Virtual Cardiac Patient

A Multimedia Guide to Heart Sounds and Murmurs

User's Guide

Introduction

Welcome to Virtual Cardiac Patient, a multi-media guide to heart sounds and murmurs, created by computer simulation. This document will explain the main features of the program.

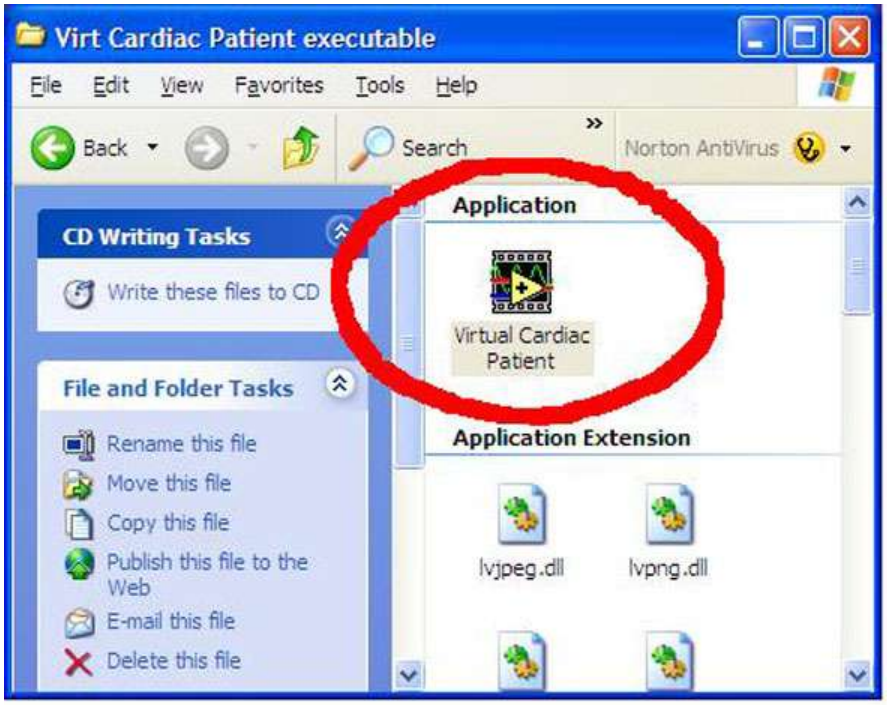
System Requirements

In order to use this program successfully you must have the following equipment:

- A Personal Computer running Windows XP or later
- Or an Apple Macintosh computer running OS X or later
- with one gigahertz or faster processor
- Headphones are REQUIRED! You will lose important low frequency information without them. In a group setting you can use high quality speakers with a subwoofer.

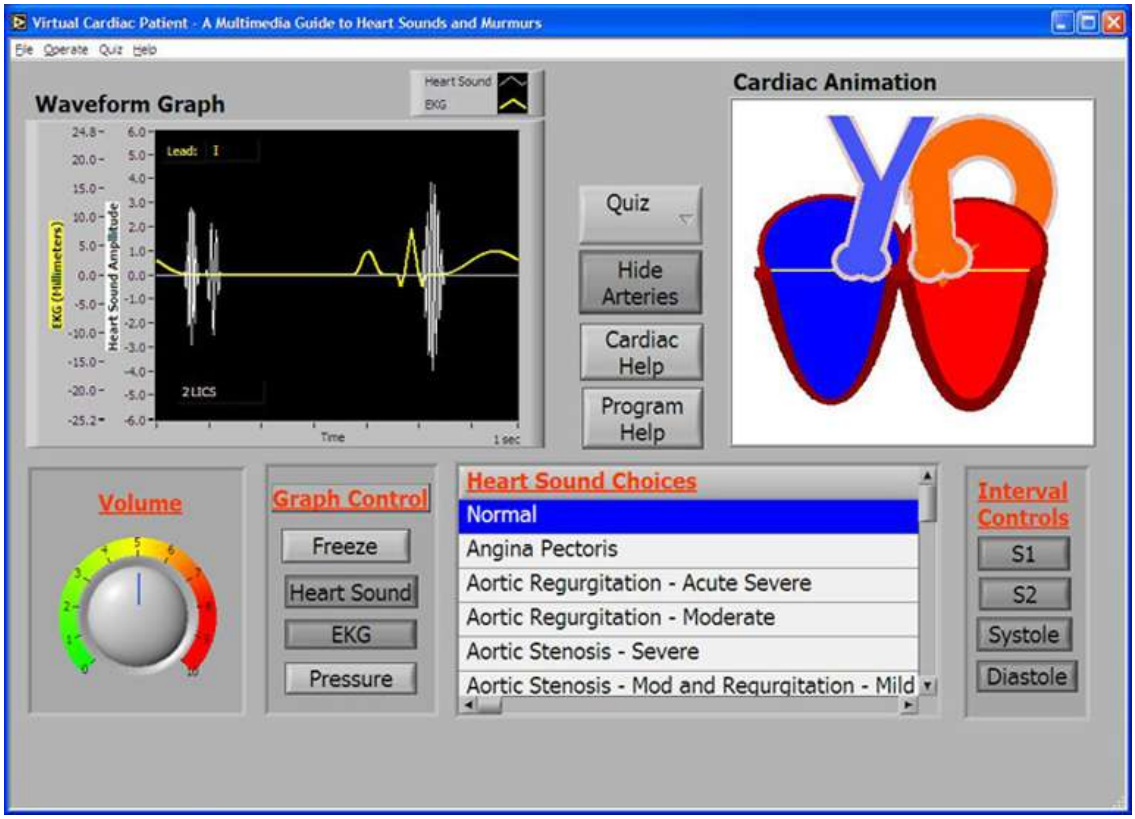
Start

After downloading the compressed Virtual Cardiac Patient zip file, extract the application and supporting files into a folder on your hard drive. Then double click the Virtual Cardiac Patient program icon to start the application.



The Main Window

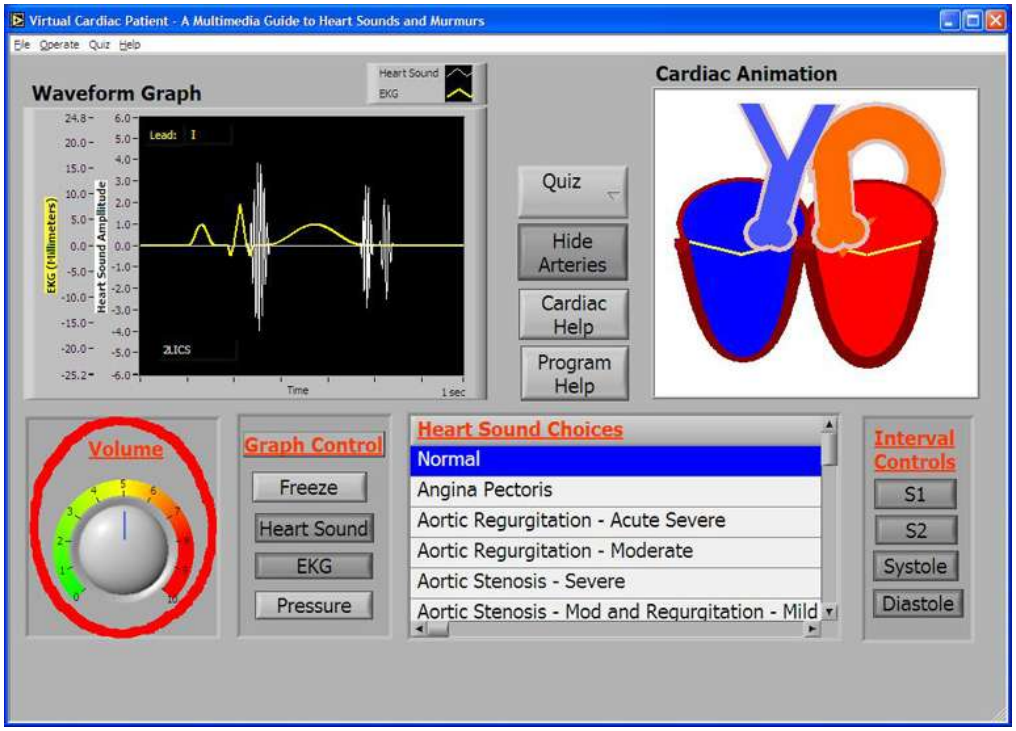
Here is the main window of Virtual Cardiac Patient.



