Pleo Booklet: Instructor

Introduction to Pleo

What is Pleo?

Pleo is a robotic dinosaur created by UGobe Life Forms. Pleo can interact with people and objects because she has her own senses and behaviors (such as eating, sleeping, and playing). Pleo can also express herself through noise and gestures. Not only does Pleo have behaviors, but each Pleo also has her own unique personality. This personality is developed when Pleo is first turned on and helps define how Pleo interacts with people later on in her life. Most importantly to us, however, Pleo is programmable! This means that anyone can learn how to program not only different personalities but also specific behaviors for a Pleo to perform.

Purpose and Motivation for the Workshop

Our goal for this workshop is to introduce students to computing in an engaging way. We plan to do this by allowing them to explore computer programming by teaching a robotic dinosaur tricks. Currently, the environment we are using for the Pleo only lets us introduce simple sequential programming and event driven programming. We also plan to introduce the students to research on Artificial Intelligence by demonstrating the Pleo's built-in behaviors.

Workshop Cost Analysis

This workshop is designed to have one station per girl. One station has the following required and recommended items:

Quantity	Item – Required	Price
1	Computer – DELL OptiPlex 360 Minitower	$597
1	Pleo	$349
1	Extra Pleo Battery	$49
1	SD Card – 2GB	$7
1	SD Card Reader (if the computer does not have a built-in SD Card Reader)	$15
1	Browser (Internet Explorer or Mozilla Firefox)	FREE
1	MySkit Environment	FREE
1	Flash 10 or higher	FREE
	TOTAL	$1,017

Quantity	Item – Recommended	Price
1	Microphone	$15
1	Headphones	$10
	TOTAL	$25

Pleo Hardware

Pleo has certain sensors or "senses" which allow her to interact with the world. These sensors are:

- Infrared transmitters and receivers on her nose allow Pleo to identify and interact with other Pleos.

- Infrared interrupter allows Pleo to detect when something has been placed in her mouth.

- Microphones on the left and right sides of her head which allow her to detect noise.

- A color camera on her nose which allows Pleo to detect light, color, and motion. Pleo can also tell when something is blocking her path or when there is no more table or other high surface to walk on ahead of her. (note: she cannot tell when there is not a surface to her side or behind herself and therefore still needs to be watched closely in order to avoid injury).

- Touch Sensors on her chin, head, shoulder, lower back, and legs. Each touch sensor allows Pleo to feel when she is being tickled, handled, and so on.
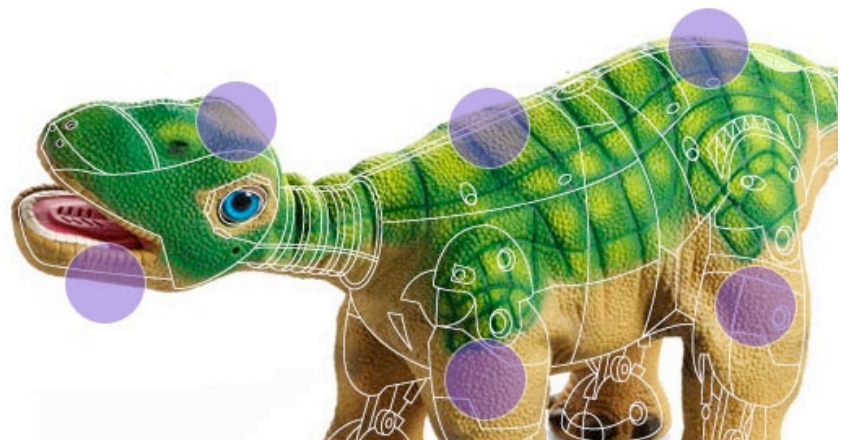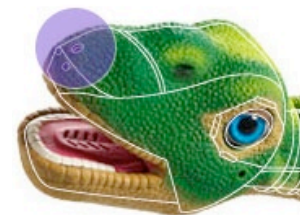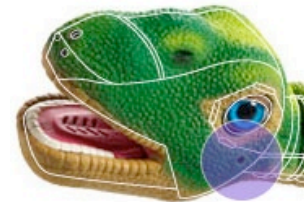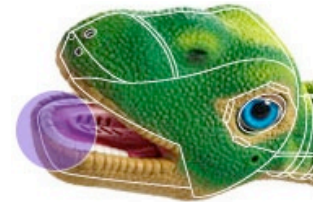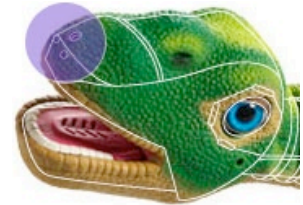
- Speakers in her mouth and right above her tail which allow Pleo to communicate with noise.

