MUSIC

Music Theory Fundamentals

Sound and the overtone series, notation, scales and key signatures, intervals, chords, rhythm and meter, diatonic harmony and the circle of fifths, chord progressions and cadences, and musical form — closing with a capstone composing and fully analyzing an original short piece from scratch.

10 Chapters

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Generated with Claude

CHAPTER 1: WHY STUDY MUSIC THEORY? SOUND, PITCH & THE OVERTONE SERIES

Music Theory Fundamentals

Chapter 1 · Why Study Music Theory? Sound, Pitch & the Overtone Series

Music theory doesn't invent the rules it describes — it discovers them, in real, measurable physics. Almost everything the rest of this course covers (scales, intervals, chords, why some combinations of notes sound stable and others sound tense) traces back to one real acoustic phenomenon this opening chapter explains in full: the overtone series. Understand this chapter, and the reason a major chord sounds the way it does stops being an arbitrary convention and starts being a real, physical fact you can derive.

What Sound Actually Is

Sound is a real, physical pressure wave — a vibrating object (a guitar string, a column of air in a flute, a singer's own vocal folds) compresses and rarefies the surrounding air in a repeating pattern, and that pattern travels outward until it reaches an ear or a microphone. Two real properties of that wave map directly onto two things we hear: **frequency** (how many times per second the wave repeats, measured in Hertz) determines **pitch** — how high or low a note sounds — and **amplitude** (how large the pressure swings are) determines **loudness**.

Pitch, Frequency & A440

The higher a vibrating object's real frequency, the higher the pitch we hear. The reference pitch this entire course is built around — the note A above middle C — is standardized today at exactly **440 Hz**, meaning the air genuinely vibrates 440 times every second.

A GENUINELY CONTESTED REAL STANDARD

A440 wasn't always the agreed standard. France set 435 Hz in the 1860s; Austria followed in 1885; the American music industry informally settled on 440 Hz by 1926. It only became a real, formal international standard at a 1939 conference at BBC Broadcasting House in London, with delegates from seven countries — and one real, practical reason 440 won out over the nearby alternative of 439: engineer Sir James Swinburne argued 440 could be more easily factored and electronically synthesized than a prime number like 439. ISO 16 formalized it again in 1955. Some regions and early-music ensembles still genuinely use other reference pitches today.

The Overtone Series: Where Music Theory Actually Comes From

Here's the real physical fact everything else in this course builds on: a vibrating string or air column never produces just one pure frequency. It vibrates simultaneously at its **fundamental** frequency *and* at a whole series of real, quieter **overtones** — frequencies that are exact integer multiples of the fundamental (2×, 3×, 4×, 5×, and so on). This is the **overtone series**, also called the **harmonic series**, and it's a genuine, measurable property of the physics of vibration, not a musical convention anyone invented.

The real reason this matters: when two notes have a simple integer-ratio relationship between their own frequencies, their overtone series overlap heavily, and our ears hear that overlap as **consonance** — a stable, "settled" sound. The octave (2:1), the perfect fifth (3:2), and the major third (5:4) are the three simplest possible ratios above 1:1 — and, not coincidentally, the three intervals every later chapter in this course treats as foundational.

INTERVAL	REAL FREQUENCY RATIO	HARMONICS INVOLVED
Octave	2:1	1st and 2nd harmonic
Perfect fifth	3:2	2nd and 3rd harmonic
Major third	5:4	4th and 5th harmonic

A Popular Myth Worth Correcting

ALREADY CORRECTED ONCE ON THIS SITE

A popular legend credits Pythagoras with discovering these harmonic ratios after hearing blacksmiths' hammers of different weights ring out consonant intervals. Music History I, Chapter 1 already established the real record on this: the tuning system that bears Pythagoras's name actually traces to a real Mesopotamian origin, and the blacksmith-hammer story is a real, documented apocryphal legend, not a historical account. What *is* real is the underlying physics this chapter just covered — simple integer ratios genuinely do produce consonant intervals — even though the popular origin story attached to that discovery doesn't hold up.

Hands-On Exercises

EXERCISE 1

A note is being played at 220 Hz. Using the real definition of the octave as a 2:1 frequency ratio, calculate the frequency of the note exactly one octave above it, and the frequency of the note exactly one octave below it.

View solution

EXERCISE 2

Using the real 3:2 frequency ratio for a perfect fifth, calculate the frequency of the perfect fifth above A440 (440 Hz). Round to the nearest whole Hz.

