Date: 30/11/24

Progress:

Curiosity was killing me and I decided to see from where can I begin. So, I considered the function F(x) = 255 sin(x) where unit of x is radians. I would like to call this the Introductory Experiment.
I found out the values of F(x) from x = 1 till x = 256

Data:

		R	G	B
1	214.5751	214	107	53
2	231.8708	231	115	57
3	35.9856	35	17	8
4	192.9846	192	96	48
5	244.5257	244	122	61
6	71.25095	71	35	17
7	167.5316	167	83	41
8	252.2864	252	126	63
9	105.0902	105	52	26
10	138.7254	138	69	34
11	254.9975	254	127	63
12	136.8261	136	68	34
13	107.1426	107	53	26
14	252.6049	252	126	63
15	165.8234	165	82	41
16	73.41535	73	36	18
17	245.1564	245	122	61
18	191.5017	191	95	47
19	38.21869	38	19	9
20	232.801	232	116	58
21	213.3472	213	106	53
22	2.257084	2	1	0
23	215.7862	215	107	53
24	230.9225	230	115	57
25	33.7497	33	16	8
26	194.4524	194	97	48
27	243.8759	243	121	60
28	69.08098	69	34	17
29	169.2266	169	84	42
30	251.9481	251	125	62
31	103.0296	103	51	25
32	140.6138	140	70	35
33	254.9775	254	127	63
34	134.9161	134	67	33
35	109.1866	109	54	27
36	252.9036	252	126	63
37	164.1022	164	82	41

38	75.57399	75	37	18
39	245.7678	245	122	61
40	190.0039	190	95	47
41	40.44878	40	20	10
42	233.713	233	116	58
43	212.1026	212	106	53
44	4.513991	4	2	1
45	216.9804	216	108	54
46	229.956	229	114	57
47	31.51115	31	15	7
48	195.9049	195	97	48
49	243.2069	243	121	60
50	66.90559	66	33	16
51	170.9084	170	85	42
52	251.59	251	125	62
53	100.9609	100	50	25
54	142.4912	142	71	35
55	254.9376	254	127	63
56	132.9955	132	66	33
57	111.222	111	55	27
58	253.1825	253	126	63
59	162.3682	162	81	40
60	77.72671	77	38	19
61	246.36	246	123	61
62	188.4911	188	94	47
63	42.6757	42	21	10
64	234.6066	234	117	58
65	210.8413	210	105	52
66	6.770544	6	3	1
67	218.1576	218	109	54
68	228.9716	228	114	57
69	29.27013	29	14	7
70	197.3421	197	98	49
71	242.5189	242	121	60
72	64.72496	64	32	16
73	172.5768	172	86	43
74	251.2123	251	125	62
75	98.88432	98	49	24
76	144.3574	144	72	36
77	254.8776	254	127	63
78	131.0645	131	65	32
79	113.2487	113	56	28
80	253.4416	253	126	63
81	160.6214	160	80	40
82	79.87334	79	39	19
83	246.9329	246	123	61
84	186.9635	186	93	46

85	44.89928	44	22	11
86	235.4819	235	117	58
87	209.5635	209	104	52
88	9.026567	9	4	2
89	219.3177	219	109	54
90	227.9691	227	113	56
91	27.02682	27	13	6
92	198.7638	198	99	49
93	241.8119	241	120	60
94	62.53926	62	31	15
95	174.2317	174	87	43
96	250.8149	250	125	62
97	96.79997	96	48	24
98	146.2124	146	73	36
99	254.7977	254	127	63
100	129.1232	129	64	32
101	115.2666	115	57	28
102	253.6808	253	126	63
103	158.8621	158	79	39
104	82.01371	82	41	20
105	247.4865	247	123	61
106	185.4213	185	92	46
107	47.11934	47	23	11
108	236.3387	236	118	59
109	208.2694	208	104	52
110	11.28188	11	5	2
111	220.4606	220	110	55
112	226.9489	226	113	56
113	24.78139	24	12	6
114	200.17	200	100	50
115	241.086	241	120	60
116	60.34866	60	30	15
117	175.873	175	87	43
118	250.3978	250	125	62
119	94.70805	94	47	23
120	148.0559	148	74	37
121	254.6979	254	127	63
122	127.1719	127	63	31
123	117.2754	117	58	29
124	253.9002	253	126	63
125	157.0903	157	78	39
126	84.14766	84	42	21
127	248.0207	248	124	62
128	183.8646	183	91	45
129	49.33571	49	24	12
130	237.177	237	118	59
131	206.9589	206	103	51

