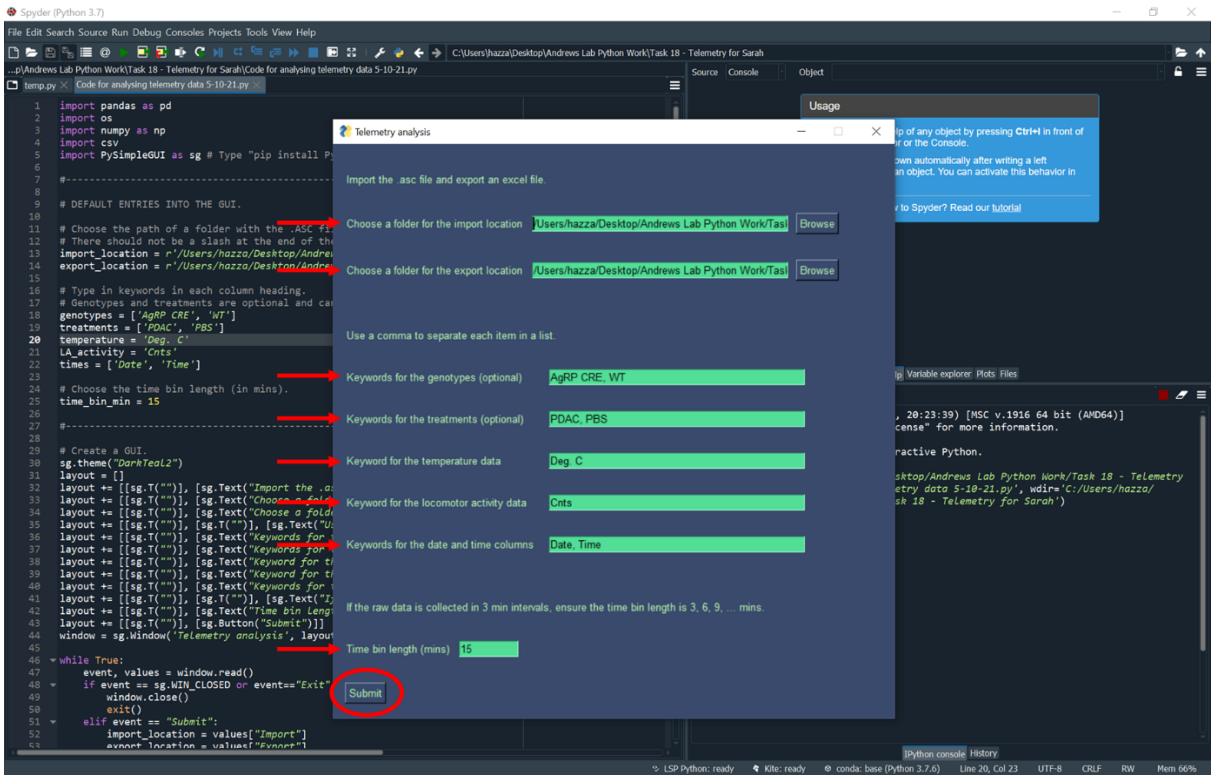
Guide to the telemetry code

Purpose: the .ASC telemetry output files have column titles that describe whether temperature or locomotor activity data is used, the mouse number and sometimes the genotype and treatment. This code separates the data based on these categories and also creates time bins.

