# Synthetic Generation Documentation

## Phase 1

### Goal: Create a Program that generates synthetic data from well data

Using Python and QT, create a program with a Graphical User Interface (GUI) that takes in well data in LAS form.

### Python Libraries:

* Welly -> LAS data loading
* Bruges -> wavelet generation
* Agile ->
* Github
* SSME
* Auralib

### Requirements:

1. Must be able to take in LAS data and plot log data (i.e. gamma, sonic, density, resistivity, Sp etc.)
2. GUI must have:
   1. Button to select desired log data (in TWT -> for convolution with a wavelet)
   2. Option for type of wavelet to use and frequency
      1. Ormsby filter frequency option of (Low Cut, Low Pass, High Cut, High Pass)
   3. Be able to also load in well top formations
   4. Option to edit data or not (apply corrections)

### Examples:

Need GUI on right/left/top to select data

From well data automatically generate synthetic data (actual Goal)

Chart

Description automatically generated

## Phase 1 cont.

### Goal: Develop program further to be able to take in more than 1 well data at a time

### Example:

Chart

Description automatically generatedChart

Description automatically generated

## Phase 2

### Goal: Program to be able to take in seismic data between wells along with synthetic generate trace

## Phase 3

### Goal: Model trace response given a geological model (i.e. wedge model)

## Phase 4:

### Goal: Stretch/Squeeze/velocity correction

From Meeting:

Text

Description automatically generated with low confidence

Current Goal: Load 2D Seismic

1. Add Option to load Seismic Data for Specific well/add option to
2. Add option for bulk shift to synthetic trace
   1. change replacement velocities? Or pad data? – data that’s before sonic exist –
3. Add option to stretch and squeeze to synthetic trace
   1. Create a time depth pair for certain intervals
4. Add option to have multiple traces
5. Wedge model from bruges

Create time-depth pair

Change the replacement velocity – aligned – keeping the datum the same but changing the near surface velocity before the well log begin

Apply shift to each t-d pair