132	13.53631	13	6	3
133	221.5863	221	110	55
134	225.9108	225	112	56
135	22.53401	22	11	5
136	201.5605	201	100	50
137	240.3412	240	120	60
138	58.15333	58	29	14
139	177.5004	177	88	44
140	249.9611	249	124	62
141	92.6087	92	46	23
142	149.8877	149	74	37
143	254.5781	254	127	63
144	125.2105	125	62	31
145	119.275	119	59	29
146	254.0996	254	127	63
147	155.3062	155	77	38
148	86.27502	86	43	21
149	248.5354	248	124	62
150	182.2935	182	91	45
151	51.54822	51	25	12
152	237.9967	237	118	59
153	205.6321	205	102	51
154	15.78969	15	7	3
155	222.6946	222	111	55
156	224.8551	224	112	56
157	20.28488	20	10	5
158	202.9351	202	101	50
159	239.5775	239	119	59
160	55.95344	55	27	13
161	179.114	179	89	44
162	249.5048	249	124	62
163	90.50209	90	45	22
164	151.7079	151	75	37
165	254.4383	254	127	63
166	123.2393	123	61	30
167	121.2653	121	60	30
168	254.2792	254	127	63
169	153.51	153	76	38
170	88.39561	88	44	22
171	249.0307	249	124	62
172	180.7081	180	90	45
173	53.75669	53	26	13
174	238.7978	238	119	59
175	204.2893	204	102	51
176	18.04182	18	9	4
177	223.7854	223	111	55
178	223.7817	223	111	55

179	18.03415	18	9	4
180	204.2939	204	102	51
181	238.7951	238	119	59
182	53.74917	53	26	13
183	180.7135	180	90	45
184	249.029	249	124	62
185	88.3884	88	44	22
186	153.5161	153	76	38
187	254.2786	254	127	63
188	121.2585	121	60	30
189	123.2461	123	61	30
190	254.4388	254	127	63
191	151.7017	151	75	37
192	90.50928	90	45	22
193	249.5064	249	124	62
194	179.1085	179	89	44
195	55.96094	55	27	13
196	239.5802	239	119	59
197	202.9305	202	101	50
198	20.29254	20	10	5
199	224.8587	224	112	56
200	222.6908	222	111	55
201	15.78201	15	7	3
202	205.6367	205	102	51
203	237.994	237	118	59
204	51.54069	51	25	12
205	182.2989	182	91	45
206	248.5337	248	124	62
207	86.26778	86	43	21
208	155.3123	155	77	38
209	254.099	254	127	63
210	119.2682	119	59	29
211	125.2172	125	62	31
212	254.5785	254	127	63
213	149.8815	149	74	37
214	92.61586	92	46	23
215	249.9626	249	124	62
216	177.4949	177	88	44
217	58.16081	58	29	14
218	240.3438	240	120	60
219	201.5558	201	100	50
220	22.54167	22	11	5
221	225.9144	225	112	56
222	221.5825	221	110	55
223	13.52864	13	6	3
224	206.9634	206	103	51
225	237.1742	237	118	59

226	49.32817	49	24	12
227	183.8699	183	91	45
228	248.0189	248	124	62
229	84.1404	84	42	21
230	157.0964	157	78	39
231	253.8995	253	126	63
232	117.2686	117	58	29
233	127.1785	127	63	31
234	254.6983	254	127	63
235	148.0496	148	74	37
236	94.71518	94	47	23
237	250.3993	250	125	62
238	175.8674	175	87	43
239	60.35612	60	30	15
240	241.0885	241	120	60
241	200.1652	200	100	50
242	24.78904	24	12	6
243	226.9524	226	113	56
244	220.4568	220	110	55
245	11.2742	11	5	2
246	208.2738	208	104	52
247	236.3358	236	118	59
248	47.11179	47	23	11
249	185.4266	185	92	46
250	247.4846	247	123	61
251	82.00643	82	41	20
252	158.8681	158	79	39
253	253.6801	253	126	63
254	115.2597	115	57	28
255	129.1299	129	64	32
256	254.798	254	127	63

Formula used to calculate R,G and B:
R = floor(F(x)).
G = floor(F(x)/2).
B = floor(F(x)/4).

A python script was used to plot the grid:

```
import matplotlib.pyplot as plt
import matplotlib.patches as patches
```

```
from PIL import Image
import numpy as np

def create_color_grid(rgb_values):
  """
  Creates a 16x16 grid of colored boxes based on
RGB values.

  Args:
    rgb_values: A list of 256 RGB tuples, each
tuple representing (R, G, B) values (0-255).

  Returns:
    A matplotlib figure object displaying the color
grid.
  """


  if len(rgb_values) != 256:
      raise ValueError("Exactly 256 RGB values are
required.")

  # Create a figure and axes
  fig, ax = plt.subplots(figsize=(8, 8))  # Adjust
figure size if needed

  # Set axis limits and remove ticks and labels
  ax.set_xlim(0, 16)
  ax.set_ylim(0, 16)
  ax.set_xticks([])
  ax.set_yticks([])


  # Iterate through RGB values and create boxes
  for i in range(16):
      for j in range(16):
          index = i * 16 + j
          color = rgb_values[index]  # Assuming
rgb_values contains 256 entries
```

```
            # Create a rectangle patch with the
specified color
            rect = patches.Rectangle((j, 15-i), 1, 1,
linewidth=0, facecolor=tuple(np.array(color)/255))

            # Add the rectangle patch to the axes
            ax.add_patch(rect)

    # Display the grid
    plt.show()

    return fig
rgbValues = [#list of tuples of above listed RGB
values]
create_color_grid(rgbValues)
```