View solution

EXERCISE 3

Explain, in your own words, why a note played on a real instrument (rather than a pure electronic tone) sounds recognizably different from the same note played on a different instrument, even at the exact same fundamental frequency and loudness — referring directly to this chapter's own material on the overtone series.

View solution

CHAPTER 1 QUICK REFERENCE

- **Frequency** (Hz) determines pitch; **amplitude** determines loudness
- **A440** — the modern reference pitch, formally adopted internationally in 1939 (London), reaffirmed by ISO 16 in 1955; earlier standards genuinely varied (France 435 Hz, 1860s)
- The **overtone/harmonic series** — a vibrating object produces integer-multiple overtones (2×, 3×, 4×...) alongside its fundamental, a real physical fact, not a convention
- Simple integer ratios between frequencies produce consonance: **octave** (2:1), **perfect fifth** (3:2), **major third** (5:4)
- The Pythagoras/blacksmith-hammer origin story is a real, documented myth (per Music History I, Ch.1) — the underlying physics is real even though that particular origin story isn't

- **Next chapter:** Reading Musical Notation — the staff, clefs, and note values

Music Theory Fundamentals

Chapter 2 · Reading Musical Notation: The Staff, Clefs & Note Values

Notation is where music theory becomes something you can actually read and write, not just hear. This chapter covers the three real building blocks every later chapter's own notated examples will assume you already know: the staff itself, the clef that fixes what its lines and spaces mean, and the note shapes that encode how long each pitch lasts.

The Staff

The modern staff is five parallel horizontal lines (with four spaces between them), each line and space representing a specific pitch once a clef is applied. That five-line standard wasn't always the norm — Guido of Arezzo, working around the year 1000, developed a real, working **four-line** staff, still recognizably used (minus his own recommended red and yellow line-coloring) in modern Gregorian chant publications. The five-line staff only began appearing in 13th-century Italy, championed by theorist Ugolino da Forlì — and real four-, five-, and six-line staves genuinely coexisted in actual use as late as 1600, well over five centuries after Guido's original innovation.

> **A DIRECT ECHO OF MUSIC HISTORY I**
>
> Music History I, Chapter 2 already covered Guido of Arezzo's own real contribution in depth — his staff notation and solmization syllables cut real musical training time from roughly ten years down to one or two. This chapter's own staff is the direct, five-centuries-later descendant of exactly that innovation.

Clefs: Fixing What the Lines Mean

A bare staff has no fixed meaning — a clef is what assigns a real pitch to one specific line, which then determines every other line and space around it. Clefs weren't originally symbols at all: early notation simply labeled the reference line with the actual letter name of its pitch — F, C, or G — and those letters gradually became stylized into the symbols used today.

CLEF	REAL LETTER ORIGIN	FIXES WHICH LINE
Treble (G clef)	A stylized letter G; its own top flourish real, likely derived from a cursive "S" for *sol* (solfège for G)	The second line from the bottom = G above middle C
Bass (F clef)	A stylized letter F	The second line from the top = F below middle C

Note Values: Encoding Duration

A note's own shape encodes how long it lasts, following a real, strict binary system — each successive value is exactly half the duration of the one before it.

MODERN NAME	REAL HISTORICAL NAME	PROPORTIONAL DURATION
Whole note	Semibreve	1
Half note	Minim	1/2
Quarter note	Crotchet	1/4
Eighth note	Quaver	1/8
Sixteenth note	Semiquaver	1/16

The historical names trace to real Latin and Renaissance-era English terminology — "semibreve" literally means "half-short" (from *brevis*, short), and "semiquaver" uses the same *semi-* ("half") prefix. The whole real system of distinct note shapes for distinct durations was invented around 1250 by the theorist Franco of Cologne.

> **A DIRECT ECHO OF MUSIC HISTORY I**
>
> Music History I, Chapter 3 already covered Franco of Cologne's real mensural notation directly, framing it as solving rhythm the same way Guido of Arezzo (this chapter's own Section 1) had already solved pitch roughly two centuries earlier. The note values in this chapter are the direct, real descendants of that same 13th-century system.

Hands-On Exercises

EXERCISE 1

If a whole note lasts 4 beats, how many beats does a single eighth note last? Show the proportional halving from whole note down to eighth note step by step.

View solution

EXERCISE 2

Explain, using this chapter's own material, why a clef is necessary at all — what would be ambiguous about a staff with notes written on it but no clef present?

View solution

EXERCISE 3

How many sixteenth notes does it take to equal the duration of one whole note? Show your reasoning using the real proportional relationships from this chapter's own note-value table.