1. Select all the options for the time bins analysis and click “submit”. Here is an explanation of all the options:

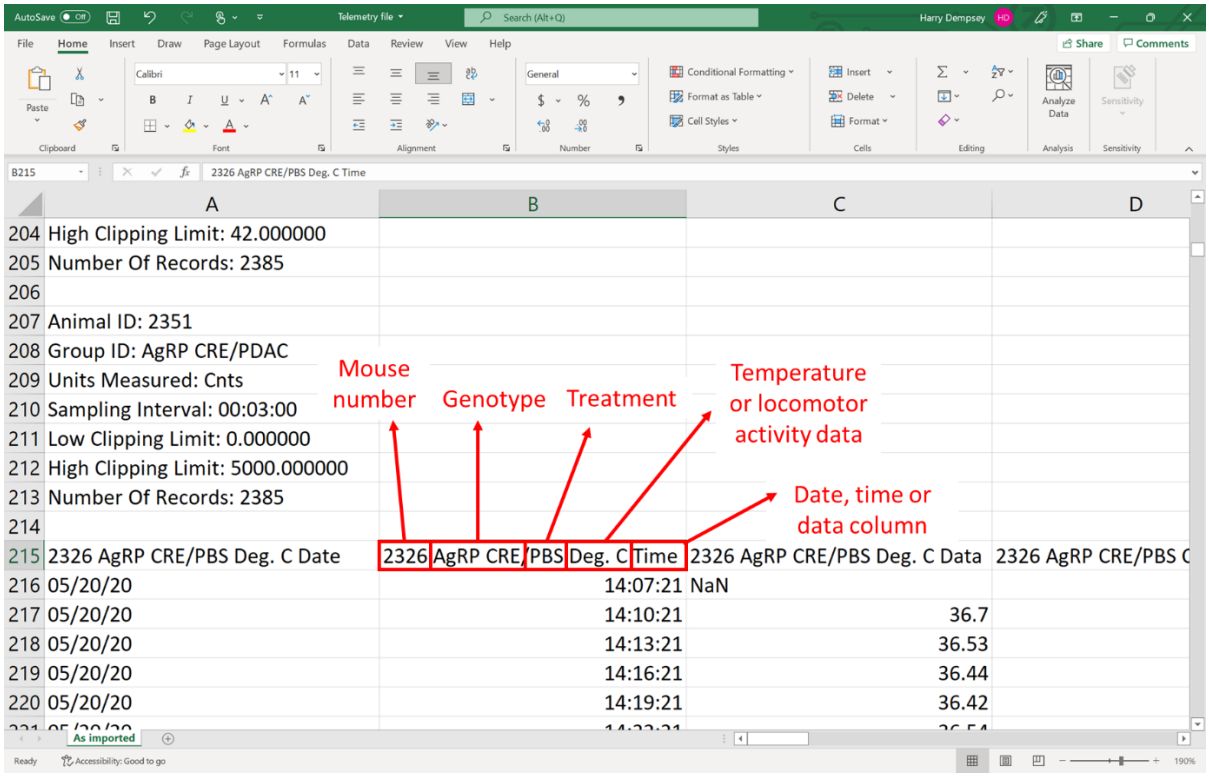


- **Import location:** the import location is a folder that contains the raw .ASC data. The code will analyse each .ASC file in the folder.
- **Export location:** the export location is a folder for the analysed files.

The column titles from the raw .ASC files need to be separated into unique keywords. See the screenshot below. Make sure different entries are also separated by a comma.