Obtained Result:

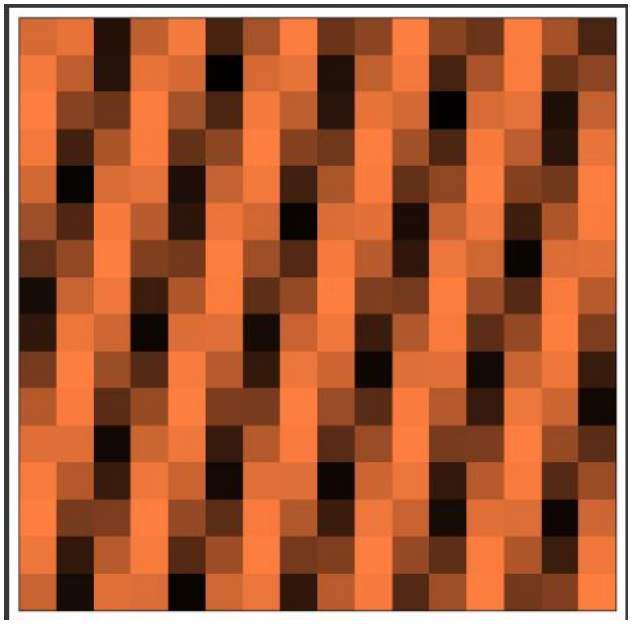

Fig. 1

On exchanging R and G values, obtained resut:

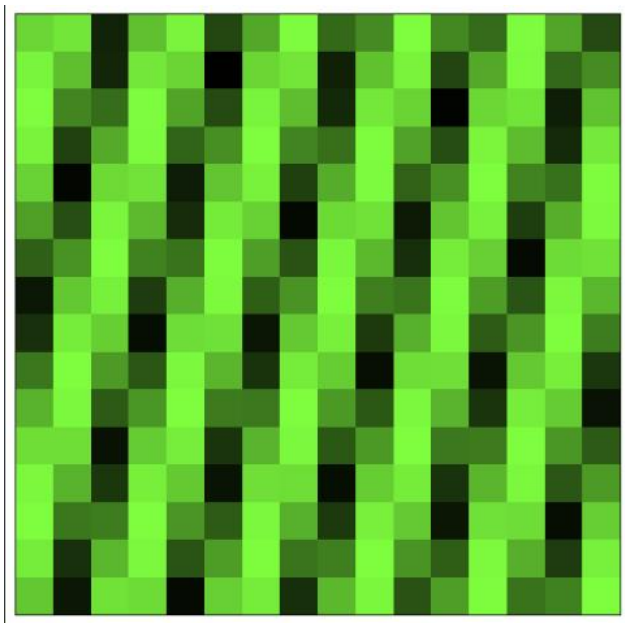

Fig. 2

On assigning
Existing R values to B
Existing G values to R
And Existing B values to G, obtained result:

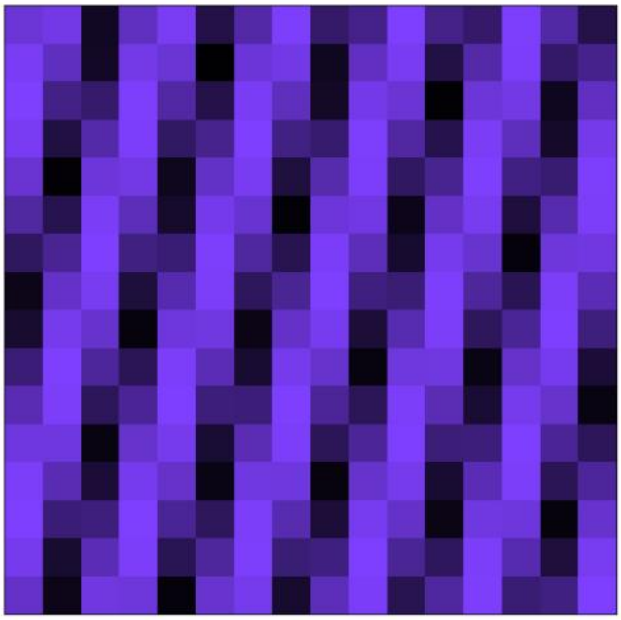

Fig. 3

Analysis of Result:

1. Clearly, we can see periodicity in the image produced. This is expected as our original sound signal, F(x), is also periodic.
2. The dark patches indicate comparatively low values of R, G and B.
3. We can see R dominating in Fig. 1, G dominating in Fig 2, and B dominating in Fig 3, that resonates with the corresponding data.