

```
1 #include <Arduino.h>
2 #include "../vars/constants.h"
3
4 class Buzzer
5 {
6     public:
7     enum Songs
8     {
9         TEST,
10        ImperialMarch,
11        NGGYU,
12        Tetris,
13    };
14
15    void init()
16    {
17        ledcAttachPin(constants::pins::buzzer::buzzer_pin,
18                      constants::pins::buzzer::pwm_channel);
19    }
20
21    void PlaySong(Songs song)
22    {
23        switch(song)
24        {
25            case TEST:
26                PlayTEST();
27                break;
28
29            case ImperialMarch:
30                PlayImperialMarch();
31                break;
32
33            case NGGYU:
34                PlayNGGYU();
35                break;
36
37            case Tetris:
38                PlayTetris();
39                break;
40        }
41        ledcWrite(constants::pins::buzzer::pwm_channel, 0);
42    }
43
44    private:
45
46    struct noteEntry
47    {
48        note_t note;
49        uint8_t octave;
50        uint32_t duration;
51    };
52
53    struct freqEntry
```

```
53     {
54         uint32_t freq;
55         uint16_t duration;
56     };
57
58     void PlayNote(uint8_t channel, note_t note, uint8_t octave,      ↗
59                 uint32_t duration)
60     {
61         if(note == NOTE_MAX)
62         {
63             delay(duration);
64             return;
65         }
66         ledcWriteNote(channel, note, octave);
67         delay(duration);
68         ledcWrite(constants::pins::buzzer::pwm_channel, 0);
69         delay(2);
70     }
71     void PlayFreq(uint8_t channel, uint32_t freq, uint16_t duration)
72     {
73         ledcWriteTone(channel, freq);
74         delay(duration);
75         ledcWrite(constants::pins::buzzer::pwm_channel, 0);
76         delay(2);
77     }
78     void PlayTEST()
79     {
80         for (size_t i = 0; i < 8; i++)
81         {
82             PlayNote(constants::pins::buzzer::pwm_channel, songTEST      ↗
83                     [i].note, songTEST[i].octave, songTEST[i].duration);
84         }
85     }
86     void PlayImperialMarch()
87     {
88         for (size_t i = 0; i < 18; i++)
89         {
90             PlayFreq(constants::pins::buzzer::pwm_channel,      ↗
91                     songImperialMarch[i].freq, songImperialMarch[i].duration);
92         }
93     }
94     void PlayNGGYU()
95     {
96         for (size_t i = 0; i < 339; i++)
97         {
98             PlayNote(constants::pins::buzzer::pwm_channel, songNGGYU      ↗
99                     [i].note, songNGGYU[i].octave, songNGGYU[i].duration);
100         }
101     }
102     void PlayTetris()
```

```
102     {
103         for (size_t i = 0; i < 99; i++)
104         {
105             PlayNote(constants::pins::buzzer::pwm_channel, songTetris
106                 [i].note, songTetris[i].octave, songTetris[i].duration);
107         }
108     }
109     noteEntry songTetris[99]
110     {
111         //Whole Note: 1667
112         {NOTE_E, 5, 417},
113         {NOTE_B, 4, 208},
114         {NOTE_C, 5, 208},
115         {NOTE_D, 5, 417},
116         {NOTE_C, 5, 208},
117         {NOTE_B, 4, 208},
118         {NOTE_A, 4, 417},
119         {NOTE_A, 4, 208},
120         {NOTE_C, 5, 208},
121         {NOTE_E, 5, 417},
122         {NOTE_D, 5, 208},
123         {NOTE_C, 5, 208},