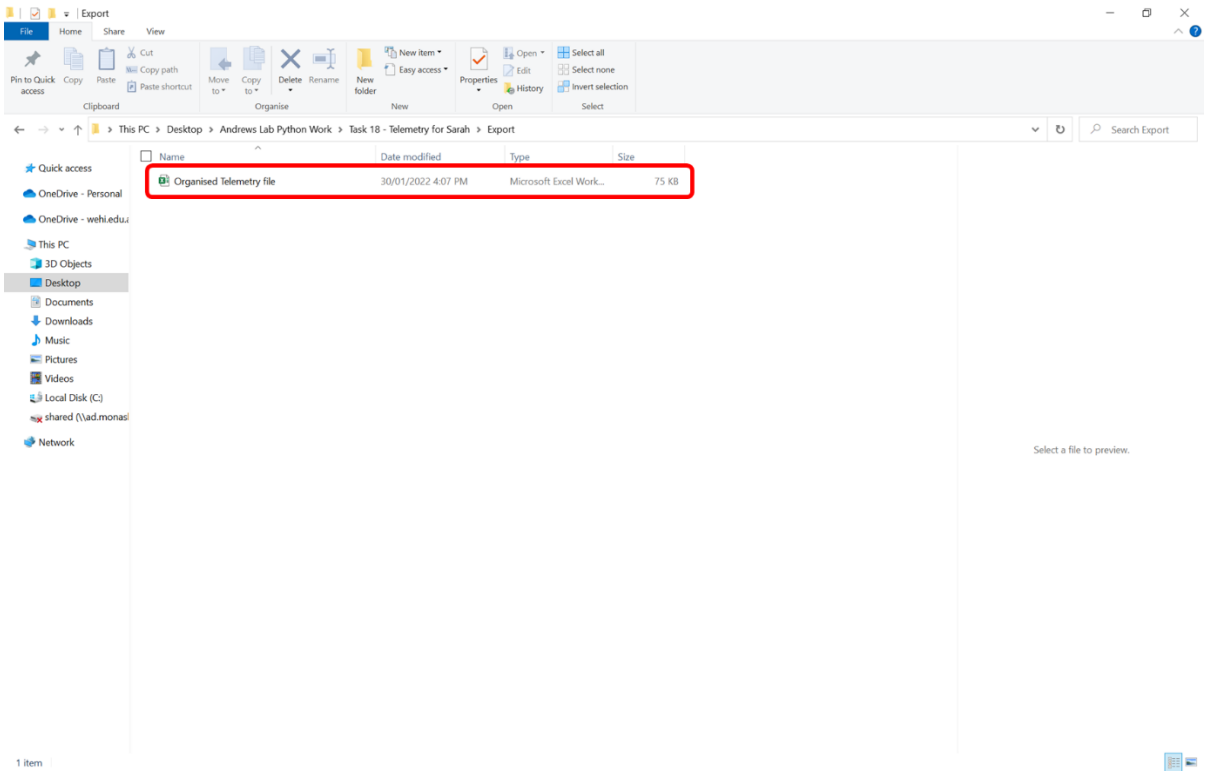
- The mouse number will be automatically sliced out from the column titles by looking for numbers.
- **Genotypes** and **treatments**: these could be ‘AgRP CRE, WT’ and ‘PDAC, PBS’ respectively. These keywords are also optional.
- **Temperature data** and **locomotor activity data**: these are usually ‘Deg. C’ and ‘Cnts’.
- **Date** and **time**: these are usually ‘Date’ and ‘Time’.

- **Time bin length:** this should be a multiple of the number of minutes that the raw data is collected. In the time column in the screenshot below, this data is collected in 3-minute intervals. Thus, the time bins should be 3, 6, 9, … minutes.



