

# Assignment 11 Solutions

Page 253-254:

9. Examine the Pythagorean scale shown on page 244. How many perfect fourths are possible from the eight notes of this scale. A perfect fourth is two whole tones plus a semitone. The intervals that satisfy this requirement are : C-F, D-G, E-A, G-C, A-D, B-E for six in total. The interval F-B is not a perfect fourth because it has three whole tones and is off by a semitone.

10. How many perfect thirds are possible from the eight notes of the just scale shown on page 246? The perfect major thirds are: C-E, F-A, G-B.

11. Let us try to generate a scale by the following procedure: Start at a frequency  $f$ , go up a perfect fifth, down a perfect fourth, up a fifth, down a fourth, and so on. identify the difficulties inherent in the scale resulting from this procedure. See the scales spreadsheet on the Pythagorean tuning at the very end. The scale generated in the question and shown in the spreadsheet is basically a Pythagorean scale with a different F that is sharp with respect to the perfect fourth ratio of  $4/3$ .

Special questions:

1. You were asked to generate the Gflat and Cflat major scales in Pythagorean tuning. I have added these to the spreadsheet scales and put it into the solutions folder.

2. Compare the Cflat and B major scales. Although we want them to be the same scale, they are completely different. The B major scale is sharp with respect to the Cflat scale. Every note is this way. See the bottom of the spreadsheet for this comparison.

3. Compare the F# major scale with the Gflat major scale. Again we want these two scales to agree, but every note in the F# major scale is sharp with respect to the Gflat mior scale. This comparison is at the bottom of the spreadsheet in the solutions folder.