Let us guide you through the use of each individual component of this screen.

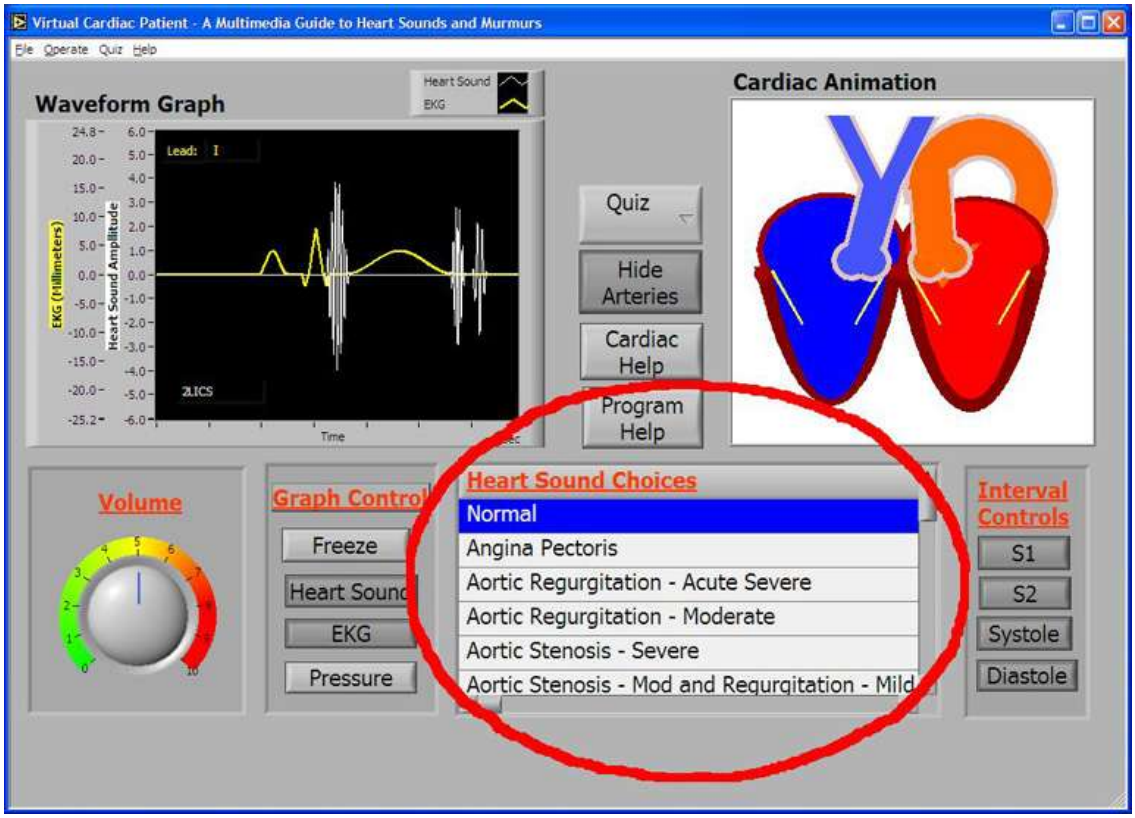
The Volume Control

This is the volume control. At any time you can adjust the sound volume to a comfortable level by using this control.



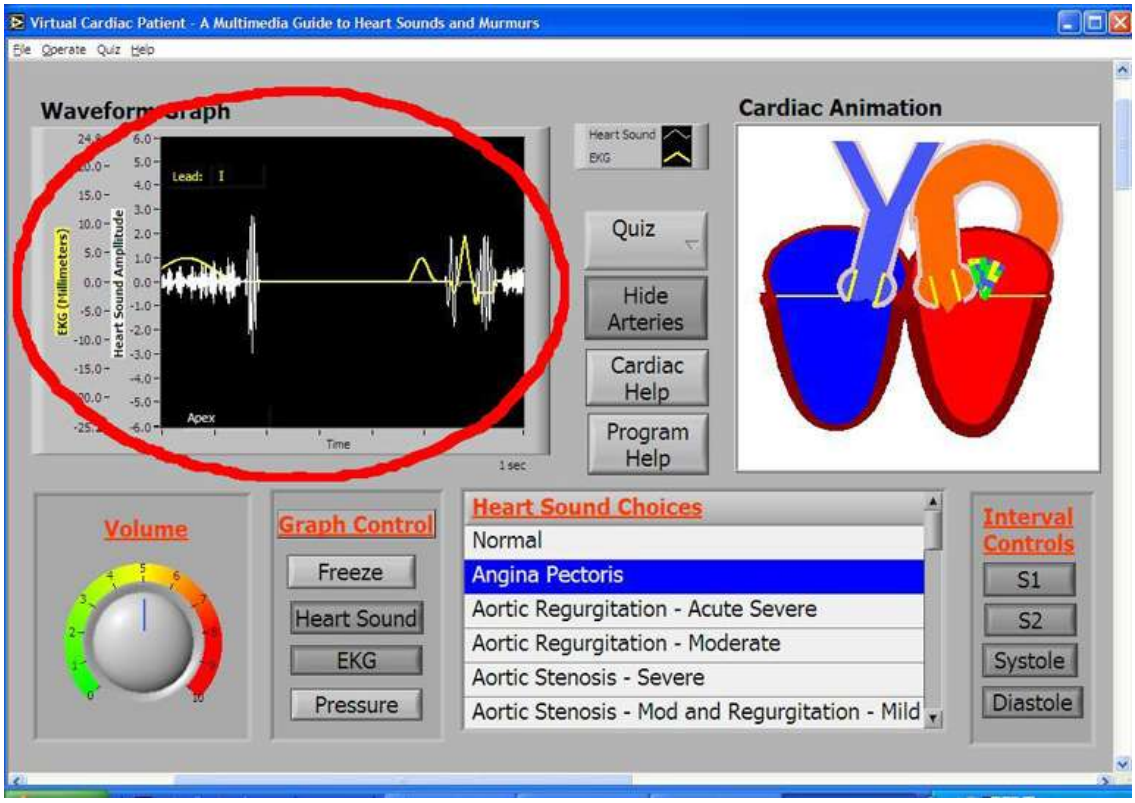
List of Heart Sounds

This is the list of supplied heart sound choices. All heart sounds play at a rate of 60 beats per minute. There is a scrollbar on the right which allows you to go forward and backward in the list. There are 28 simulated sound files in all, each of which is a separate clinical condition. At any time you can change the heart sound condition that is playing by clicking on another entry in the list. When the program starts it always selects the first heart sound on the list, the Normal heart sound.