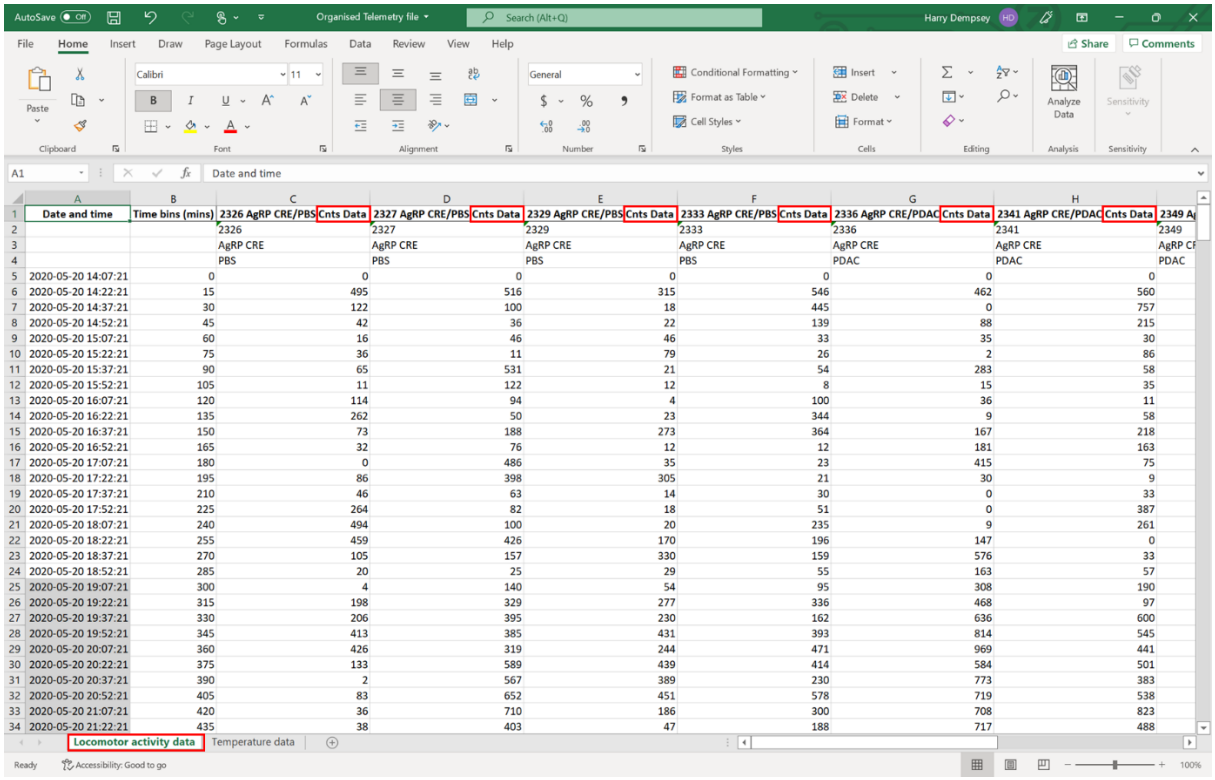
	A	B	C	D
204	High Clipping Limit: 42.000000			
205	Number Of Records: 2385			
206				
207	Animal ID: 2351			
208	Group ID: AgRP CRE/PDAC			
209	Units Measured: Cnts			
210	Sampling Interval: 00:03:00			
211	Low Clipping Limit: 0.000000			
212	High Clipping Limit: 5000.000000			
213	Number Of Records: 2385			
214				
215	2326 AgRP CRE/PBS Deg. C Date	2326 AgRP CRE/PBS Deg. C Time	2326 AgRP CRE/PBS Deg. C Data	2326 AgRP CRE/PBS C
216	05/20/20	14:07:21	NaN	
217	05/20/20	14:10:21	36.7	
218	05/20/20	14:13:21	36.53	
219	05/20/20	14:16:21	36.44	
220	05/20/20	14:19:21	36.42	