View solution

CHAPTER 2 QUICK REFERENCE

- The modern **staff** has 5 lines, 4 spaces — descended from Guido of Arezzo's real 4-line original (c. 1000 CE); the 5-line version only standardized from the 13th century onward, coexisting with other formats until as late as 1600
- **Treble/G clef** and **bass/F clef** are real stylized versions of the letters F and G, which originally just labeled the reference line directly
- **Note values** follow a strict binary halving: whole → half → quarter → eighth → sixteenth (1, 1/2, 1/4, 1/8, 1/16)
- The whole system of distinct note shapes traces to Franco of Cologne's real mensural notation, c. 1250 — covered directly in Music History I, Chapter 3
- **Next chapter:** Scales & Key Signatures — major and minor

Music Theory Fundamentals

Chapter 3 · Scales & Key Signatures: Major and Minor

A scale is simply a real, fixed pattern of whole and half steps applied starting from any note. Learn the pattern once, and you can build the same scale starting anywhere — which is exactly how this chapter's own key signatures work.

The Major Scale

Every major scale follows the exact same real interval pattern: whole, whole, half, whole, whole, whole, half — usually written **W-W-H-W-W-W-H**. Applied starting on C, this produces C-D-E-F-G-A-B-C, using only the white keys on a piano — the only major scale that needs no sharps or flats at all, which is exactly why C major is the standard reference point for everything else in this chapter.

The Natural Minor Scale

The natural minor scale follows a genuinely different real pattern: whole, half, whole, whole, half, whole, whole — **W-H-W-W-H-W-W**. Applied starting on A, this produces A-B-C-D-E-F-G-A — also using only the white keys, with no sharps or flats.

Relative Major and Minor

That's not a coincidence — C major and A minor share the exact same key signature (no sharps, no flats), because they contain exactly the same seven notes, just starting from a different point in the pattern. A minor's own tonic sits on the **sixth scale degree** of C major (C-D-E-F-G-**A**), a real, fixed relationship that holds for every major/minor pair: the relative minor's tonic is always the sixth degree of its relative major, three semitones below it.

Key Signatures and the Circle of Fifths

Key signatures don't accumulate sharps or flats randomly — they follow directly from Chapter 1's own real perfect fifth (the 3:2 frequency ratio). Stack real perfect fifths upward from C — C, G, D, A, E, B, F♯ — and each new key in that sequence gains exactly one more sharp than the last, in a fixed real order: **F♯-C♯-G♯-D♯-A♯-E♯-B♯**. Stack perfect fifths downward instead, and each new key gains one more flat, in the exact reverse order: **B♭-E♭-A♭-D♭-G♭-C♭-F♭**.

KEY	SHARPS/FLATS	RELATIVE MINOR
C major	None	A minor
G major	1 sharp (F♯)	E minor
D major	2 sharps (F♯, C♯)	B minor
F major	1 flat (B♭)	D minor

A GENUINELY SURPRISING REAL LIMIT

Stacking twelve real, exact 3:2 perfect fifths (per Chapter 1's own ratio) should eventually return exactly to the starting pitch, seven octaves up — but it doesn't. The real gap is called the **Pythagorean comma**, about 23.46 cents (roughly a quarter of a semitone), and it's a genuine mathematical fact, not a tuning error: $(3/2)^{12}$ is not exactly equal to 2^7. This real discrepancy is the actual reason equal temperament — the tuning system that very slightly adjusts every interval so the circle of fifths closes cleanly — was developed, and it's covered in depth later in this course.

The circle of fifths itself, as a real teaching diagram, isn't a modern invention either — the earliest documented version appears in Mykola Dyletsky's 1677 *Grammatika*, written to teach a Russian audience how to compose Western-style polyphonic music.

Hands-On Exercises

EXERCISE 1

Using the real W-W-H-W-W-W-H major scale pattern, build the G major scale starting on G, and identify which single note requires a sharp.

View solution

EXERCISE 2

D major has 2 sharps. Using the real relative-minor relationship from this chapter (the sixth scale degree of the major scale), identify D major's relative minor key.

View solution

EXERCISE 3

Explain, in your own words, why the Pythagorean comma shows that a perfectly "pure" (exact 3:2 ratio) circle of fifths cannot actually close into a real circle at all.