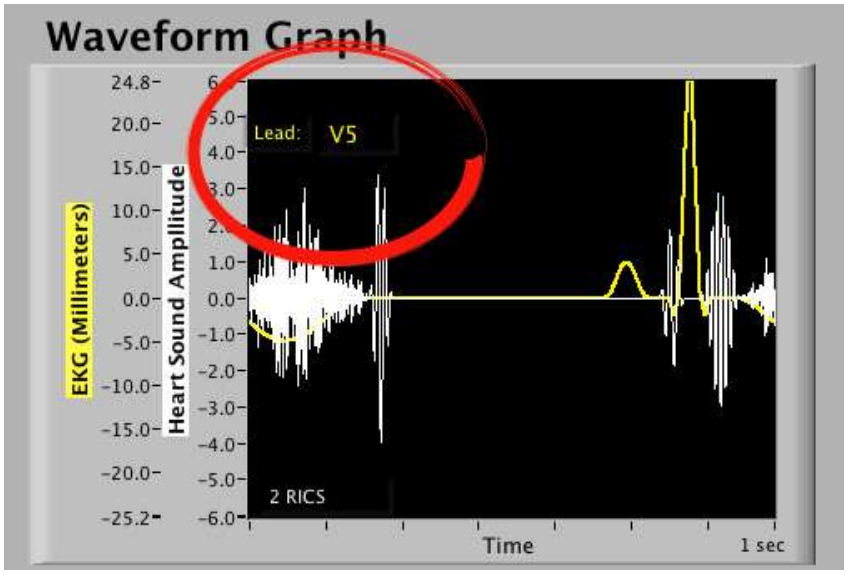
The Phonocardiogram

The waveform graph is highlighted below. It is a synchronized visual display of the phonocardiogram and superimposed EKG of the currently playing heart sound condition. The EKG is useful for timing. The phonocardiogram is in white and the EKG in yellow. As an example, you are currently seeing the phonocardiogram of Angina Pectoris. Note that Angina Pectoris is highlighted in the Heart Sound Choices list.



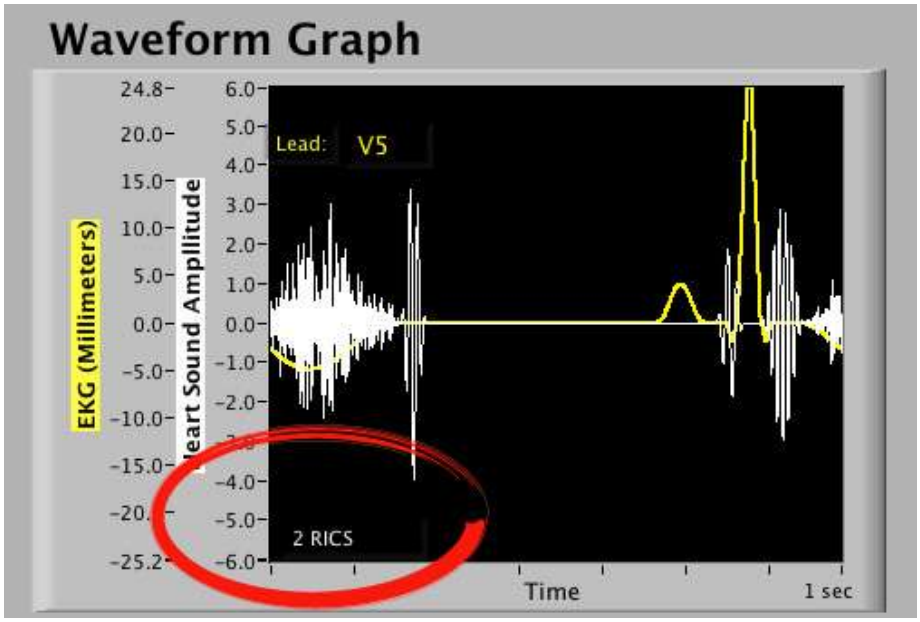
EKG Lead

The EKG lead is shown in the upper left corner of the waveform graph.



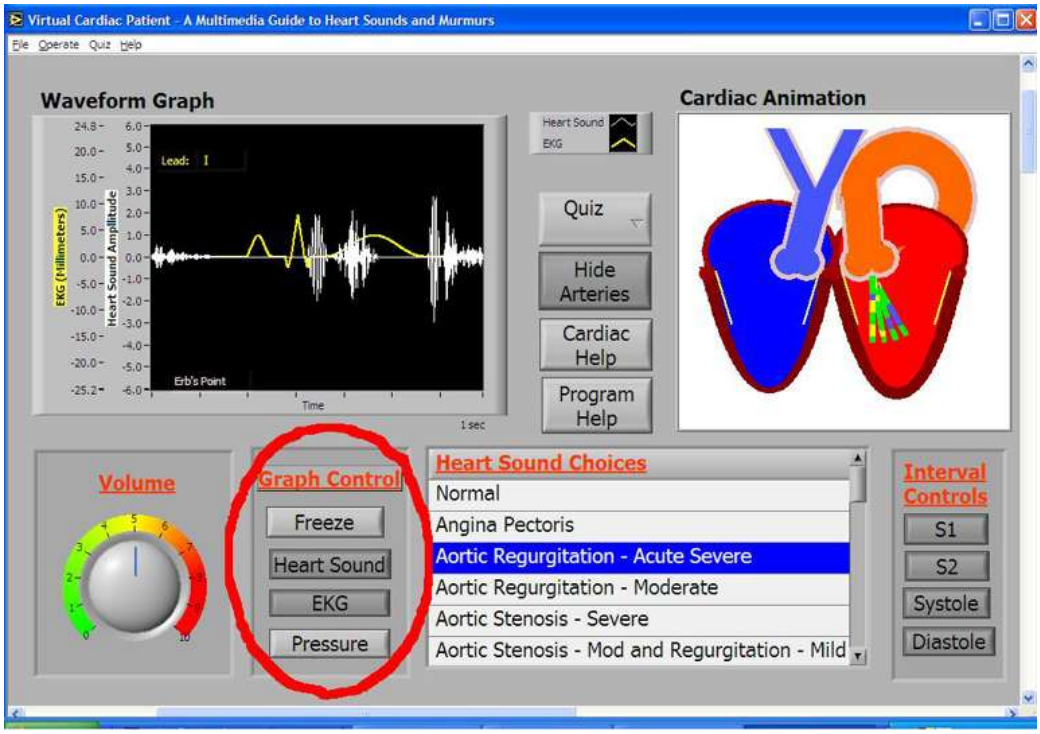
Auscultation Point

The Auscultation point is shown in the lower left corner of the waveform graph.