- Tilt and Shake sensors which allow Pleo to know her orientation.

- Ground Sensors which allow Pleo to know if she is on a solid surface or if she has been picked up.

- Force feedback sensors on her legs, neck, tail, and torso motors allow Pleo to know when she is being handled roughly, which then affects her personality and mood. If Pleo is being handled too roughly, she will shut down in order to avoid internal damage.

In her belly, Pleo has a battery which can be charged outside of Pleo's body and then placed inside her for use, an SD card slot (which is discussed in more detail below), a power switch, a "Pleo button" and a mini USB port.
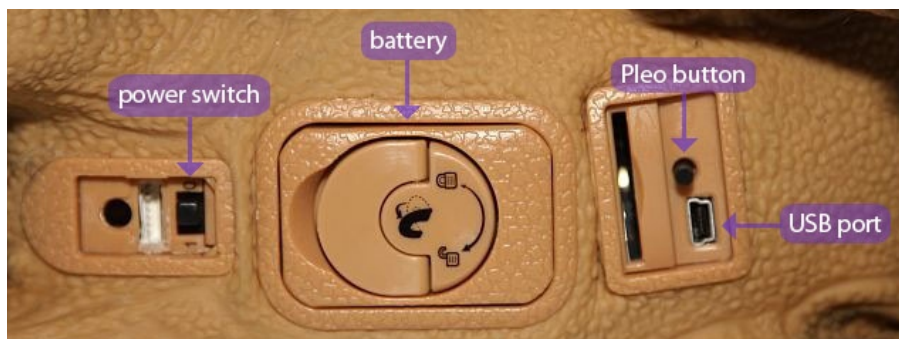
The "Pleo button" has two functions:
- Holding the Pleo button for ten seconds puts her into the packaging position. Be prepared to turn her off quickly; she will only be in this position for a couple second before she resumes wiggling.
- Pressing it once will mute the Pleo, twice will make the volume soft, and three times will put it back into normal volume mode.

The mini USB port allows you to plug Pleo into the USB port of a computer. There is a mini USB to standard USB cable that comes included with Pleo.

SD Card
The SD card slot in Pleo's belly is what will allow the students to play their own Pleo programs. Each student or group of students will be given an SD card and SD card reader along with their computer and Pleo. Each SD card will also come with a default trick which we will provide. The students will then be able to create their own programs using their computers and save them onto the SD card with their SD card readers. (More detailed descriptions will be provided in the workshop documentation). Once the SD cards have been loaded, all the students will have to do is place them in Pleo and turn her on. Each activity will have been set to a touch sensor (during the saving process) which must only be lightly pressed to activate.
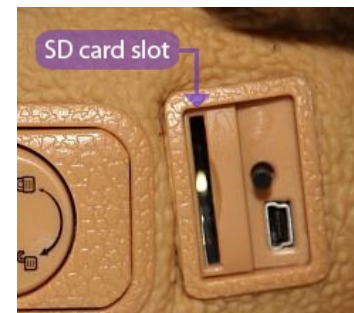
Pleo's Personality
Pleo has four different moods: happy and curious, playful and lively, scared and surprised, and sad and vexed. Pleo's likelihood to be in any one personality depends both on her own personality and how she's being treated. A Pleo who is being hung by her tail might easily become sad and vexed, but a Pleo being fed and played with is much more likely to feel playful and lively.
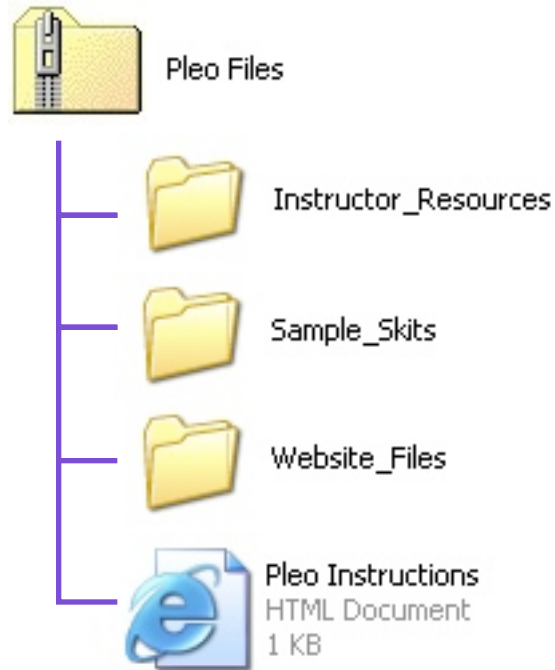
Computer Setup
Downloading the Files
All the files you need for this workshop can be found in ICE's website <http://coweb.cc.gatech.edu/ice-gt>. On the main page select "Resources for Teachers" and then "Pleo Resources." Here you will find a Pleo_Files.zip. This file contains the following folders and files:

