

When Harry Met Iannis

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The Story Behind “When Harry Met Iannis”

Iannis Xenakis passed away on February 4, 2001. When he arrived in Heaven, he sought out his mentor, Olivier Messiaen. Messiaen said, “Iannis, there’s someone here I want you to meet.” The two walked over to a small sidewalk cafe, and there sat Harry Partch.

And so from this fanciful meeting in Heaven, “When Harry Met Iannis” was born. From Partch, the piece inherits the 43-tone just scale, tuned to $G = 392$ Hz. Also from Partch, the piece inherits the need to build instruments to play in the Partch scale. The harmonies in “When Harry Met Iannis” are derived from the Tonality Diamond.

Who Was Harry Partch?

- ▶ Born 1901, died 1974
- ▶ Composed in a 43-tone Just scale
- ▶ Had elaborate theory behind the scale
- ▶ Wrote theatrical pieces
- ▶ Built his own instruments
- ▶ *Genesis of a Music* (1974), Da Capo Press, New York, ISBN 0-306-80106-X

Partch Concepts in the Piece

- ▶ The Tonality Diamond
 - ▶ Otonality / Utonality
 - ▶ Numerary Nexus
 - ▶ Oidentity / Uidentity
 - ▶ $1/1 = G\ 392$
- ▶ Building your own instruments

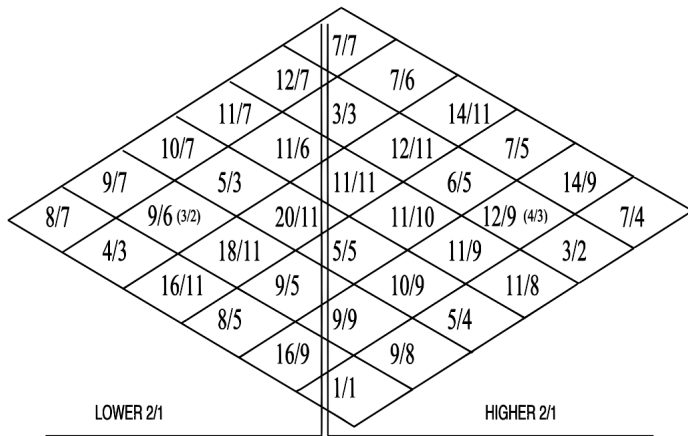
Who Was Iannis Xenakis?

- ▶ Born 1922, died 2001
- ▶ Born in Romania, Greek parents, French citizen
- ▶ Most famous work was the Philips Pavilion at the Brussels Worlds Fair
- ▶ Composed for both conventional and electronic instruments
- ▶ Mostly algorithmic composition
- ▶ *Formalized Music* (1992), Pendragon Press, Stuyvesant, NY, ISBN 0-945193-24-6

Xenakis Concepts in the Piece

- ▶ Stochastic algorithmic composition
- ▶ Electronic instruments

Tonality Diamond for “When Harry Met Iannis”



Partch Terminology

- ▶ A pitch is defined as a *ratio* of two numbers
- ▶ The numerator is called the *Over* number
- ▶ The denominator is called the *Under* number
- ▶ $1/1$ has frequency 392 Hz (G below A440)
- ▶ $1/2$ has frequency 196 Hz (G below A220)
- ▶ Etc.

Conventions

- ▶ Differs from the version in *Genesis of a Music*:
 - ▶ “lower octave” is pitches *below* G 392!
- ▶ Over or under number is multiplied by powers of two to place pitch in the desired octave
- ▶ Ratios are reduced to lowest terms
- ▶ The numbers 1, 9, 5, 11, 3, 7 are called *Identities*
- ▶ *Otonalities* go up to the right between solid lines
 - ▶ Pitches increase in frequency
- ▶ *Utonalities* go up to the left between dotted lines
 - ▶ Pitches decrease in frequency

Otonality

- ▶ An *Otonality* is a collection of pitches with a common *Under* number
- ▶ This Under number is called the *Numerary Nexus*
- ▶ The *Over* numbers are called *Odentities*
- ▶ Corresponds to a “major” key in conventional notation
- ▶ Six Otonalities in the diamond, going upwards in pitch

Utonality

- ▶ A *Utonality* is a collection of pitches with a common *Over* number
- ▶ This *Over* number is called the *Numerary Nexus*
- ▶ The *Under* numbers are called *Udentities*
- ▶ Corresponds to a “minor” key in conventional notation
- ▶ Six Utonalities in the diamond, going downwards in pitch

Coding of Chords in “When Harry Met Iannis”

- ▶ The piece consists of a sequence of chords from the diamond
- ▶ A chord has four components:
 - ▶ Otonality/Utonality switch: $+1 = O$, $-1 = U$
 - ▶ Octave multiplier relative to G 392
 - ▶ Numerary Nexus
 - ▶ List of Identities

Stochastic Composition

- ▶ *Stochastic* means that it has random elements
- ▶ Any or all elements of a stochastic composition may be random
- ▶ Examples go back to Mozart's time, using dice
- ▶ Modern stochastic composition using computers started in the late 1950s / early 1960s by Hiller, Isaacson and Xenakis

Structure of “When Harry Met Iannis”

- ▶ The piece starts with the full six-pitch chord (hexad) in the Otonality with Numerary Nexus 1
 - ▶ Bottom Otonality in the diamond
- ▶ Each successive chord is generated by a random transformation of the preceding chord
- ▶ Durations of the chords are generated at random

Major Transformations

- ▶ Flip the Otonality / Utonality switch
- ▶ Go up or down an octave
- ▶ Replace the Numerary Nexus with one of the other five
- ▶ Add or delete one of the Identities

Octave Jumps

- ▶ Pick a direction (*up* or *down*) at random
- ▶ If the new octave would be too high or too low, go the other way
- ▶ Random walk with reflecting barriers

Adding / Deleting Identities

- ▶ Choose *add* or *delete* at random
- ▶ If the new list would have too few or too many, do the other one
- ▶ If adding, add one that isn't already there at random
- ▶ If dropping, delete one at random

Final Chord Generation

- ▶ One of the Identities is chosen at random as the “root” of the chord
- ▶ This “root” is placed in the octave between $1/1$ and $2/1$ for an Otonality and between $1/2$ and $1/1$ for a Utonality
- ▶ The rest of the pitches in the chord are placed in the octave up from the root for an Otonality and down from the root for a Utonality
- ▶ The whole chord is then transposed according to the octave multiplier

Where We Are

- ▶ What we've described so far is the composition process
- ▶ Implemented as a Perl script
- ▶ Output is a score for a computer sound generation language
- ▶ Could be modified to produce scores for other instruments, MIDI with pitch bends, etc.