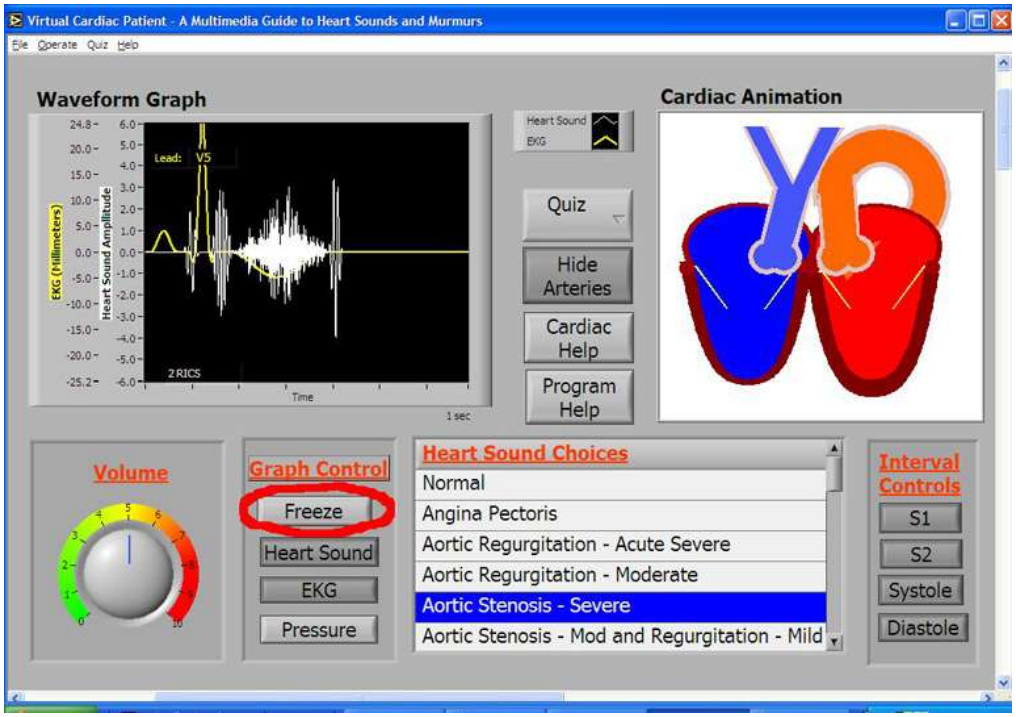
Graph Control

The graph control section is highlighted below. There are four buttons. We will describe them one by one.



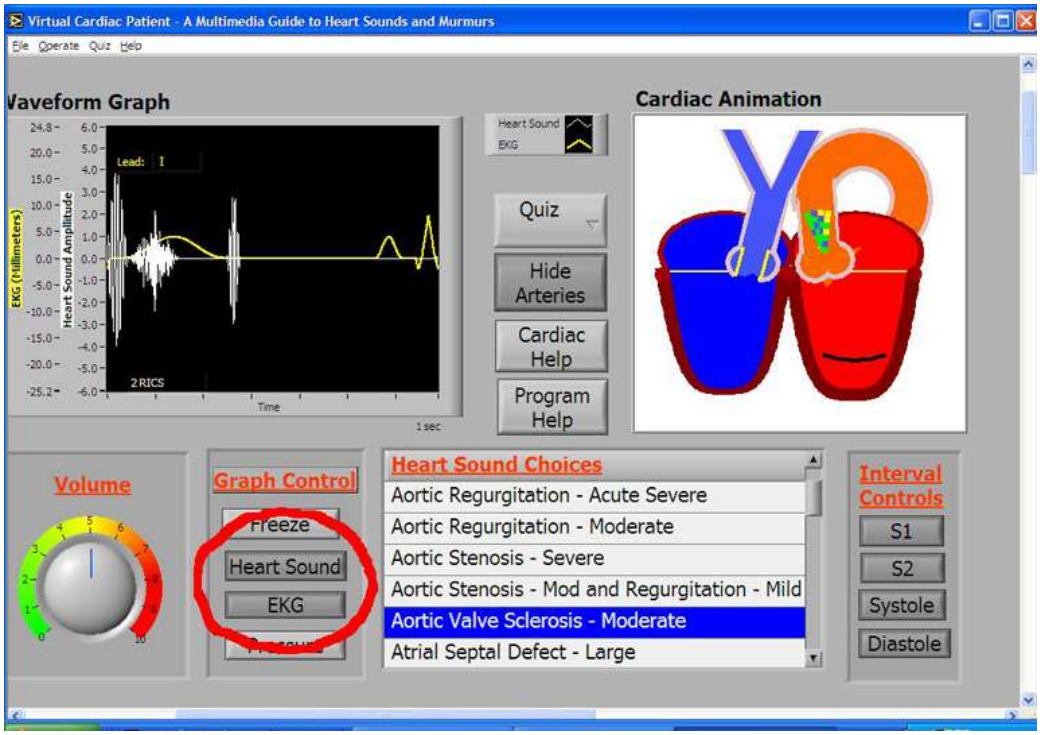
Freeze Button

This is the freeze button. It allows you to freeze the phonocardiogram so you can examine the waveform more carefully. The sound continues to play. To unfreeze the waveform, press the freeze button again.



Heart Sound and EKG buttons

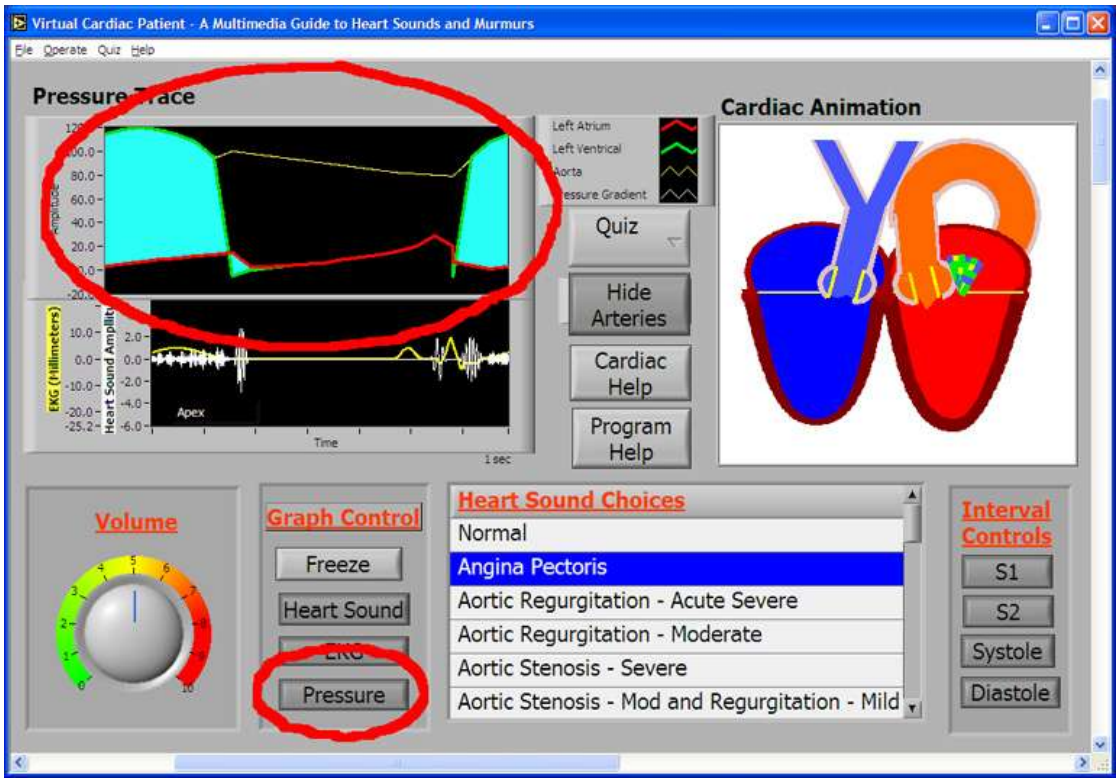
Similarly, the phonocardiogram and EKG can be turned on and off by pressing the Heart Sound and EKG buttons



Pressure Tracings

Use the Pressure button to activate the pressure waveform. Notice that the waveform graph shrinks to make space for the pressure tracings. The pressure tracings show pressure values in chambers and gradients across chambers and cardiac valves.