- **Instructor_Resources Folder**
  - Completed_Skits Folder
    - *Beg Pleo.pleo*
    - *Bow Pleo.pleo*
    - *Sit Pleo.pleo*
    - *Speak Pleo.pleo*
    - *Wag Tail Pleo.pleo*
  - MySkit Folder
    - *MySkit.exe*
  - Booklet - Pleo Intro.pdf
  - Booklet - Workshop.pdf
  - Install_Flash_Player.exe
  - Installing Flash - Read Me.pdf
  - Installing MySkit - Read Me.pdf
  - Instructor_Presentation.pdf
  - Instructor_Presentation.ppt
  - Instructor_Presentation_Notes.pdf
  - MySkit-v1.3-Installer.exe
- **Sample_Skits Folder**
  - Sample_Program.pleo
- **Website_Files Folder**
- **Pleo Instructions.html** (may either have an Internet Explorer icon or a Firefox icon)

The Instructor_Resources folder has all of the materials you need to setup the computers and run the workshop. Inside the Instructor_Resources folder, you will find the Completed_Skits folder which contains a completed version of the skits the students will be working on. The MySkit folder contains the MySkit.exe file that can be used to transfer MySkit to your computer without having to install it. For instructions on how to do this, see the Programming Environment Introduction of this document. Inside the Instructor_Resources you will also find several files; you will find the two booklets we have created for you, the installer for Adobe Flash 10, which you will need to be able to play the videos that are on the student website we have created for you. We have also included the PowerPoint point presentation you can use for the lecture part of the workshop. This PowerPoint presentation has notes on suggested topics to address during the lecture. You will also find the MySkit installer which will allow you to install MySkit. Finally, you will find two Read Me files; these are provided for you in case you need a school administrator to install Flash and/or MySkit.

You will also find a Sample_Skits folder This is where the students will be saving their skits. This folder has a Sample_Program.pleo, which is a simple MySkit program.

You will also see the Website_Files folder. This folder contains all the files that make up the website. And finally you will see the Pleo Instructions.html file which is the file that will allow you and the students to view the website.

Setting up the folders
When you download the Pleo_Files.zip file, depending on the browser you are using, one of two things may happen; the files in the zip will be placed in the directory you specified or the files will be placed inside another folder called Pleo_Files in the directory you specified.
We recommend that you place the Sample_Skits folder, the Website_Files folder, the Pleo Instructions.html file and the shortcut for MySkit on the desktop for easy access. The Instructor_Resources folder can be placed on the desktop as well.

Setting up the website
For the website to work properly both the Website_Files folder and the Pleo Instructions.html file must be in the same place. We recommend you place both on the desktop, but if you are not able to place the files on the computer's desktop, you do need to place both, the file and the folder, in the same folder, otherwise when you double click on the Pleo Instructions.html file you will get an error and you will not be able to see or use the website.

Programming Environment

Introduction
This guide should help you to get started using MySkit. For a complete reference of all of MySkit's features, please visit the software creator's website <http://www.dogsbodynet.com/MySkit/index.html>. This tool allows you to create your own actions for Pleo and even add sound to them.

