
- A Teensy 3.2 with pins, mounted into the protoboard.

Task 1: Learn and understand Teensy for keyboard and mouse operation

The Teensy has an advantage over the original (genuine) Arduino in that is provides keyboard and mouse emulation out-of-the-box. There are less than a dozen calls in the API, so it's easy and useful to explore them all. The serial mode is also extremely; you'll find it especially handy for debug messages since the Arduino has no direct way of displaying text output.

1. Run through the serial port tutorial: www.pjrc.com/teensy/td_serial.html. Confirm that you can successfully see the serial port messages.
2. Run through the USB keyboard tutorial: www.pjrc.com/teensy/td_keyboard.html. Confirm that everything works as advertised.
3. Run through the USB mouse tutorial: www.pjrc.com/teensy/td_mouse.html. Confirm that everything works as advertised.

Task 2: Find keyboard shortcuts for Windows and Customize Windows with keyboard shortcuts

The downside of GUIs is that the position of items can easily change. Keyboard shortcuts are good because they “always” work. In a programmatic environment, using keyboard shortcuts is preferable to mouse events so we'd like to know as many as possible. MS-Windows has long had the ability to designate a particular keystroke combination to activate a particular application. Make sure you know how this works.

1. Google to find the best, most comprehensive set of keyboard shortcuts for your version of Windows.
2. Try out the shortcuts to confirm that they work.
3. Start simple: add a shortcut keystroke for a single application. Right-click on an application launcher (either on the desktop or within the Start menu); choose Properties, and look for the setting Shortcut Key

4. Experiment to find out the requirements for a keyboard shortcut: does it always require a CTRL key? A SHIFT key? Both these keys?
5. Find out if it's possible to (accidentally) assign the same keyboard shortcut to two different applications.
6. Explore the behaviour of issuing the keyboard shortcut multiple times, putting the application in the background between keystrokes. Do you get multiple instances of the application, or does it just get brought to the foreground?
7. Explore any other behaviour you can imagine for keyboard shortcuts.

Task 3 (Demo #1): Create a simple keyboard app

1. Create a keyboard shortcut for an app such as Notepad.
2. Write some code that opens up the software package, writes a few lines of text, and then saves the file.
3. Functionality may be added by adding some additional text every 30 seconds and ensures the file is saved to disk **every time** text is added.

Task 4 (Demo #2): Create a simple mouse app

1. Create an app to demonstrate the operation of the teensy mouse. The app will open MS Paint (or any equivalent program) and draws a series of geometric shapes (square, triangle, and circle).
2. As a minimum, your app **must draw three different shapes**, one of which **must be a circle (using trigonometry)** for full marks. Do not use the sample apps for your demonstrations – draw your own shapes. Tip: use trigonometry to draw the circle.

Task 5 (Demo #3): Create a customized Teensy keyboard + mouse app

1. Programmatically invoke an email app, start and fill in an email, and send it off to your Smartphone (details such as address to use are specified in course notes). Invoke a browser, navigate to a suitable web page, and send an SMS message at a given interval?

Deliverables:

Complete a demo of [2 marks each item]:

1. A simple keyboard app that uses shortcut keys to open a text program (such as Notepad) and then records some text.
2. A simple mouse app that uses shortcut keys to open a drawing program (such as Paint) and draws geometric shapes.
3. A keyboard/mouse app that can send a text to your smart phone.