Twelve-Tone Analysis – Dr Ian Percy
Rosetta Stone Three

There are twelve <u>pitch-types</u>:

$$C - C^{\#} - D - E^{b} - E - F - F^{\#} - G - G^{\#} - A - B^{b} - B$$

The enharmonic equivalent notes of tonality are treated as the same pitch-type (pitch-class) within the dodecaphonic system: $C^{\#} = D^{b}$ and $D^{\#} = E^{b}$ etc.

There are twelve <u>pitch-classes</u> numbered: 0123456789TE

There are twelve <u>interval-types</u>:

Unison [0], minor 2nd [0,1], Major 2nd [0,2], minor 3rd [0,3], Major 3rd [0,4], Perfect 4th [0,5], Tritone [0,6], Perfect 5th [0,7], minor 6th [0,8], Major 6th [0,9], minor 7th [0,10], Major 7th [0,11].

The dodecaphonic system treats the unison and octave as the same pitch-class, negating the pivotal roles octave displacement and harmonic inversions play within the functioning harmony of tonality. The 12-tone system exclusively uses mirror-inversion (identical inversion) and negates the variable relationships of harmonic inversions through reducing the twelve interval-types into <u>SIX interval-classes</u>:

There are SIX Interval-Classes: (Note: Prime = 0)

Class One: minor 2nd/Major 7th (1 semi-tone from prime) [01E]
Class Two: Major 2nd/minor 7th (2 semi-tones from prime) [02T]
Class Three: minor 3rd/Major 6th (3 semi-tones from prime) [039]
Class Four: Major 3rd/minor 6th (4 semi-tones from prime) [048]
Class Five: Perfect 4th/Perfect 5th (5 semi-tones from prime) [057]
Class Six: Tritone/diminished 5th (6 semi-tones from prime) [0,6]

Pitch-Class Sets:

Any interval or group of notes can be referred to as a **Pitch-Class Set**. A pitch-class set (**PC Set**) is a sequence of pitch-types written as a sequence of pitch-classes (numbers 0-11).

Forte Numbers:

Pitch-classes can be identified for further research using a system developed by American Analyst Allan Forte (Structure of Atonal Music). This system is referred to as the **Forte Number**. To identify the Forte Number one must first identify the PC Set (pitch-types written as pitch-classes):

$$C - C^{\#} - B = 0, 1, 11 \ [01E]$$

Normal Order:

The **Normal Order** for any PC Set can be identified through rotating the sequences of pitch-classes (numbers 0-11) until the span between the first and last pitch-class is as short as it can be:

0, 1, 11 [01E] and 1, 11, 0 both span twelve semi-tones, but 11, 0, 1 only spans three semi-tones. Therefore, the **Normal Order** for **PC Set** 0, 1, 11 [01E] is 11, 0, 1 [E01].

Prime Order:

Once the Normal Order has been identified, if required, it is transposed back into **Prime Order** (sequence transposed/written from 0): 11, 0, 1 = 0, 1, 2

Therefore the **Prime Order** of 0, 1, 11 [01E] = 0, 1, 2 [012] = PC Set: 3-1

Additional Example: $C - D - B^{b}$

0, 2, 10 [02T] = span of 11 semi-tones

2, 10, 0 [2T0] = span of 11 semi-tones

10, 0, 2 [T02] = Shortest span of 5 semi-tones: 10, 0, 2 = Normal Order

10, 0, 2 [T02] Transposed to Prime Order = 0, 2, 4 = PC Set: 3-6*