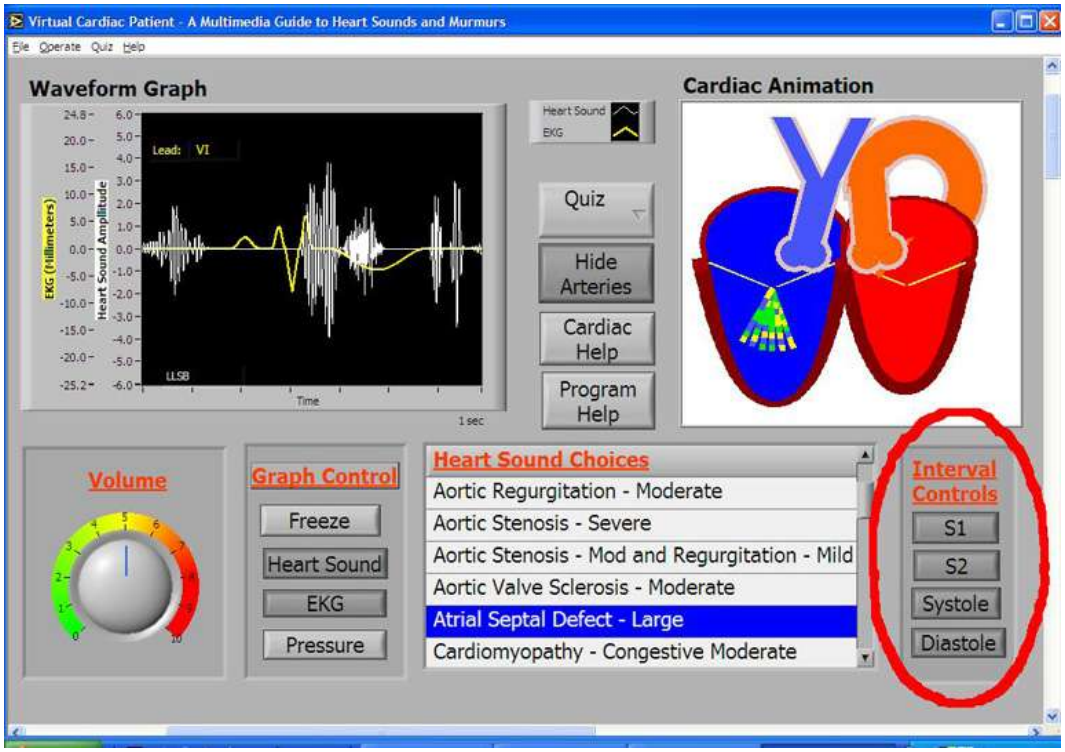
This simulates the information that would be obtained during cardiac catheterization.



To close the window and restore the waveform graph to its normal size, press the pressure button again.

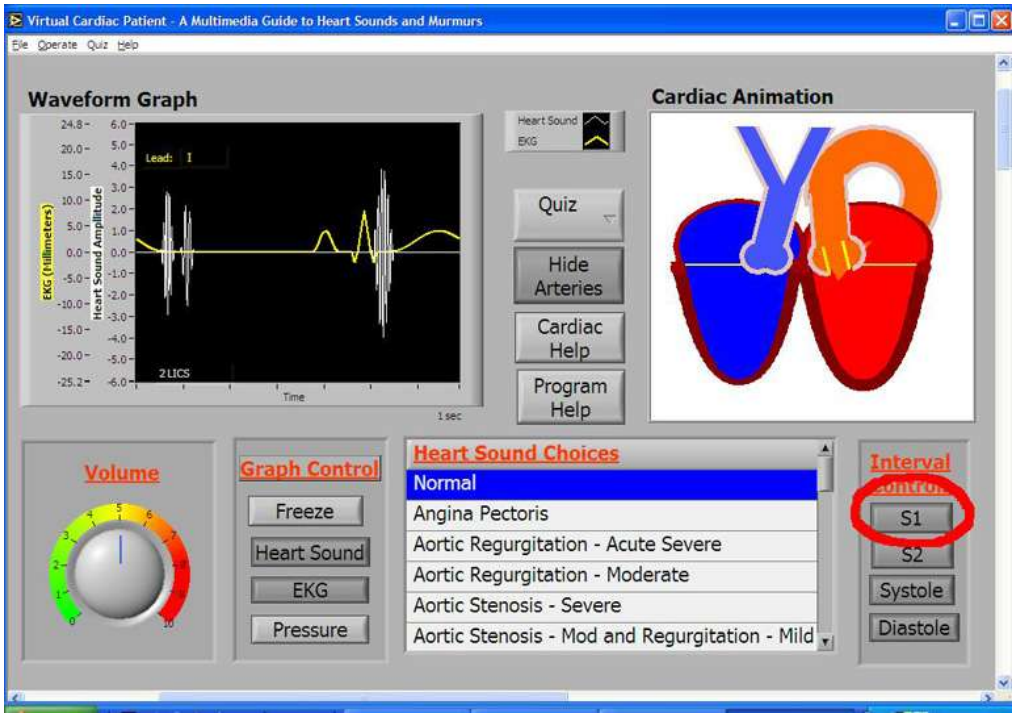
Interval Controls

The interval controls allow you to examine parts of the heart sound cycle individually. Using these buttons you can eliminate sounds and focus on individual parts of the heart sound cycle. Each of the buttons allows you to turn on or turn off a component of the heart sound cycle.



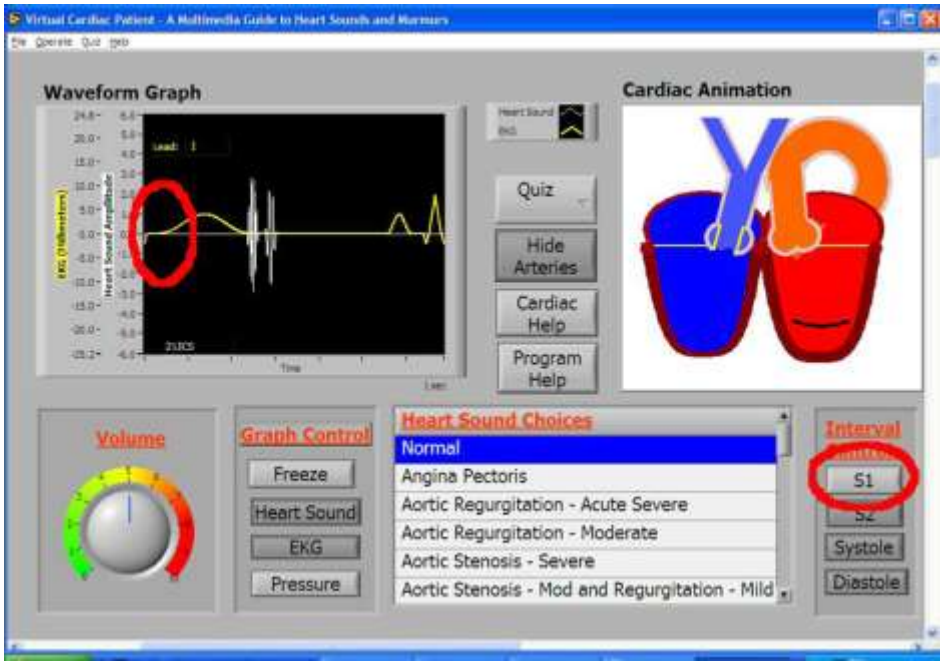
S1 Button

The image below shows a normal heart sound cycle with both S1 and S2 present. Note that S1 is single and S2 is split.