Installation
System Requirements:
- Windows 98 or newer
- 800 MHz+ processor
- 3D graphics card
- At least 220 MB of hard drive space
- SD Card reader (built-in or external)
- SD Card with at least 8 MB
- Sound card (optional, but highly recommended)
- Microphone (optional)

To begin, extract the files from "Pleo Files.zip" onto the desktop. You will need to install MySkit if it is not already installed on the computers the students will be using. To install MySkit, please run the "MySkit_Installer.exe" that came in the zip file in a folder named "Instructor_Resources" and follow the prompts it presents to you. If this does not work, please go to <http://www.dogsbodynet.com/MySkit/index.html> and follow the website's instructions for downloading the MySkit installer. Now, run this installer and follow the prompts that are presented. Once MySkit has been installed, you should have a shortcut to the program on your desktop.

Next, you should be sure that all the necessary files have been saved or manually placed onto the desktop. This should include "Sample_Skits," "Website_Files," and the file "Pleo Instructions.html."

Alternative installation method
If you do not have administrative access to the computer you are using or for whatever reason cannot install MySkit onto the computer, there is an alternative method of getting the program working on your computer. Inside of the "Instructor_Resources" folder, there is a MySkit folder that has a MySkit.exe file in it. This file is all you need to run MySkit. Here are the steps you must take in order to use this file:

1. Click on the desktop and select "New" and then from the window that appears select "Shortcut."
2. A window will launch which will step you through the process of creating the shortcut.
3. Navigate to the "Instructor_Resources" folder.
4. Select the "MySkit" folder.
5. Select the "MySkit.exe" file.
6. Double click on MySkit and it should load.

Keep in mind that installing MySkit in this way is not a full installation. Some small differences in program performance will occur. First, MySkit files will not have the usual MySkit icons. Second, double clicking MySkit files will not automatically open the program. In order to use these files, you will need to open MySkit first and then select "File" and then "Open..." and navigate to the file in question.
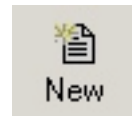
Editing Pleo's Motion

When you first open the program, you should see something similar to the picture here:
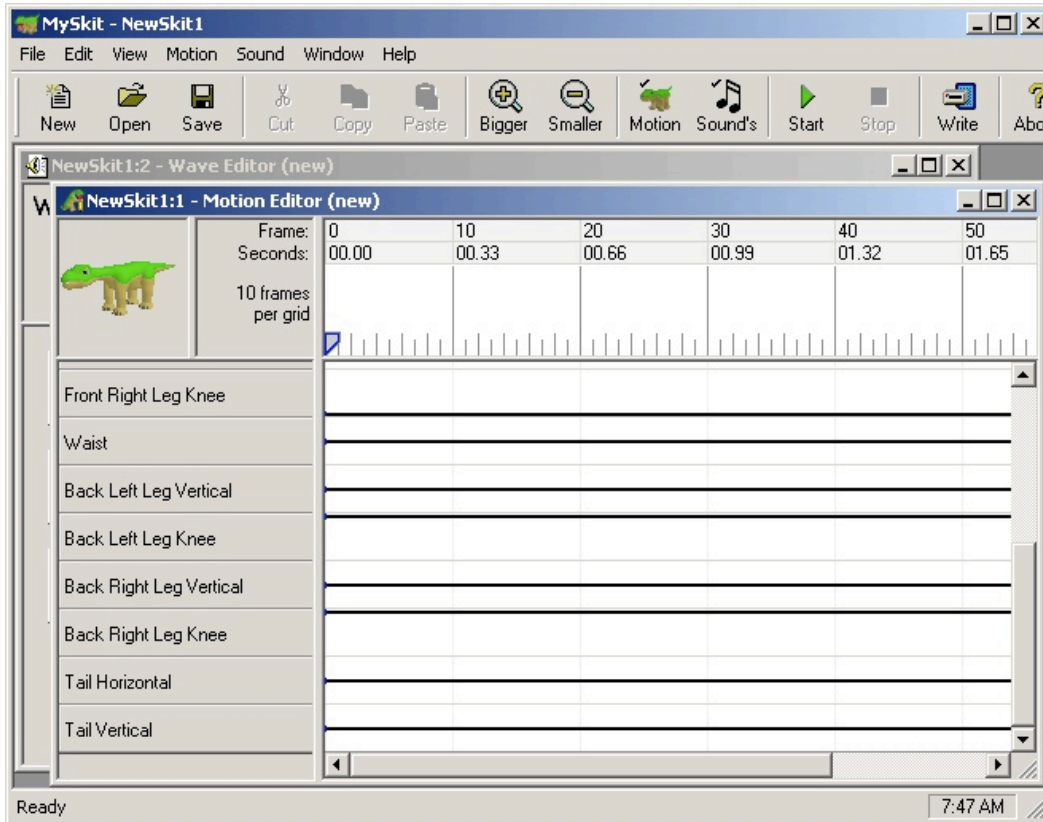
Each skit is composed of the two main windows you see: the Motion Editor and the Wave Editor. **Note: if you do not see the Motion Editor and Wave Editor windows just press the "New" button on the upper toolbar and they should appear.** You probably want to go ahead and save your skit by going to *File->Save As...* and putting your new skit into the "Sample_Skits" folder.