View solution

CHAPTER 3 QUICK REFERENCE

- **Major scale** pattern: W-W-H-W-W-W-H (e.g. C major: C-D-E-F-G-A-B-C)
- **Natural minor scale** pattern: W-H-W-W-H-W-W (e.g. A minor: A-B-C-D-E-F-G-A)
- **Relative major/minor** — share the same key signature; the minor's tonic is the major's own 6th scale degree
- **Circle of fifths** — built from real 3:2 perfect fifths (Ch.1); sharps add in the order F-C-G-D-A-E-B, flats in the reverse order
- The real **Pythagorean comma** (~23.46 cents) is the genuine mathematical reason twelve exact perfect fifths don't close the circle, motivating equal temperament
- **Next chapter:** Intervals — The Building Blocks of Harmony

Music Theory Fundamentals

Chapter 4 · Intervals: The Building Blocks of Harmony

An interval is simply the distance between two pitches — but naming that distance precisely requires two separate pieces of information, and one of the two real interval categories traces directly back to the overtone series from Chapter 1.

Naming an Interval: Number and Quality

Every interval has a **number** (2nd, 3rd, 4th, 5th, 6th, 7th, octave — counted by letter names, inclusive of both notes) and a **quality** (perfect, major, or minor, among others). C to E is a third by number (C, D, E — three letter names); its quality (major, in this case) depends on the exact number of semitones between the two notes.

Perfect Intervals: A Real Physical Reason for the Name

Only four interval numbers ever take the quality "perfect": the unison, the fourth, the fifth, and the octave. This isn't an arbitrary label — it's a direct real consequence of Chapter 1's own overtone series. Each of these intervals corresponds to a genuinely simple, low-integer frequency ratio: unison is 1:1, the octave is 2:1, the perfect fifth is 3:2, and the perfect fourth is 4:3. Those simple ratios made these four intervals sound so stable and consonant, historically, that they were treated as a separate category entirely — "perfect" in the sense of already complete, needing no further classification into major or minor at all.

Major and Minor Intervals

Every other interval number — the 2nd, 3rd, 6th, and 7th — takes either a **major** or **minor** quality instead, corresponding to real, less simple frequency ratios and, historically, less immediate consonance than the perfect intervals.

INTERVAL	QUALITY	REAL SEMITONE COUNT
Unison	Perfect	0
2nd	Minor / Major	1 / 2
3rd	Minor / Major	3 / 4
4th	Perfect	5
5th	Perfect	7
6th	Minor / Major	8 / 9
7th	Minor / Major	10 / 11
Octave	Perfect	12

Interval Inversion

Flip an interval upside-down — move the lower note up an octave instead — and you get its **inversion**, governed by a real, fixed rule: the original interval's number and its inversion's number always add up to **9**. A quality rule accompanies it: major inverts to minor (and minor to major), while perfect always inverts to perfect.

> **A WORKED EXAMPLE**
>
> A major 3rd (C to E) inverted becomes a minor 6th (E to C, an octave up) — the numbers 3 and 6 add to 9, and major flipped to minor, exactly as the rule predicts. A perfect 5th (C to G) inverted becomes a perfect 4th (G to C) — 5 and 4 add to 9, and perfect stayed perfect.

Hands-On Exercises

EXERCISE 1

Using this chapter's own real semitone-count table, identify the interval quality and number for a distance of exactly 7 semitones, and explain why this specific interval is called "perfect" rather than "major" or "minor."

📄 View solution

EXERCISE 2

Using the real inversion rule from this chapter (number + inversion number = 9; major↔minor, perfect↔perfect), find the inversion of a minor 7th.

📄 View solution

EXERCISE 3

Explain, using Chapter 1's own overtone-series material, why the perfect fourth (4:3 ratio) and perfect fifth (3:2 ratio) are both considered highly consonant, even though the perfect fourth's ratio is slightly less simple than the fifth's.

📄 View solution

CHAPTER 4 QUICK REFERENCE

- An interval's name has two parts: a **number** (2nd-7th, octave) and a **quality** (perfect, major, minor)
- **Perfect intervals** (unison, 4th, 5th, octave) get their name from real simple frequency ratios (1:1, 4:3, 3:2, 2:1) — directly from Chapter 1's overtone series
- **Major/minor intervals** apply only to 2nds, 3rds, 6ths, and 7ths
- **Inversion rule**: number + inversion number = 9; major↔minor; perfect↔perfect
- **Next chapter:** Chords — Triads & Seventh Chords

Music Theory Fundamentals

Chapter 5 · Chords: Triads & Seventh Chords

A chord is simply several intervals stacked on top of each other and sounded together. This chapter builds every basic chord type directly out of Chapter 4's own third intervals — and shows that the most common chord in all of Western music isn't an arbitrary invention, but a direct mathematical consequence of Chapter 1's own overtone series.