2. Go to the export location to find the time binned file.



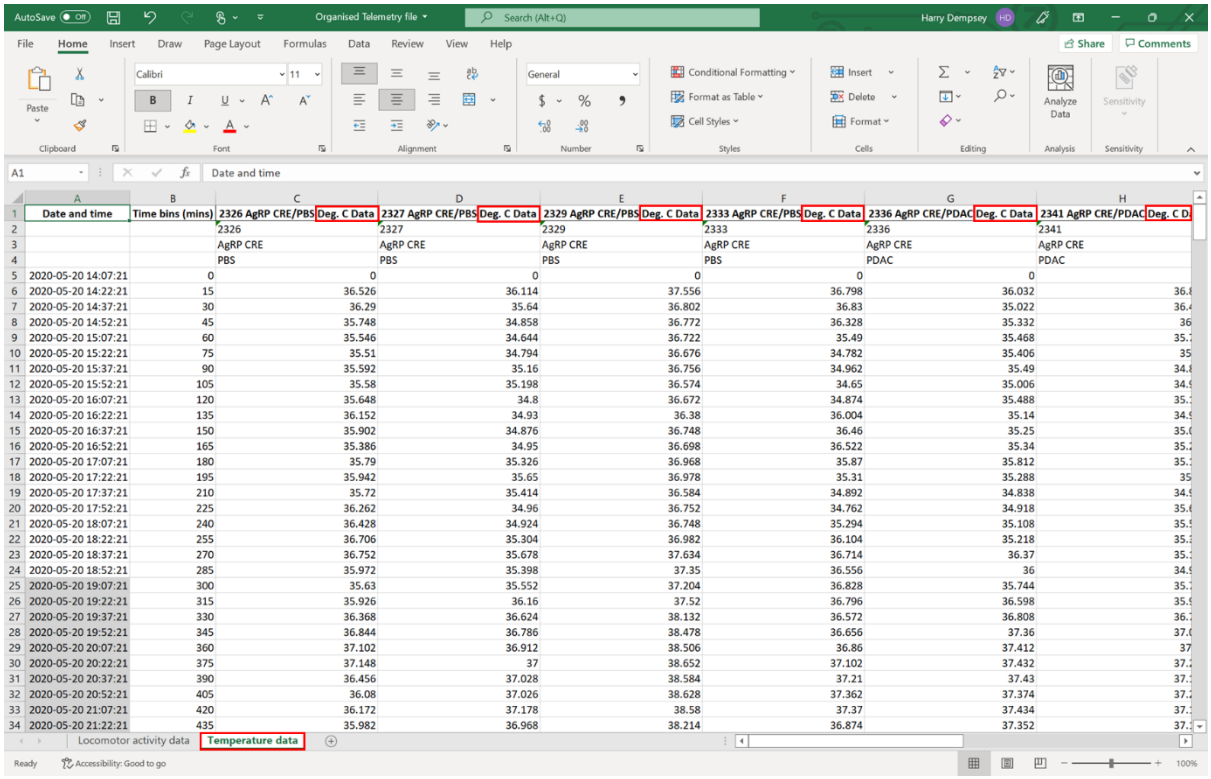
3. Here is the exported data.
    - The locomotor activity data and temperature data are split into 2 sheets.
    - The column headings within each sheet are labelled with mouse number, genotype and treatment (if listed). They are arranged by genotype first and then treatment.
    - The time bins in minutes since the first time point and the corresponding dates and times are included. Assuming that the dark cycle is between 7pm and 7am, these dates and times are highlighted in grey.