124         {NOTE_B, 4, 625},
125         {NOTE_C, 5, 208},
126         {NOTE_D, 5, 417},
127         {NOTE_E, 5, 417},
128         {NOTE_C, 5, 417},
129         {NOTE_A, 4, 417},
130         {NOTE_A, 4, 208},
131         {NOTE_A, 4, 417},
132         {NOTE_B, 4, 208},
133         {NOTE_C, 5, 208},
134         {NOTE_D, 5, 625},
135         {NOTE_F, 5, 208},
136         {NOTE_A, 5, 417},
137         {NOTE_G, 5, 208},
138         {NOTE_F, 5, 208},
139         {NOTE_E, 5, 625},
140         {NOTE_C, 5, 208},
141         {NOTE_E, 5, 417},
142         {NOTE_D, 5, 208},
143         {NOTE_C, 5, 208},
144         {NOTE_B, 4, 417},
145         {NOTE_B, 4, 208},
146         {NOTE_C, 5, 208},
147         {NOTE_D, 5, 417},
148         {NOTE_E, 5, 417},
149         {NOTE_C, 5, 417},
150         {NOTE_A, 4, 417},
151         {NOTE_A, 4, 417},
152         {NOTE_MAX, 0, 417},
153         {NOTE_E, 5, 417},
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```
154      {NOTE_B, 4, 208},
155      {NOTE_C, 5, 208},
156      {NOTE_D, 5, 417},
157      {NOTE_C, 5, 208},
158      {NOTE_B, 4, 208},
159      {NOTE_A, 4, 417},
160      {NOTE_A, 4, 208},
161      {NOTE_C, 5, 208},
162      {NOTE_E, 5, 417},
163      {NOTE_D, 5, 208},
164      {NOTE_C, 5, 208},
165      {NOTE_B, 4, 625},
166      {NOTE_C, 5, 208},
167      {NOTE_D, 5, 417},
168      {NOTE_E, 5, 417},
169      {NOTE_C, 5, 417},
170      {NOTE_A, 4, 417},
171      {NOTE_A, 4, 208},
172      {NOTE_A, 4, 417},
173      {NOTE_B, 4, 208},
174      {NOTE_C, 5, 208},
175      {NOTE_D, 5, 625},
176      {NOTE_F, 5, 208},
177      {NOTE_A, 5, 417},
178      {NOTE_G, 5, 208},
179      {NOTE_F, 5, 208},
180      {NOTE_E, 5, 625},
181      {NOTE_C, 5, 208},
182      {NOTE_E, 5, 417},
183      {NOTE_D, 5, 208},
184      {NOTE_C, 5, 208},
185      {NOTE_B, 4, 417},
186      {NOTE_B, 4, 208},
187      {NOTE_C, 5, 208},
188      {NOTE_D, 5, 417},
189      {NOTE_E, 5, 417},
190      {NOTE_C, 5, 417},
191      {NOTE_A, 4, 417},
192      {NOTE_A, 4, 417},
193      {NOTE_MAX, 0, 417},
194      {NOTE_E, 5, 834},
195      {NOTE_C, 5, 834},
196      {NOTE_D, 5, 834},
197      {NOTE_B, 4, 834},
198      {NOTE_C, 5, 834},
199      {NOTE_A, 4, 834},
200      {NOTE_Gs, 4, 834},
201      {NOTE_B, 4, 417},
202      {NOTE_MAX, 0, 208},
203      {NOTE_E, 5, 834},
204      {NOTE_C, 5, 834},
205      {NOTE_D, 5, 834},
206      {NOTE_B, 4, 834},
```

```
207     {NOTE_C, 5, 417},
208     {NOTE_E, 5, 417},
209     {NOTE_A, 5, 834},
210     {NOTE_Gs, 5, 834},
211 };
212
213 noteEntry songNGGYU[339]
214 {
215     //Whole Note: 2105
216     {NOTE_D, 5, 789},
217     {NOTE_E, 5, 789},
218     {NOTE_A, 4, 526},
219     {NOTE_E, 5, 789},
220     {NOTE_Fs, 5, 789},
221     {NOTE_A, 5, 132},
222     {NOTE_G, 5, 132},
223     {NOTE_Fs, 5, 263},
224     {NOTE_D, 5, 789},
225     {NOTE_E, 5, 789},
226     {NOTE_A, 4, 1053},
227     {NOTE_A, 4, 132},
228     {NOTE_A, 4, 132},
229     {NOTE_B, 4, 132},
230     {NOTE_D, 5, 263},
231     {NOTE_D, 5, 132},
232     {NOTE_D, 5, 789},
233     {NOTE_E, 5, 789},
234     {NOTE_A, 4, 526},
235     {NOTE_E, 5, 789},
236     {NOTE_Fs, 5, 789},
237     {NOTE_A, 5, 132},
238     {NOTE_G, 5, 132},
239     {NOTE_Fs, 5, 263},
240     {NOTE_D, 5, 789},
241     {NOTE_E, 5, 789},
242     {NOTE_A, 4, 1053},
243     {NOTE_A, 4, 132},
