Initial Notes

* Use Crystal value 22.1184 MHz
* AT89C51ED2 divides the crystal internally by 12
* Internal clock frequency = 22.1184MHz /12 = 1.8432 MHz
* 1 Clock cycle = 0.5425 µsec
* We calculate fourth octave frequencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Octaves No.** | **Frequency Hz.** | **Time Ms.** | **Total No of Cycles** | **Cycles per Pulse** |
| **C** | **261.63** | **3.822191644689065** | **7046** | **3523** |
| **D** | **293.66** | **3.40529864469114** | **6278** | **3139** |
| **E** | **329.63** | **3.03370445651185** | **5592** | **2796** |
| **F** | **349.23** | **2.86344243048993** | **5278** | **2639** |
| **G** | **392.00** | **2.55102040816327** | **4702** | **2351** |
| **A** | **440.00** | **2.27272727272727** | **4190** | **2095** |
| **B** | **493.88** | **2.024783348181750** | **3732** | **1866** |

We will create subroutine 2 nested loops to reach required number of cycles

* Inner loop will be always 255
* Outer loop will vary.

|  |  |  |
| --- | --- | --- |
| **Octaves No.** | **Outer Loop.** | **Reminder Cycles** |
| **C** | **6** | **445** |
| **D** | **6** | **61** |
| **E** | **5** | **231** |
| **F** | **5** | **74** |
| **G** | **4** | **299** |
| **A** | **4** | **43** |
| **B** | **3** | **327** |