Flowchart for the TECAN ↔ ECHO Conversion

a) Step by Step instructions: (flowchart for more details)

1) Given an input file of either TECAN (in .gwl or in .docx format), or ECHO (in .csv or .echo), the programs TecanConverter.py or EchoConverter.py will convert the instructions in the file as English pseudo-code. The user can verify the pseudo-code as a simulation of a TECAN robot experiment.

2) Using the English pseudo code, both programs TecanConverter.py and EchoConverter.py will be able to convert the source and destination wells according to a coordinate system:

Note: Talk with Luis to make sure the understanding is correct for the TECAN / ECHO conversions before posting on the power point!

TECAN	ECHO
Coordinated from wells 1-96	Coordinated from wells A1 – H12
Parameters (simplified A/D only): - Command_type - Source_name - Source_type - Destination_type - Vol (transfer) - Tip_number (if necessary) - Source position start and end (if necessary)	Parameters (simplified): - Commands (A,D,W) - plate_name - source - destination - transfer volume
Used only with conjunction with TECAN robot (in GWL form)	Can be used with conjunction of TECAN robot or on EchoConverter.py (readfile input in CSV or Excel or ECHO form)

TECAN:

1	9	17	25	33	41	49	57	65	73	81	89
2	10	18	26	34	42	50	58	66	74	82	90
3	11	19	27	35	43	51	59	67	75	83	91
4	12	20	28	36	44	52	60	68	76	84	92
5	13	21	29	37	45	53	61	69	77	85	93
6	14	22	30	38	46	54	62	70	78	86	94
7	15	23	31	39	47	55	63	71	79	87	95
8	16	24	32	40	48	56	64	72	80	88	96

ECHO:

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12
E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12

3) **For each now converted script (in a TextEdit / Notebook format), Python will create a .pyc executable file (file that was the output of running either TecanConverter.py or EchoConverter.py). Within each script, the user can modify any data that needs to be changed if necessary.**

4) **The user can put script as an input again for Convert.py, which is the Python program that will officially convert the pseudo-code script into either GWL format (as a Word document) or in ECHO format (as a csv file that is parsed).**

5) **Since TecanConverter.py and EchoConverter.py are two-way Python modules, and Convert.py is the middleware module that makes the output files, the user can use either program to do the conversion.**

**** Note: To increase abstraction / make the process easier, I will build an HTML "holding page" that will allow the user to immediately upload the script (TECAN / ECHO), do the conversion, and then allow the user to either download or save the script (TECAN / ECHO) as an output file. The User will have a selection as to what format the input file and output files should be ****

b) Deliverables: (in a Table Format):

Name of deliverable	Format / Program Language	Use / Description
TecanConverter.py	**Python**	**Python module that gives easy access for the user to convert a TECAN instruction GWL / Docx file into English psuedocode (as a TECAN robot simulation)**
EchoConverter.py	**Python**	**Python module that gives easy access for the user to convert an ECHO instruction / CSV file into English psuedocode**

Convert.py	**Python**	**Python middleware module that converts the coordinates of TECAN (1-96) to ECHO (A1 – H12) and vice a versa. Can also turn the TECAN psuedocode into a parsed CSV file and the ECHO pseudocode into GWL TECAN format**
conversion.csv	**CSV / Excel**	**CSV file (as part of the prototype) that shows a simplified output of the JoVE article, for the first 100 TECAN commands**
Tecan Conversion to ECHO.docx	**Word Document**	**"Manual" that will help the user convert from TECAN to ECHO and (vice versa), freely using the Freedom EVOware manual for the TECAN robot**
tecanconvert.html	**HTML**	**HTML webpage that will carry out the conversion of TECAN -> ECHO from the front end (upload / download source input and output files)**
tecanmessenger.html*	**HTML**	**Messenger "application" webpage that will inform the user any errors the TECAN robot encounters before simulation / conversion to ECHO**
echoconvert.html*	**HTML**	**HTML webpage that will carry out the conversion of ECHO -> TECAN from the front end (upload / download source input and output files)**

Note: * = deliverable not yet implemented for prototype

c) Flowchart:

Pseudocode: Can be viewed, but not changed (RWX -> Read and Execute Permissions) / might be too long to read if the input is as long as the JoVE Article (~ 500 commands)