244     {NOTE_A, 4, 132},
245     {NOTE_B, 4, 132},
246     {NOTE_D, 5, 263},
247     {NOTE_D, 5, 132},
248     {NOTE_MAX, 0, 526},
249     {NOTE_B, 4, 263},
250     {NOTE_Cs, 5, 263},
251     {NOTE_D, 5, 263},
252     {NOTE_D, 5, 263},
253     {NOTE_E, 5, 263},
254     {NOTE_Cs, 5, 394},
255     {NOTE_B, 4, 132},
256     {NOTE_A, 4, 1053},
257     {NOTE_MAX, 0, 526},
258     {NOTE_MAX, 0, 263},
259     {NOTE_B, 4, 263},
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260      {NOTE_B, 4, 263},
261      {NOTE_Cs, 5, 263},
262      {NOTE_D, 5, 263},
263      {NOTE_B, 4, 526},
264      {NOTE_A, 4, 263},
265      {NOTE_A, 5, 263},
266      {NOTE_MAX, 0, 263},
267      {NOTE_A, 5, 263},
268      {NOTE_E, 5, 789},
269      {NOTE_MAX, 0, 526},
270      {NOTE_B, 4, 263},
271      {NOTE_B, 4, 263},
272      {NOTE_Cs, 5, 263},
273      {NOTE_D, 5, 263},
274      {NOTE_B, 4, 263},
275      {NOTE_D, 5, 263},
276      {NOTE_E, 5, 263},
277      {NOTE_MAX, 0, 263},
278      {NOTE_MAX, 0, 263},
279      {NOTE_Cs, 5, 263},
280      {NOTE_B, 4, 263},
281      {NOTE_A, 4, 789},
282      {NOTE_MAX, 0, 526},
283      {NOTE_MAX, 0, 263},
284      {NOTE_B, 4, 263},
285      {NOTE_B, 4, 263},
286      {NOTE_Cs, 5, 263},
287      {NOTE_D, 5, 263},
288      {NOTE_B, 4, 263},
289      {NOTE_A, 4, 526},
290      {NOTE_E, 5, 263},
291      {NOTE_E, 5, 263},
292      {NOTE_E, 5, 263},
293      {NOTE_Fs, 5, 263},
294      {NOTE_E, 5, 526},
295      {NOTE_MAX, 0, 526},
296      {NOTE_D, 5, 1053},
297      {NOTE_E, 5, 263},
298      {NOTE_Fs, 5, 263},
299      {NOTE_D, 5, 263},
300      {NOTE_E, 5, 263},
301      {NOTE_E, 5, 263},
302      {NOTE_E, 5, 263},
303      {NOTE_Fs, 5, 263},
304      {NOTE_E, 5, 526},
305      {NOTE_A, 4, 526},
306      {NOTE_MAX, 0, 1053},
307      {NOTE_B, 4, 263},
308      {NOTE_Cs, 5, 263},
309      {NOTE_D, 5, 263},
310      {NOTE_B, 4, 263},
311      {NOTE_MAX, 0, 263},
312      {NOTE_E, 5, 263},
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323      {NOTE_B, 4, 132},
324      {NOTE_D, 5, 132},
325      {NOTE_B, 4, 132},
326      {NOTE_E, 5, 394},
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329      {NOTE_Cs, 5, 132},
330      {NOTE_B, 4, 394},
331      {NOTE_A, 4, 132},
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337      {NOTE_Cs, 5, 394},
338      {NOTE_B, 4, 132},
339      {NOTE_A, 4, 263},
340      {NOTE_A, 4, 263},
341      {NOTE_A, 4, 263},
342      {NOTE_E, 5, 526},
343      {NOTE_D, 5, 1053},
344      {NOTE_A, 4, 132},
345      {NOTE_B, 4, 132},
346      {NOTE_D, 5, 132},
347      {NOTE_B, 4, 132},
348      {NOTE_Fs, 5, 394},
349      {NOTE_Fs, 5, 394},
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351      {NOTE_A, 4, 132},
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353      {NOTE_D, 5, 132},
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355      {NOTE_A, 5, 526},
356      {NOTE_Cs, 5, 263},
357      {NOTE_D, 5, 394},
358      {NOTE_Cs, 5, 132},
359      {NOTE_B, 4, 263},
360      {NOTE_A, 4, 132},
361      {NOTE_B, 4, 132},
362      {NOTE_D, 5, 132},
363      {NOTE_B, 4, 132},
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```
366     {NOTE_Cs, 5, 394},
367     {NOTE_B, 4, 132},
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373     {NOTE_MAX, 0, 263},