S1 Button with S1 off

Press the S1 button to turn off S1.



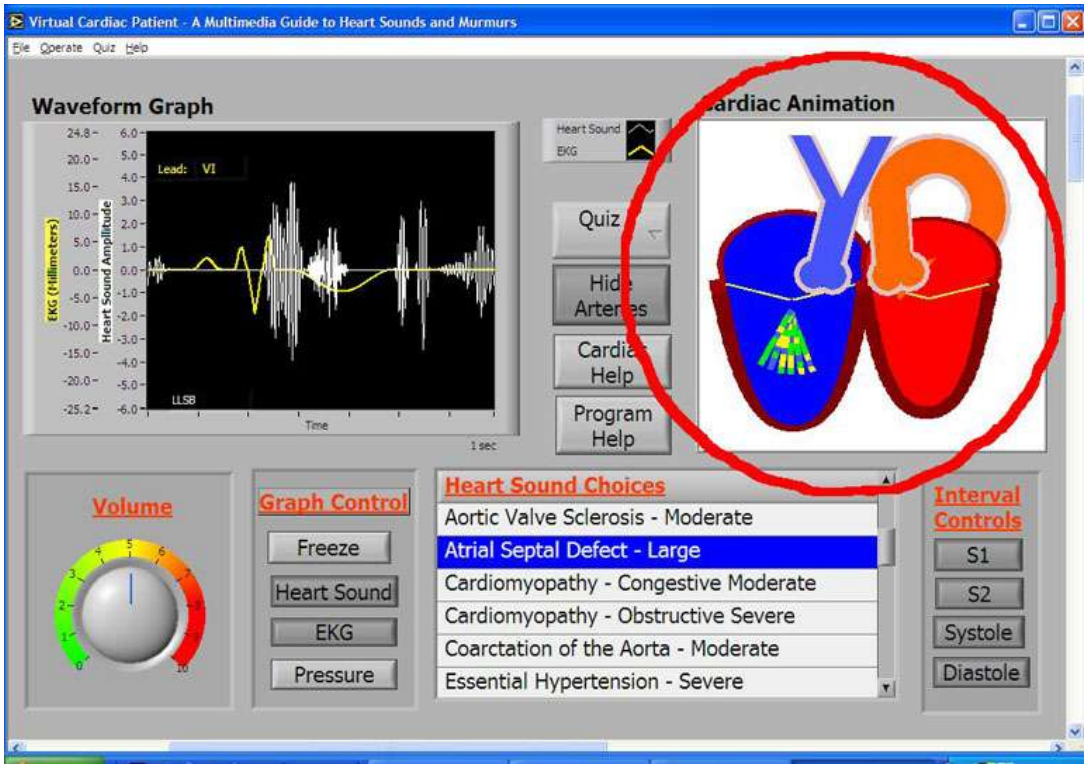
To restore S1 press the button again.

S2, Systole and Diastole Buttons

The S2, as well as the Systole and Diastole buttons function in the same way as demonstrated with S1.

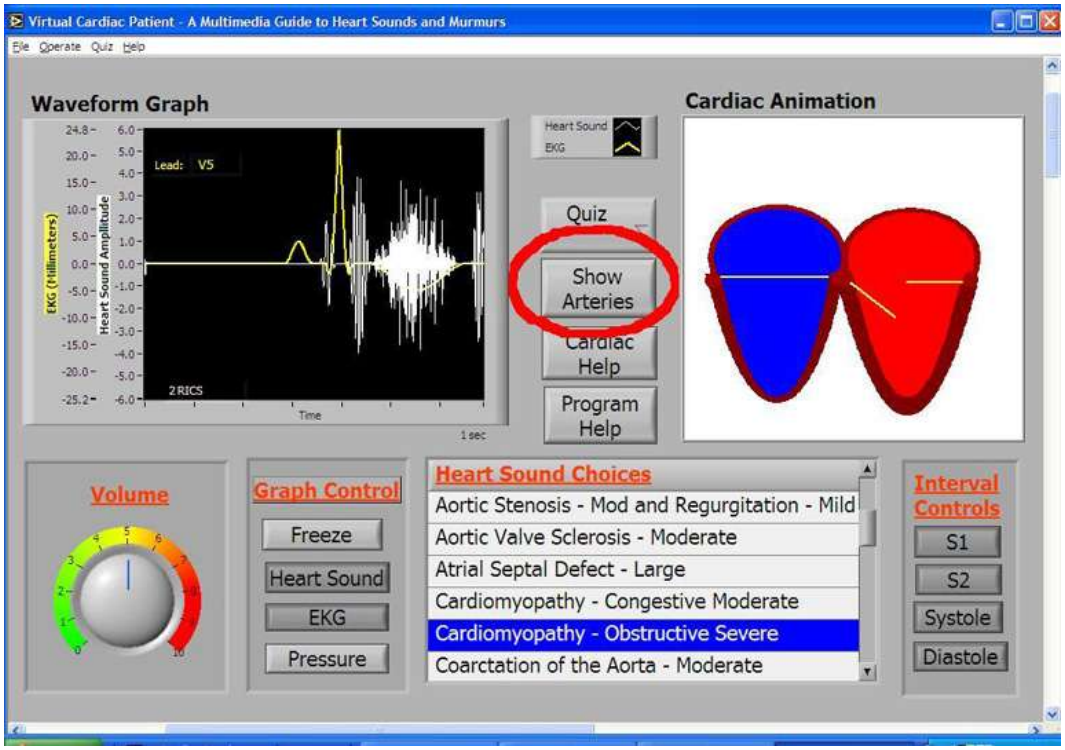
Cardiac Animation

The cardiac animation shows a stylized representation of the cardiac pathology. The chamber size, wall thickness, valve motion, and turbulent flow are all represented in cartoon like fashion.