Locomotor activity sheet



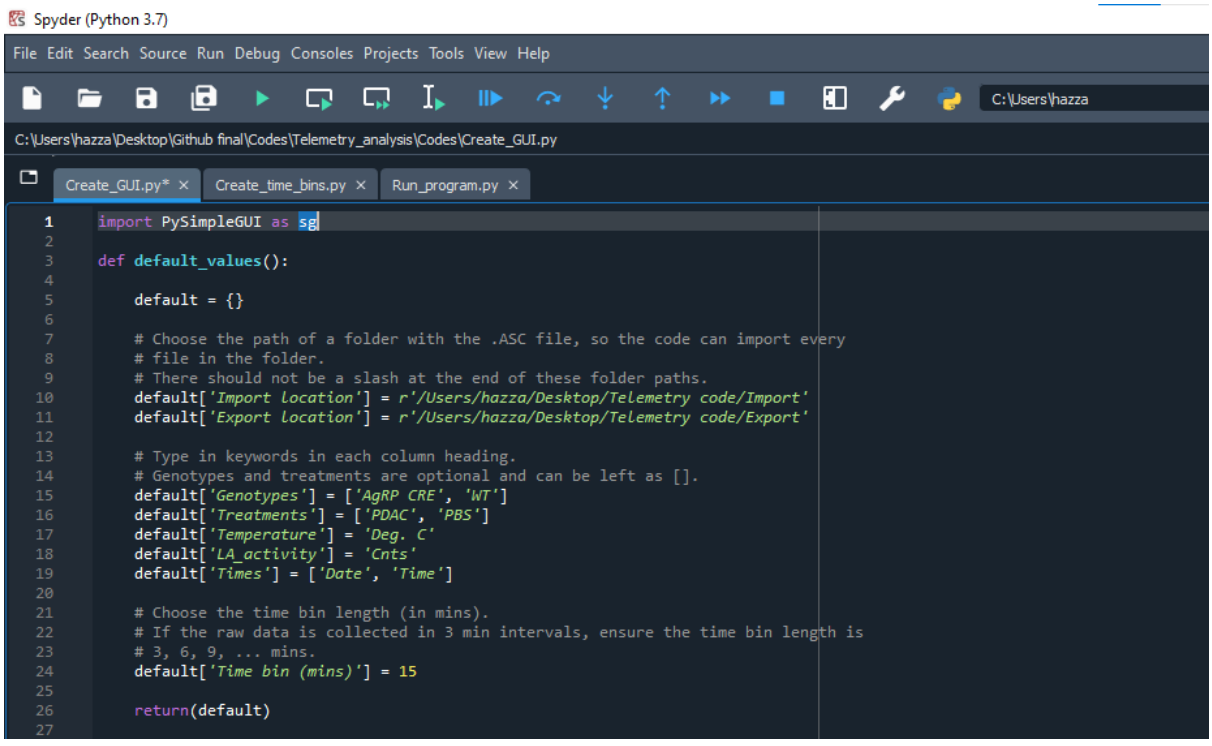
	A	B	C	D	E	F	G	H
1	Date and time	Time bins (mins)	2326 AgRP CRE/PBS Cnts Data	2327 AgRP CRE/PBS Cnts Data	2329 AgRP CRE/PBS Cnts Data	2333 AgRP CRE/PBS Cnts Data	2336 AgRP CRE/PDAC Cnts Data	2341 AgRP CRE/PDAC Cnts Data
2			2326	2327	2329	2333	2336	2341
3			AgRP CRE	AgRP CRE	AgRP CRE	AgRP CRE	AgRP CRE	AgRP CRE
4			PBS	PBS	PBS	PBS	PDAC	PDAC
5	2020-05-20 14:07:21	0	0	0	0	0	0	0
6	2020-05-20 14:22:21	15	495	516	315	546	462	560
7	2020-05-20 14:37:21	30	122	100	18	445	0	757
8	2020-05-20 14:52:21	45	42	36	22	139	88	215
9	2020-05-20 15:07:21	60	16	46	46	33	35	30
10	2020-05-20 15:22:21	75	36	11	79	26	2	86
11	2020-05-20 15:37:21	90	65	531	21	54	283	58
12	2020-05-20 15:52:21	105	11	122	12	8	15	35
13	2020-05-20 16:07:21	120	114	94	4	100	36	11
14	2020-05-20 16:22:21	135	262	50	23	344	9	58
15	2020-05-20 16:37:21	150	73	188	273	364	167	218
16	2020-05-20 16:52:21	165	32	76	12	12	181	163
17	2020-05-20 17:07:21	180	0	486	35	23	415	75
18	2020-05-20 17:22:21	195	86	398	305	21	30	9
19	2020-05-20 17:37:21	210	46	63	14	30	0	33
20	2020-05-20 17:52:21	225	264	82	18	51	0	387
21	2020-05-20 18:07:21	240	494	100	20	235	9	261
22	2020-05-20 18:22:21	255	459	426	170	196	147	0
23	2020-05-20 18:37:21	270	105	157	330	159	576	33
24	2020-05-20 18:52:21	285	20	25	29	55	163	57
25	2020-05-20 19:07:21	300	4	140	54	95	308	190
26	2020-05-20 19:22:21	315	198	329	277	336	468	97
27	2020-05-20 19:37:21	330	206	395	230	162	636	600
28	2020-05-20 19:52:21	345	413	385	431	393	814	545
29	2020-05-20 20:07:21	360	426	319	244	471	969	441
30	2020-05-20 20:22:21	375	133	589	439	414	584	501
31	2020-05-20 20:37:21	390	2	567	389	230	773	383
32	2020-05-20 20:52:21	405	83	652	451	578	719	538
33	2020-05-20 21:07:21	420	36	710	186	300	708	823
34	2020-05-20 21:22:21	435	38	403	47	188	717	488