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380     {NOTE_MAX, 0, 263},
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382     {NOTE_B, 4, 263},
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387     {NOTE_B, 4, 263},
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401     {NOTE_B, 4, 263},
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404     {NOTE_B, 4, 263},
405     {NOTE_MAX, 0, 263},
406     {NOTE_Cs, 5, 263},
407     {NOTE_B, 4, 263},
408     {NOTE_A, 4, 789},
409     {NOTE_MAX, 0, 526},
410     {NOTE_B, 4, 263},
411     {NOTE_B, 4, 263},
412     {NOTE_Cs, 5, 263},
413     {NOTE_D, 5, 263},
414     {NOTE_B, 4, 263},
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416     {NOTE_MAX, 0, 263},
417     {NOTE_MAX, 0, 263},
418     {NOTE_E, 5, 263},
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425      {NOTE_Fs, 5, 263},
426      {NOTE_E, 5, 526},
427      {NOTE_E, 5, 263},
428      {NOTE_E, 5, 263},
429      {NOTE_Fs, 5, 263},
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431      {NOTE_A, 4, 263},
432      {NOTE_A, 4, 526},
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438      {NOTE_B, 4, 263},
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440      {NOTE_E, 5, 263},
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482      {NOTE_A, 5, 526},
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484      {NOTE_D, 5, 394},
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519      {NOTE_D, 5, 526},
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521      {NOTE_Cs, 5, 394},
522      {NOTE_B, 4, 132},
523      {NOTE_A, 4, 526},
524      {NOTE_A, 4, 263},
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```
525     {NOTE_E, 5, 526},
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528     {NOTE_B, 4, 132},
529     {NOTE_D, 5, 132},
530     {NOTE_B, 4, 132},
531     {NOTE_Fs, 5, 394},
532     {NOTE_Fs, 5, 394},
533     {NOTE_E, 5, 789},
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536     {NOTE_D, 5, 132},
537     {NOTE_B, 4, 132},
538     {NOTE_A, 5, 526},
539     {NOTE_Cs, 5, 263},
540     {NOTE_D, 5, 394},
541     {NOTE_Cs, 5, 132},
542     {NOTE_B, 4, 263},
543     {NOTE_A, 4, 132},
544     {NOTE_B, 4, 132},
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546     {NOTE_B, 4, 132},
547     {NOTE_D, 5, 526},
548     {NOTE_E, 5, 263},
549     {NOTE_Cs, 5, 394},
550     {NOTE_B, 4, 132},
551     {NOTE_A, 4, 526},
552     {NOTE_A, 4, 263},
553     {NOTE_E, 5, 526},
554     {NOTE_D, 5, 1053},
555 };
556
557 noteEntry songTEST[8]
558 {
559     {NOTE_C, 4, 250},
560     {NOTE_D, 4, 250},
561     {NOTE_E, 4, 250},
562     {NOTE_F, 4, 250},
563     {NOTE_G, 4, 250},
564     {NOTE_A, 4, 250},
565     {NOTE_B, 4, 250},
566     {NOTE_C, 5, 250},
567 };
568
569 freqEntry songImperialMarch[18]
570 {
571     {440, 400},
572     {440, 400},
573     {440, 400},
574     {349, 300},
575     {349, 300},
576     {523, 100},
577     {440, 400},
```

```
578         {523, 100},  
579         {440, 800},  
580         {659, 400},  
581         {659, 400},  
582         {659, 400},  
583         {698, 300},  
584         {523, 100},  
585         {523, 100},  
586         {415, 400},  
587         {349, 300},  
588         {440, 800},  
589     };  
590  
591  
592 };
```