Pleo's motion is controlled by creating a number of keyframes that indicate what pose Pleo should be in at a specific time. A keyframe consists of setting the position value for each of Pleo's servo motors. The timeline across the top of the Motion Editor is used to specify the timing of each pose, which will determine how fast Pleo will move (see figure below). You can think of the timeline as working similarly to the timelines in programs such as Garageband, iMovie, or Windows movie maker. Time begins on the


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left and moves to the right. The more space a move takes the slower it will be and similarly the less space it takes the faster it will be. You can create a keyframe using three major methods:

- Click on one of the black lines controlling Pleo's motor at the desired time. You can drag the line up and down to change the value of Pleo's motor at that particular time.
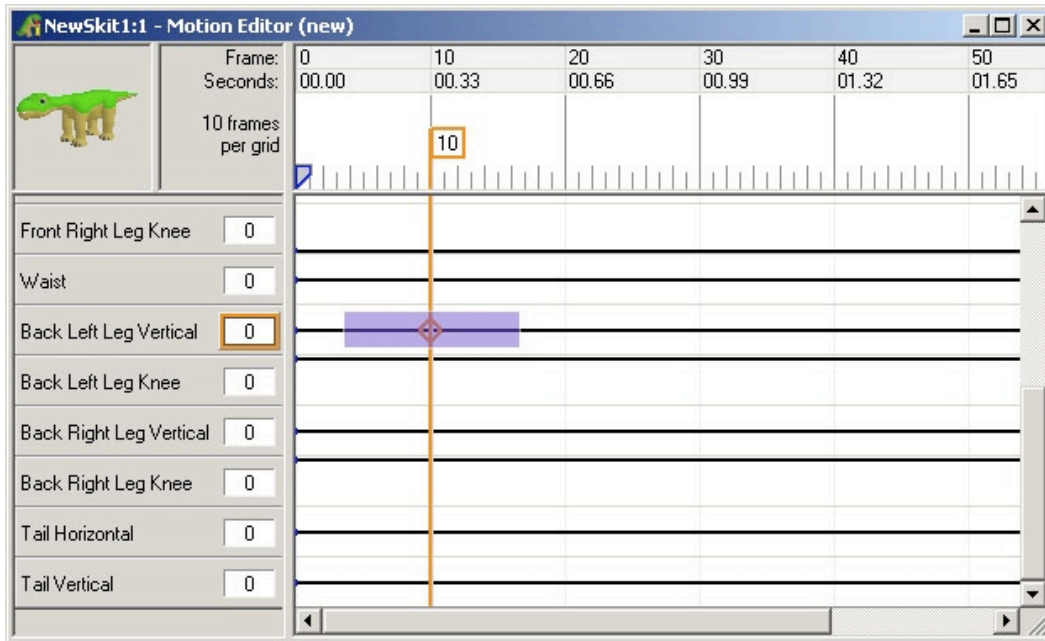