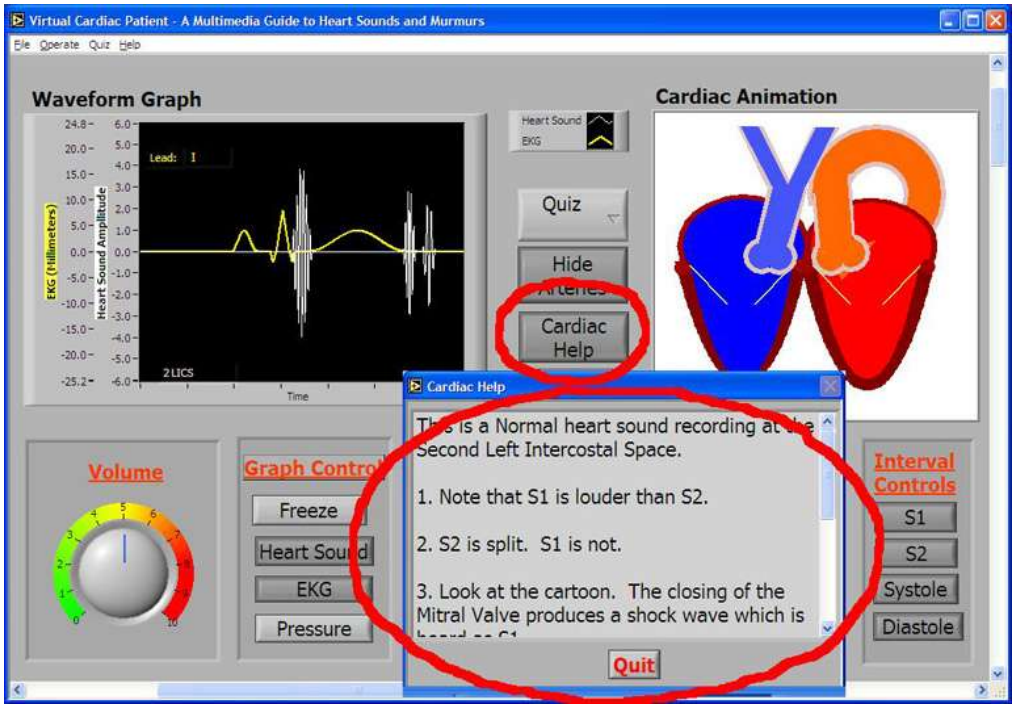
Hide Arteries button

Press the Hide Arteries button to remove the Aorta and Pulmonary artery from the Cardiac Animation window. This will allow you to see hidden pathology.



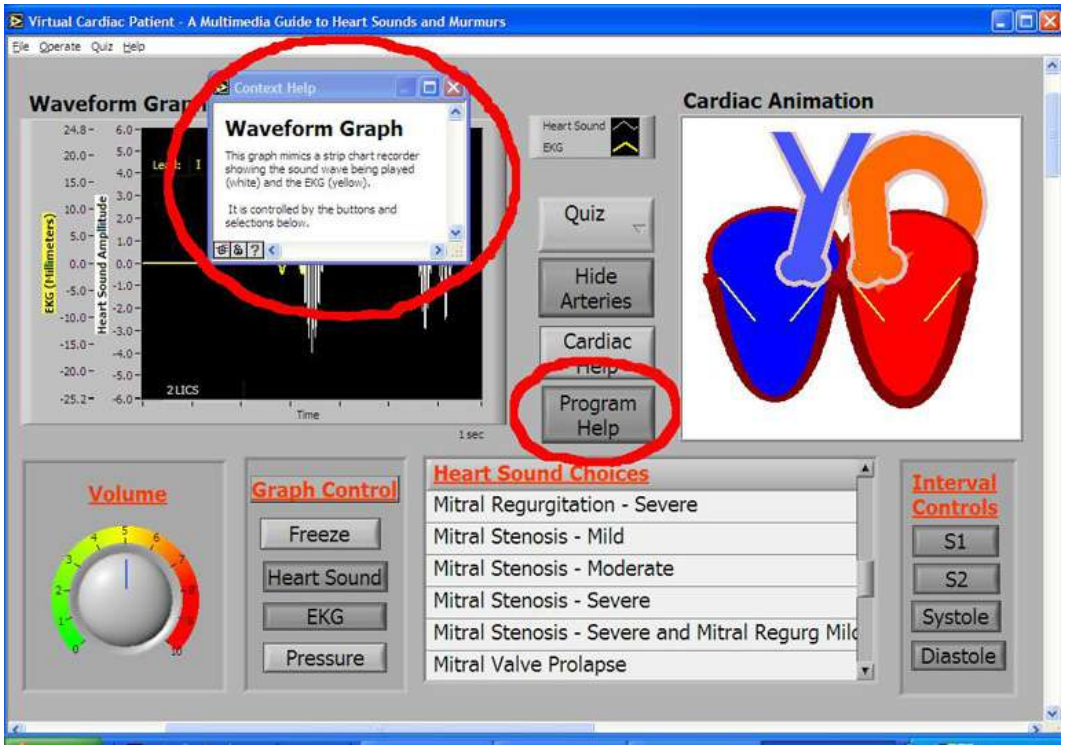
Cardiac Help

Press the Cardiac Help button to see the key elements of the currently playing condition as shown below.



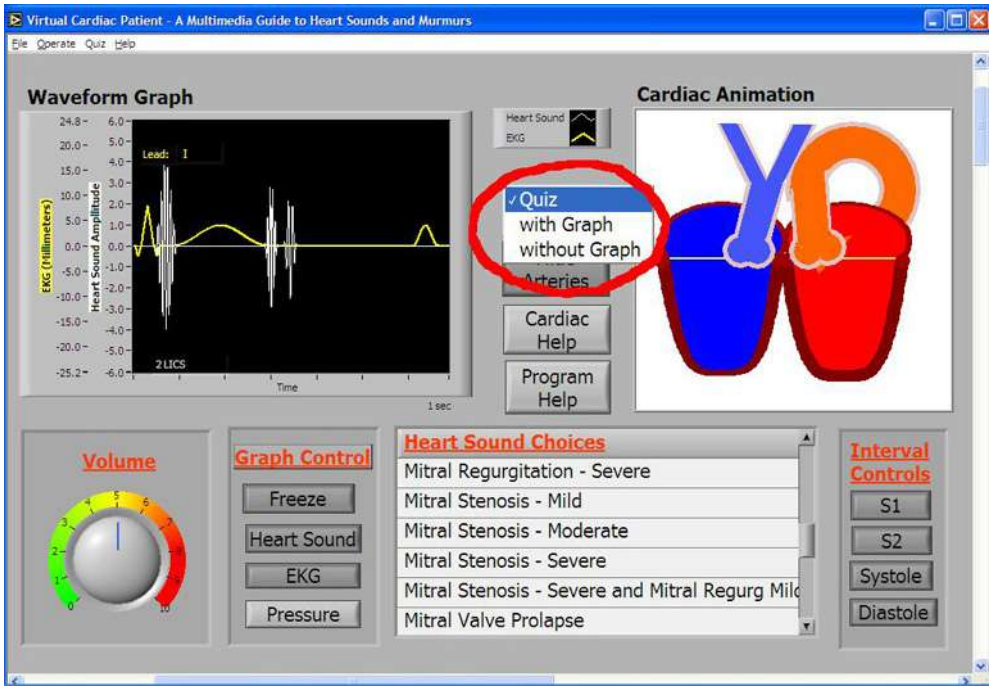
Program Help

The program help button makes a context help window visible. Position the mouse pointer over any of the objects on the screen and the window will show a brief description of the object, its contents and its use. Click the button again to hide the window.