Temperature data sheet



Date and time	Time bins (mins)	2326 AgRP CRE/PBS	Deg. C Data	2327 AgRP CRE/PBS	Deg. C Data	2329 AgRP CRE/PBS	Deg. C Data	2333 AgRP CRE/PBS	Deg. C Data	2336 AgRP CRE/PDAC	Deg. C Data	2341 AgRP CRE/PDAC	Deg. C D
		2326		2327		2329		2333		2336		2341	
		AgRP CRE		AgRP CRE		AgRP CRE		AgRP CRE		AgRP CRE		AgRP CRE	
		PBS		PBS		PBS		PBS		PDAC		PDAC	
2020-05-20 14:07:21	0	0		0		0		0		0			
2020-05-20 14:22:21	15	36.526		36.114		37.556		36.798		36.032		36.8	
2020-05-20 14:37:21	30	36.29		35.64		36.802		36.83		35.022		36.4	
2020-05-20 14:52:21	45	35.748		34.858		36.772		36.328		35.332		36	
2020-05-20 15:07:21	60	35.546		34.644		36.722		35.49		35.468		35.1	
2020-05-20 15:22:21	75	35.51		34.794		36.676		34.782		35.406		35	
2020-05-20 15:37:21	90	35.592		35.16		36.756		34.962		35.49		34.8	
2020-05-20 15:52:21	105	35.58		35.198		36.574		34.65		35.006		34.9	
2020-05-20 16:07:21	120	35.648		34.8		36.672		34.874		35.488		35.1	
2020-05-20 16:22:21	135	36.152		34.93		36.38		36.004		35.14		34.9	
2020-05-20 16:37:21	150	35.902		34.876		36.748		36.46		35.25		35.0	
2020-05-20 16:52:21	165	35.386		34.95		36.698		36.522		35.34		35.2	
2020-05-20 17:07:21	180	35.79		35.326		36.968		35.87		35.812		35.1	
2020-05-20 17:22:21	195	35.942		35.65		36.978		35.31		35.288		35	
2020-05-20 17:37:21	210	35.72		35.414		36.584		34.892		34.838		34.9	
2020-05-20 17:52:21	225	36.262		34.96		36.752		34.762		34.918		35.0	
2020-05-20 18:07:21	240	36.428		34.924		36.748		35.294		35.108		35.5	
2020-05-20 18:22:21	255	36.706		35.304		36.982		36.104		35.218		35.3	
2020-05-20 18:37:21	270	36.752		35.678		37.634		36.714		36.37		35.1	
2020-05-20 18:52:21	285	35.972		35.398		37.35		36.556		36		34.9	
2020-05-20 19:07:21	300	35.63		35.552		37.204		36.828		35.744		35.1	
2020-05-20 19:22:21	315	35.926		36.16		37.52		36.796		36.598		35.9	
2020-05-20 19:37:21	330	36.368		36.624		38.132		36.572		36.808		36.1	
2020-05-20 19:52:21	345	36.844		36.786		38.478		36.656		37.36		37.0	
2020-05-20 20:07:21	360	37.102		36.912		38.506		36.86		37.412		37	
2020-05-20 20:22:21	375	37.148		37		38.652		37.102		37.432		37.2	
2020-05-20 20:37:21	390	36.456		37.028		38.584		37.21		37.43		37.1	
2020-05-20 20:52:21	405	36.08		37.026		38.628		37.362		37.374		37.2	
2020-05-20 21:07:21	420	36.172		37.178		38.58		37.37		37.434		37.1	
2020-05-20 21:22:21	435	35.982		36.968		38.214		36.874		37.352		37.1	

4. You can also change the default values that appear in the GUI by modifying this section of the code. This is in the “Create_GUI.py” file and under the function “default_values”. This is useful if you need to run the code multiple times with similar options. Make sure that the input formats are kept the same. For example:
    - Folder paths should have forward slashes, no slash at the end and be contained in ‘ ’ marks.
    - genotypes, treatments and times should have this format: [‘input1’, ‘input2’]
    - temperature and LA_ativity should have this format: ‘input’



```
import PySimpleGUI as sg

def default_values():

    default = {}

    # Choose the path of a folder with the .ASC file, so the code can import every
    # file in the folder.
    # There should not be a slash at the end of these folder paths.
    default['Import location'] = r'/Users/hazza/Desktop/Telemetry code/Import'
    default['Export location'] = r'/Users/hazza/Desktop/Telemetry code/Export'

    # Type in keywords in each column heading.
    # Genotypes and treatments are optional and can be left as [].
    default['Genotypes'] = ['AgRP CRE', 'WT']
    default['Treatments'] = ['PDAC', 'PBS']
    default['Temperature'] = 'Deg. C'
    default['LA_activity'] = 'Cnts'
    default['Times'] = ['Date', 'Time']

    # Choose the time bin length (in mins).
    # If the raw data is collected in 3 min intervals, ensure the time bin length is
    # 3, 6, 9, ... mins.
    default['Time bin (mins)'] = 15

    return(default)
```