- Select a time, then manually input a value for the motor. After you have entered the desired value, press enter and you will see how the line is affected.
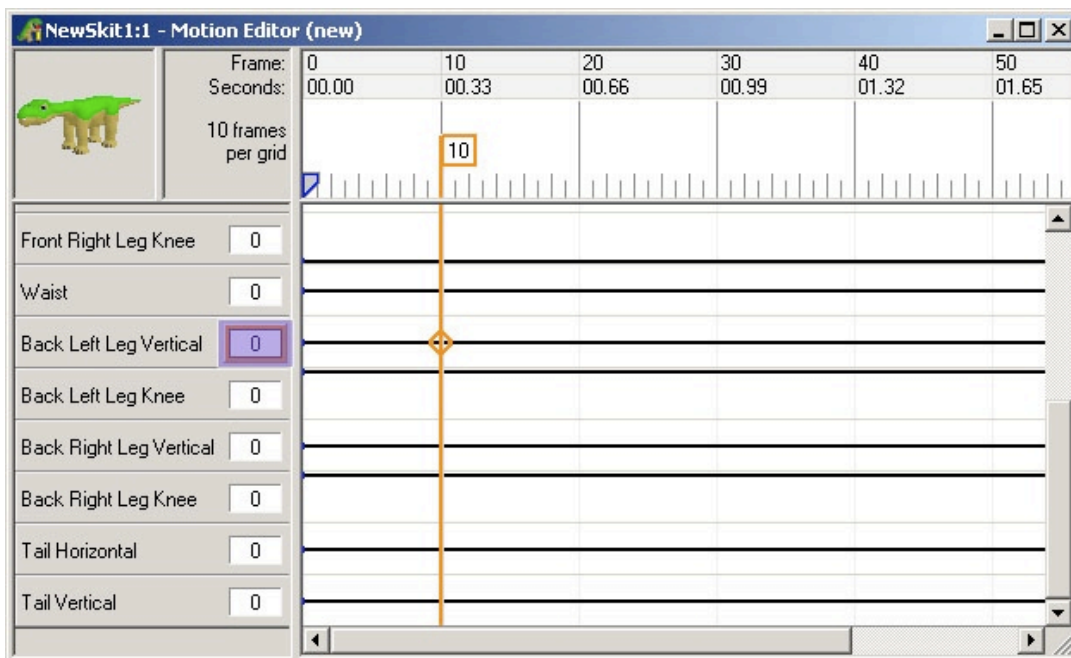
- Select a time, then modify the pose of the 3D model in the PLEO Window. This will automatically insert the correct values for the affected motors and update the motor lines appropriately.

The PLEO Window is a very useful way to keep track of what you are doing and make adjustments in your program. You can access it by going to View->PLEO Window. By creating a sequence of these keyframes, you can get Pleo to perform almost any action. The only limits are the range and speed of the servo motors. Luckily, MySkit will indicate if you are exceeding Pleo's limits. If one of the lines controlling Pleo's motors is red, then this means the motor is moving too fast. If the line is yellow, this a warning that the motor has reached its maximum speed. You can either fix this yourself or go to Motion->Fix Fast Servers or by manually adjusting the lines so that their slope is not so drastic. As you would probably suspect, MySkit also allows you to copy, cut, and paste your keyframes. Once you have created your new motion for Pleo, you are ready to add sound to your action.
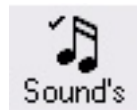

Editing Pleo's Sound
FIrst, If you do not already see the Wave Editor window, please click on the "Sound's" button in the toolbar at the top of the screen. You can see that the Wave editor is very similar to the Motion Editor. The keyframes that you established in the Motion Editor will carry over to the Wave Editor so that you can match up your sounds to Pleo's actions. There are two ways of adding sound to your Pleo's action:

