Homework 15

Table 1 below contains the captured data hex codes for several buttons on an Infrared remote (see Figure 1) used to control an LED light strip.

Table 1: Infrared remote button hex codes

Button	Hex code	Button	Hex code
Power	FF02FD	R	FF1AE5
Play	FF827D	G	FF9A65
Increase Brightness	FF3AC5	B	FFA25D
Decrease Brightness	FFBA45	W	FF22DD
Quick	FFE817	Auto	FFF00F
Slow	FFC837	Flash	FFD02F
Jump 3	FF20DF	Fade 3	FF609F
Jump 7	FFA05F	Fade 7	FFE01F

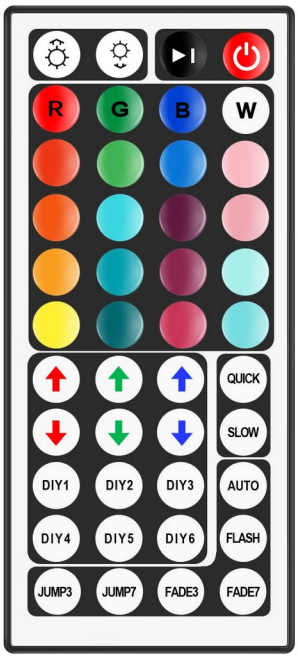

Figure 1: LED lights IR remote

An infrared receiver circuit was used to capture the signals from this remote for a few hours. The timings for these captures can be seen in Table 2.

Tasks:

- Use the python matplotlib library to plot these timing values *(a template is provided but this can be ignored as usual)* **[2 pts]**
- Use the plotted points, or some other means, to determine the protocol *(this is the same for each button so it only needs to be stated once)* and bit pattern for each capture **[1.5 pt]**
- Determine the state of the LED lights after the last button press assuming the initial state of the LED lights was Off (e.g. On, Off, Red, Green, Jump 3, Flash etc...)**[0.5 pt]**

Notes:

- Each capture can be done as a separate graph or one long plot
- There are 6 captures so 6 different bit patterns should be found
- Convert the bit pattern to hex to determine which button was pressed

Table 2: Timing values for IR Remote Captures

	Timings
Capture 1	+9050 -4450 +550 -600 +500 -600 +550 -600 +550 -550 +550 -600 +550 -600 +500 -600 +550 -600 +550 -1700 +550 -1650 +550 -1700 +550 -1650 +550 -1700 +550 -1650 +600 -1650 +550 -1700 +500 -600 +550 -600 +550 -550 +550 -600 +550 -600 +550 -550 +550 -1700 +550 -550 +550 -1700 +600 -1650 +550 -1650 +550 -1700 +550 -1650 +600 -1650 +550 -600 +500 -1700 +550 -30100
Capture 2	+9050 -4400 +550 -600 +600 -550 +500 -600 +550 -600 +550 -600 +500 -600 +550 -600 +550 -550 +600 -1650 +550 -1700 +550 -1650 +600 -1650 +550 -1650 +600 -1650 +550 -1700 +500 -1700 +550 -600 +550 -550 +600 -550 +550 -1700 +500 -1700 +600 -550 +550 -1650 +600 -550 +550 -1650 +550 -1700 +550 -1700 +550 -550 +550 -600 +550 -1650 +550 -600 +600 -1650 +550 -30100
Capture 3	+9100 -4400 +650 -500 +600 -550 +600 -550 +550 -550 +600 -550 +600 -550 +550 -550 +600 -550 +600 -1600 +600 -1650 +600 -1650 +550 -1650 +600 -1650 +550 -1650 +600 -1650 +600 -1650 +550 -550 +600 -500 +600 -1650 +600 -1600 +600 -1650 +600 -550 +550 -1650 +600 -550 +600 -1600 +600 -1650 +600 -500 +600 -550 +550 -600 +550 -1650 +600 -550 +550 -1700 +550 -30100

	Timings
Capture 4	+9000 -4500 +550 -600 +500 -600 +550 -600 +550 -600 +500 -600 +550 -600 +500 -600 +550 -600 +550 -1700 +500 -1700 +550 -1700 +550 -1650 +550 -1700 +550 -1700 +500 -1700 +550 -1700 +500 -1700 +550 -1700 +550 -550 +600 -1650 +550 -600 +550 -550 +550 -600 +550 -600 +500 -600 +550 -600 +550 -1650 +600 -550 +550 -1700 +500 -1700 +550 -1700 +550 -1650 +550 -30100
Capture 5	+9100 -4400 +600 -550 +600 -550 +600 -550 +550 -550 +600 -500 +600 -550 +600 -500 +650 -500 +600 -1650 +600 -1600 +600 -1650 +600 -1600 +600 -1650 +600 -1600 +600 -1650 +550 -1700 +550 -550 +550 -600 +500 -600 +550 -600 +550 -600 +550 -550 +600 -1650 +550 -600 +550 -1650 +600 -1650 +550 -1650 +600 -1650 +600 -550 +500 -1700 +600 -30100
Capture 6	+9000 -4500 +550 -600 +550 -550 +550 -600 +550 -600 +500 -600 +550 -600 +550 -550 +550 -600 +550 -1700 +550 -1650 +550 -1700 +550 -1650 +550 -1700 +550 -1700 +550 -1650 +550 -1700 +550 -1650 +550 -1700 +600 -1650 +550 -550 +600 -550 +550 -550 +550 -600 +550 -600 +500 -600 +550 -600 +550 -600 +500 -1700 +600 -1650 +550 -1650 +600 -1650 +550 -1700 +550 -30100

Due Date: Check Moodle for date
Late Submission Deadline: Check Moodle for date (usually 1 week after due date)
Submission Files:

- A python script with the answers *or*
- A python script and a file with the answers *or*
- A file with answers

Location: Moodle Homework15 link