

Straus Theory Exercises
Ch. 1: I-VII (pp. 15-19)

ANSWERS

I. Integer Notation

1. Melodies as strings of integers:
 - a. Schoenberg, *Fourth String Quartet*, Op. 36, theme (Score, p. 183)
2 1 9 9 9 10 5 3 4 4 4 0 8 7 6 6 11 11
 - b. Webern, "Wie bin ich froh!" from *Three Songs*, Op. 25, theme (Score, p. 22)
7 4 3 6 1 5 2 11 10 0 9 8 7 4 3 6
 - c. Schoenberg, "Nacht" from *Pierrot Lunaire*, Op. 21, passacaglia theme (Score, p. 27)
4 7 3 2 1 0 11 10 9 6 (Score p. 29)
 - d. Schoenberg, *Piano Piece*, Op. 11, No. 1, theme (Score, p. 56)
11 8 7 9 5 5 4
2. You'll have to do this one on your own or ask me about it in class! :)

II. Pitch Class and Mod 12

1. Mod 12

- a. $\text{mod}12(15) = 3$
- b. $\text{mod}12(27) = 3$
- c. $\text{mod}12(49) = 1$
- d. $\text{mod}12(13) = 1$
- e. $\text{mod}12(-3) = 9$
- f. $\text{mod}12(-10) = 2$
- g. $\text{mod}12(-15) = 9$

2. Mod 12 Equivalence Classes

- a. ..., -19, -7, **5**, 17, 29, 41...
- b. ..., -17, -5, **7**, 19, 31, 43...
- c. ... -13, -1, **11**, 23, 35, 47...

3. Mod 12 Operations (+)

- a. $\text{mod}12(6 + 6) = 0$
- b. $\text{mod}12(9 + 10) = 7$
- c. $\text{mod}12(4 + 9) = 1$
- d. $\text{mod}12(7 + 8) = 3$

4. Mod 12 Operations (-)

- a. $\text{mod}12(9-10) = 11$
- b. $\text{mod}12(7-11) = 8$
- c. $\text{mod}12(2-10) = 4$
- d. $\text{mod}12(3-8) = 7$

III. Intervals

1. No. of semitones in traditional tonal intervals

- a. major third: 4
- b. perfect fifth: 7
- c. augmented sixth: 10
- d. diminished seventh: 9
- e. minor ninth: 13
- f. major tenth: 16

2.

- a. 4: major third
- b. 6: tritone, aug. fourth, dim. fifth, etc.
- c. 9: major six
- d. 11: major seventh
- e. 15: minor tenth
- f. 24: perfect fifteenth (two octaves)

IV. OPI

1.

- a. +15: C⁴-Eb⁵
- b. -7: C⁴-F³
- c. -4: C⁴-Ab³
- d. +23: C⁴-B⁵

2.

- a. b. VII. 1 (below)
- c. Not yet available
- d. VII. 1 (below)

V. UPI

1.

- a. 15: C⁴-Eb⁵
- b. 4: C⁴-E⁴
- c. 7: C⁴-G⁴
- d. 11: C⁴-B⁴
- e. 23: C⁴-B⁵

2.

- a. b. VII. 1 (below)
- c. Not yet available
- d. VII. 1 (below)

¹ C⁴ is middle C.

VI. OPCI

1.

- a. b. VII. 1 (below)
- c. Not yet available
- d. VII. 1 (below)

2.

| | opi | opci |
|----|------------|-------------|
| a. | +7 | 7 |
| b. | -7 | 5 |
| c. | +11 | 11 |
| d. | +13 | 1 |
| e. | -1 | 11 |
| f. | -6 | 6 |

VII. INTERVAL CLASS (IC)

1.

- a. b. VII. 1 (below)
- c. Not yet available
- d. VII. 1 (below)

2.

| | ic | opi |
|----|-----------|------------------------------|
| a. | 1 | ...-11, -1, +1, +11, +13 ... |
| b. | 2 | ...-10, -2, +2, +10, +14 ... |
| c. | 3 | ...-9, -3, +3, +9, +15 ... |
| d. | 4 | ...-8, -4, +4, +8, +16 ... |
| e. | 5 | ...-7, -5, +5, +7, +17 ... |
| f. | 6 | ...-18, -6, +6, +18 ... |

**OPI/UPI/OPCI/IC
 (IV-VII)**

a. Schoenberg, *Fourth String Quartet*, Op. 36, theme

| Pitch | D4 | | C#4 | | A3 | | Bb3 | | F4 | | Eb4 | | E4 | | C5 | | Ab4 | | G4 | | F#4 | | B4 |
|-------------|------|----|-----|----|----|----|-----|----|----|----|-----|----|----|----|----|----|-----|----|----|----|-----|----|----|
| opi | | -1 | | -4 | | +1 | | +7 | | -2 | | +1 | | +8 | | -4 | | -1 | | -1 | | +5 | |
| upi | upi | 1 | | 4 | | 1 | | 7 | | 2 | | 1 | | 8 | | 4 | | 1 | | 1 | | 5 | |
| opci | opci | 11 | | 8 | | 1 | | 7 | | 10 | | 1 | | 8 | | 8 | | 11 | | 11 | | 5 | |
| ic | ic | 1 | | 4 | | 1 | | 5 | | 2 | | 1 | | 4 | | 4 | | 1 | | 1 | | 5 | |

b. Webern, *Symphonie*, Op. 21, II, theme

| Pitch | F4 | | Ab4 | | G3 | | F#4 | | Bb3 | | A4 | | Eb5 | | E4 | | C5 | | C#4 | | D5 | | B4 |
|-------------|----|----|-----|----|----|-----|-----|----|-----|-----|----|----|-----|-----|----|----|----|----|-----|-----|----|----|----|
| opi | | +3 | | - | | +11 | | -8 | | +11 | | +6 | | -11 | | +8 | | - | | +13 | | -3 | |
| upi | | 3 | | 13 | | 11 | | 8 | | 11 | | 6 | | 11 | | 8 | | 11 | | 13 | | 3 | |
| opci | | 3 | | 11 | | 11 | | 4 | | 11 | | 6 | | 1 | | 8 | | 1 | | 1 | | 9 | |
| ic | | 3 | | 1 | | 1 | | 4 | | 1 | | 6 | | 1 | | 4 | | 1 | | 1 | | 3 | |

Note the palindromic symmetry of the ic structure

c. Not yet available

d. Berg, *Schlafend trägt man mich* from Four Songs, Op. 2 (Score p. 125), theme

| Pitch | Cb5 | | G4 | | Bb4 | | Ab4 | | Gb4 | | F4 | | Db5 | | C5 | | B4 | | Bb4 |
|-------------|-----|----|----|----|-----|----|-----|----|-----|----|----|---|-----|----|----|----|----|----|-----|
| opi | | -4 | | +3 | | -2 | | -2 | | -1 | | 8 | | -1 | | -1 | | -1 | |
| upi | | 4 | | 3 | | 2 | | 2 | | 1 | | 8 | | 1 | | 1 | | 1 | |
| opci | | 8 | | 3 | | 10 | | 10 | | 11 | | 8 | | 11 | | 11 | | 11 | |
| ic | | 4 | | 3 | | 2 | | 2 | | 1 | | 4 | | 1 | | 1 | | 1 | |