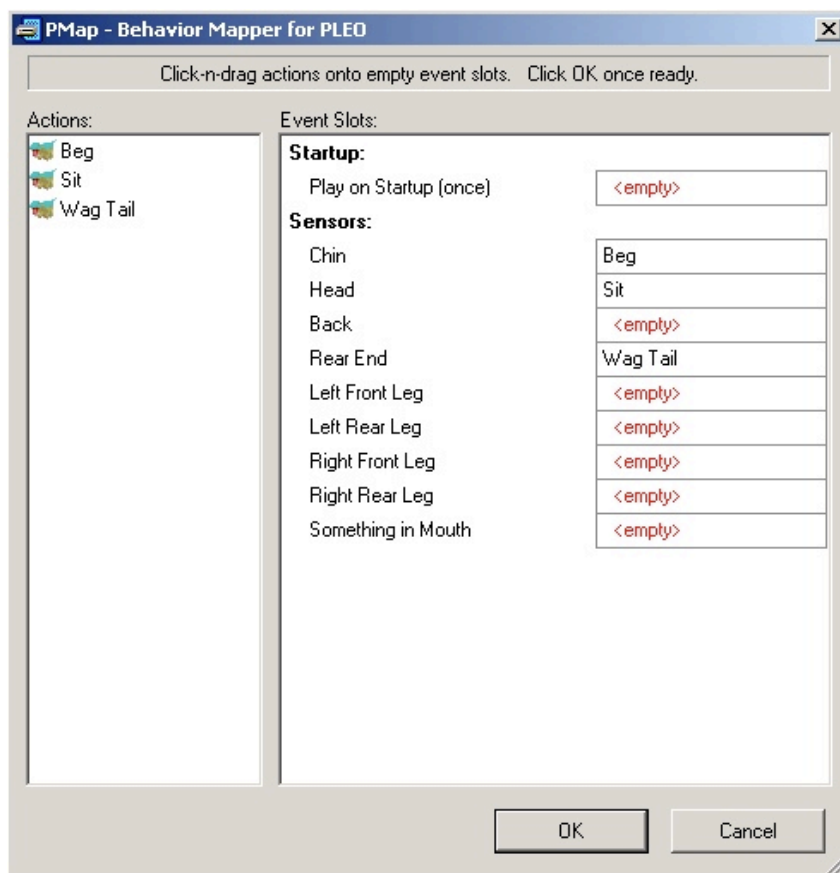- Select a time, then go to *Sound->Insert Sound…* to select a .wav file from your local hard drive
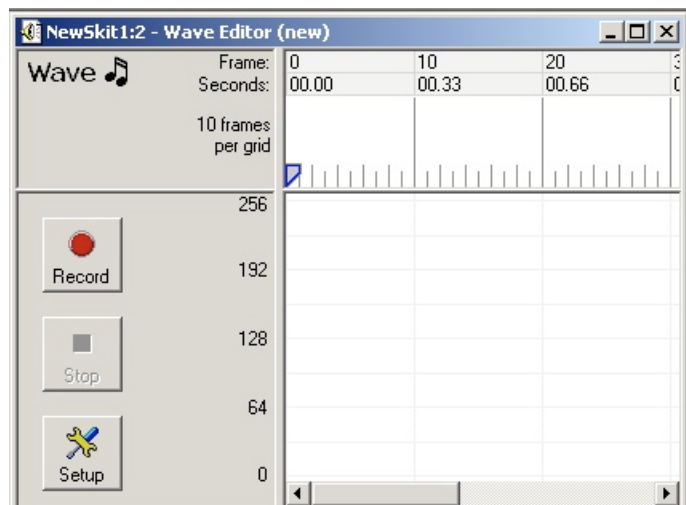
- Select a time, then use the Record and Stop buttons to record your own sound

Loading the Action into the Pleo

Now that you've created your new action for the Pleo and added sound to it, you're ready to load it onto the Pleo. First, make sure you have saved your new skit. Next, you will need to plug your SD card into the reader on your computer or your external card reader. You need to go to *File->Setup Flash Drive* and specify which drive letter corresponds to your card reader.

Now, you just need to click on the *Write* button located on the toolbar near the top of the screen. This will bring up a selection screen where you should select the "Sample_Skits" folder. After clicking OK, you will normally be presented with a screen that will allow you to select which sensor you want to activate your skit. You do this by simply dragging your action onto the appropriate sensor.

Note: if the selected folder only has one skit in it, then MySkit will automatically assign this skit to the "Play on Startup" trigger. You must have more than one skit in the folder in order to assign each of them to a trigger.

Your SD card should now be loaded with your new skit. Remove the SD card from the computer, plug it into Pleo, and turn Pleo on to test your new action.