Worksheet 1 - Signals and Noise

# Your data

1. Open the .csv file in Excel (or similar)
2. How many columns do you see?
3. What does one column correspond to?
4. How many rows do you see?
5. What does one row correspond to?

# Basic operations

1. In the first row, convert the numbers to time
2. In column A, convert the numbers to the names of the electrodes (use the electrode map image)
3. Calculate the following for each row
   1. Minimum
   2. Maximum
   3. Average

# Sources of noise

1. Blinking
   1. Find the starting time and ending time of the first five blinks
2. Eye movement
   1. Find five time points of horizontal eye movements
3. Closed eyes
   1. Find the time points when the participants’ eyes were closed
   2. In which channels do you see a pattern?
   3. How many times per second do the patterns repeat?
4. Chewing
   1. Find the starting time and ending time of chewing movements
   2. Describe the shape of the signals in these times
5. Neck and shoulder movement
   1. Find the starting time and ending time of neck and shoulder movements
   2. Describe the shape of the signals in these times
6. Remove/disconnect one electrode
   1. Find the starting time and ending time of a disconnected electrode
   2. Which electrode was disconnected?
   3. Did this disconnection affect other electrodes?
7. Put on a headphone
   1. Find the starting time and ending time of putting on the headphone
   2. How did this affect the electrodes?
   3. Which electrodes were affected?

# Noise generation

1. Create a new channel and generate a 1s long noise signal
2. Repeat with another 10 channels, take the average of these channels and plot it
3. Repeat with another 100 channels, take the average of these channels and plot it
4. Generate a signal that simulates 50Hz power line noise
5. Repeat d) but imagine you are in the United States