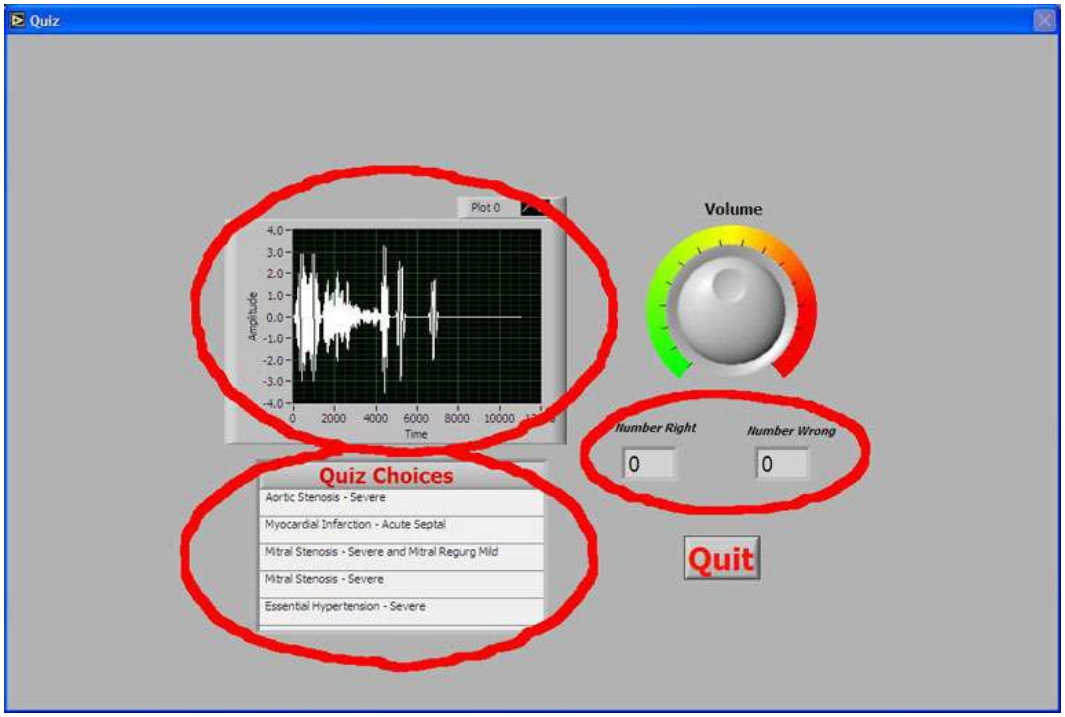
Quiz

Press the quiz button to open the quiz window. You can take a quiz at any time to test your ability to identify a randomly selected heart sound condition. You can take the quiz with or without the associated phonocardiogram.



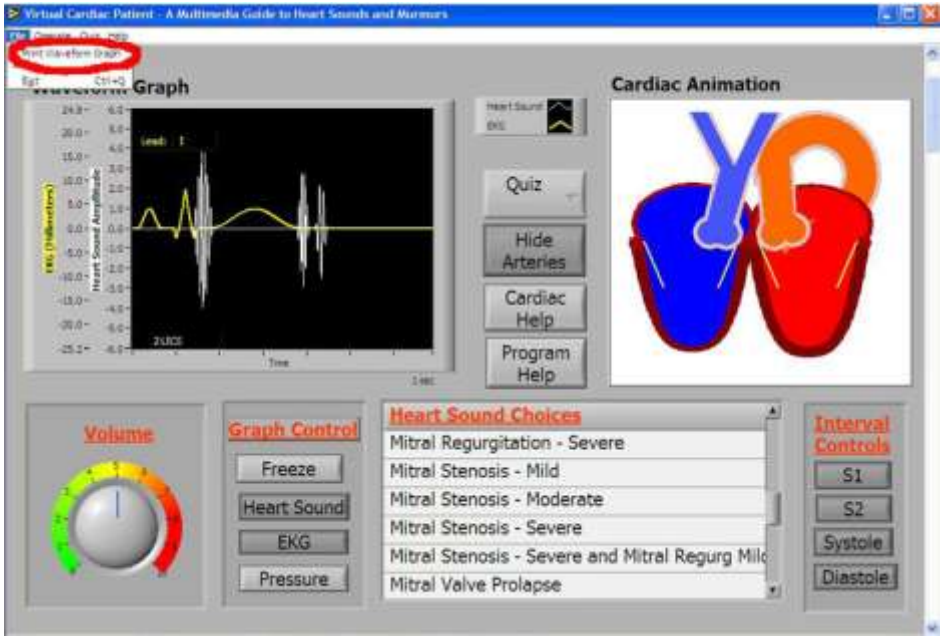
Quiz Window

The Quiz window is shown below. In this example the user has chosen to take the quiz with the phonocardiogram visible. The program plays a randomly selected heart sound condition. You must identify it from among five choices. The program counts the number of correct and incorrect answers. If you make a mistake, the correct answer is highlighted.



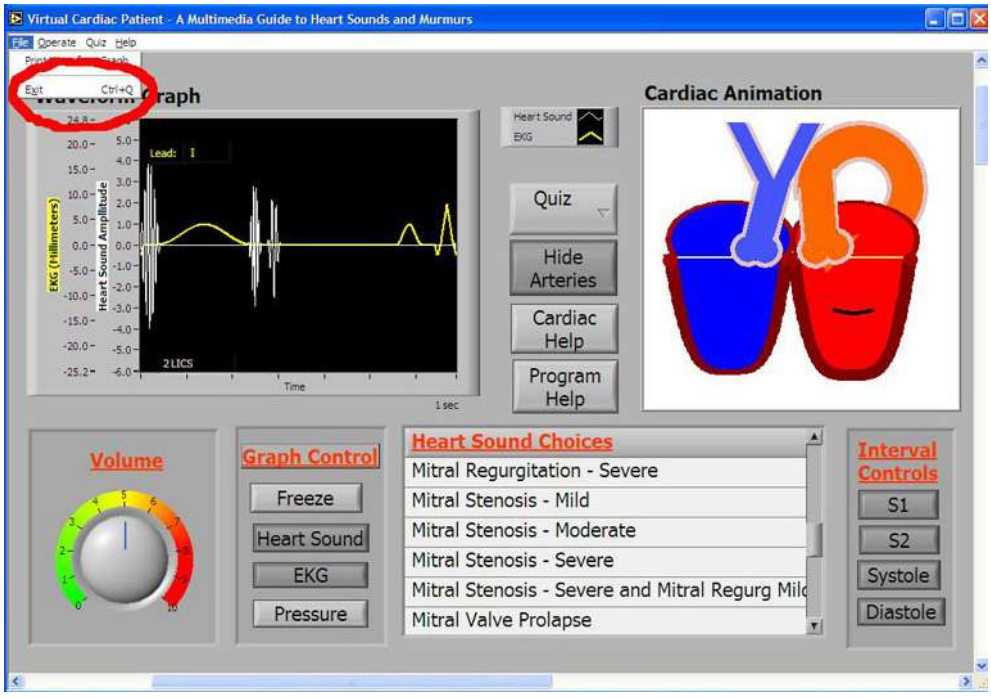
Print Graph

You can print the graph of the currently playing heart sound condition by going to Print Graph on the File menu



Exit

To terminate the program select Exit from the File menu.



Conclusion

Thank you for purchasing Virtual Cardiac Patient. We hope it will help you master the mysteries of cardiac auscultation.