EE104

Lab7

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**Documentation:**

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1. **FFT/IFFT Audio Signal Processing**

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First, you need to import the following libraries and packages to run the program:

Text

Description automatically generated

Create your sig1, sig2 and sig3:

Text

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You will get the following results:

* Signal 1: low frequency – f = 3 Hz

A picture containing text, kitchenware

Description automatically generated

* Signal 2: High frequency - f = 12 Hz
* A picture containing chart

  Description automatically generatedA picture containing text, measuring stick, chime

  Description automatically generatedSignal 3: High frequency - f = 1 Hz

Add 3 signals together:

A picture containing text

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Results:

A picture containing text, antenna, measuring stick

Description automatically generated

Create the FFT of signal

Text

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Chart, histogram

Description automatically generated

Text

Description automatically generatedFind and remove the positive frequencies:

Graphical user interface, text

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Plot the the original signal vs the filtered signal:

* The FFT of the signal Shape, arrow

  Description automatically generatedafter filter high frequency

Text

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Chart, histogram

Description automatically generated

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1. **Heart Rate Analysis – Time Domain Measurements - Biotechnology**

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First, you need to import the following libraries and packages to run the program:

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Install heartpy package in the Anaconda Prompt:

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After you download the wav file, you can apply the following code to filter out the background noise. I attached it in the same folder lab 7:

After that, you will need to convert your wav file into csv file by applying the following code. I also attached it in the same folder lab 7:

After getting the csv file, you will need to arrange your data into 1 column. For example:

Graphical user interface, application, table

Description automatically generated

Getting data from csv file:



Plot the figure from your data:

Text

Description automatically generated

A picture containing object, antenna

Description automatically generated

Run analysis:

Text

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You will get the following result:

Text

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Chart

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1. **Game: Red Alert**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

First, you need to import the following libraries and packages to run the program:

Ảnh có chứa văn bản

Mô tả được tạo tự động

You also need to install the pgzrun in the command:

Ảnh có chứa văn bản

Mô tả được tạo tự động

Create actor minions and animations:

Text

Description automatically generated

Setting the screen:

Text

Description automatically generated

Set up the music:

Graphical user interface, text

Description automatically generated

Create a background:

Text

Description automatically generated

Change the speed: you can make the stars move at different sppeds to make the game more challenging.:

Graphical user interface, text

Description automatically generated

Try agian: If game over or game complete, you can hit space button to try again.

Text

Description automatically generated

You can add this code to shuffle the actor to make the game more fun

Text

Description automatically generatedGraphical user interface, text

Description automatically generated

Enjoy the game:

A picture containing text

Description automatically generated