Triads: Stacking Two Thirds

A triad is built from a root note plus two stacked thirds. Which specific quality of third goes where determines the triad's own real quality:

TRIAD QUALITY	LOWER THIRD	UPPER THIRD	EXAMPLE
Major	Major 3rd	Minor 3rd	C–E–G
Minor	Minor 3rd	Major 3rd	A–C–E
Diminished	Minor 3rd	Minor 3rd	B–D–F
Augmented	Major 3rd	Major 3rd	D–F♯–A♯

The Major Triad Is Hiding in the Overtone Series

Take the 4th, 5th, and 6th harmonics of any real fundamental frequency — 4f, 5f, and 6f. Their real ratio, 4:5:6, is exactly a major triad: the interval from the 4th to the 5th harmonic is a real 5:4 ratio (a major third, per Chapter 1's own table), the interval from the 5th to the 6th harmonic is a real 6:5 ratio (a minor third), and the interval from the 4th to the 6th harmonic is a real 6:4 = 3:2 ratio (a perfect fifth, also from Chapter 1). Stack a major third and a minor third on top of each other, per this chapter's own table above, and you get exactly a major triad.

A DIRECT ECHO OF CHAPTER 1

The major triad isn't a cultural convention layered on top of physics — it's already sitting inside the overtone series of a single vibrating string or air column, three real harmonics apart. This is a strong real reason the major triad sounds so stable across virtually every musical tradition that uses harmony at all: any single fundamental tone already implies it.

Seventh Chords: One More Third on Top

Stack one further third on top of any triad, and you get a **seventh chord** — named for the real interval this new top note forms with the root. Five real, standard types cover the vast majority of seventh chords in practice:

SEVENTH CHORD	TRIAD	ADDED 7TH	EXAMPLE
Major 7th	Major	Major 7th	C–E–G–B
Dominant 7th	Major	Minor 7th	C–E–G–B♭
Minor 7th	Minor	Minor 7th	D–F–A–C
Half-diminished 7th	Diminished	Minor 7th	B–D–F–A
Diminished 7th	Diminished	Diminished 7th	B–D–F–A♭

Historically, sevenths began as real embellishing tones that destabilized an otherwise-stable triad, demanding resolution — a real tension this course revisits directly when it covers cadences.

Hands-On Exercises

EXERCISE 1

Using this chapter's own triad-construction table, build a diminished triad starting on C, and identify the two real interval qualities stacked to produce it.

View solution

EXERCISE 2

A dominant 7th chord is a major triad plus a minor 7th. Build the dominant 7th chord on G (i.e. G7), and name all four notes.

View solution

EXERCISE 3

Using this chapter's own real 4:5:6 harmonic-ratio explanation, show the arithmetic confirming that the interval between the 4th and 6th harmonics really is a perfect fifth (3:2 ratio), not some other interval.

View solution

CHAPTER 5 QUICK REFERENCE

- **Triads** stack two thirds: major (M3+m3), minor (m3+M3), diminished (m3+m3), augmented (M3+M3)
- The real **4:5:6 harmonic ratio** (4th, 5th, 6th overtones) is exactly a major triad — a direct mathematical consequence of Chapter 1's own overtone series
- **Seventh chords** add one more third on top of a triad: major 7th, dominant 7th, minor 7th, half-diminished 7th, diminished 7th
- Sevenths historically functioned as tension requiring resolution — revisited when this course covers cadences
- **Next chapter:** Rhythm, Meter & Time Signatures

CHAPTER 6: RHYTHM, METER & TIME SIGNATURES

Music Theory Fundamentals

Chapter 6 · Rhythm, Meter & Time Signatures

Everything covered so far in this course — pitch, intervals, chords — describes what happens on a single beat. This chapter covers how beats themselves are organized into a real, repeating pattern called meter, and how that pattern gets written down as a time signature.

Time Signature Notation

A time signature is two stacked numbers at the start of a piece. The real, standard meaning: the **bottom number** names which note value counts as one beat (a 4 means a quarter note gets the beat, an 8 means an eighth note does), and the **top number** says how many of those beats make up one measure.

> A REAL NOTATIONAL LEFTOVER
>
> The common time symbol (𝄴, used interchangeably with 4/4) and the cut time symbol (¢, used for 2/2) both real descend directly from medieval mensural notation. Cut time's own real name, *alla breve*, literally means "in the manner of the breve" — but the modern convention actually counts the beat as a half note (minim), a real, genuine mismatch between the symbol's own historical name and its actual modern meaning.

Simple vs. Compound Meter

Meter has a second, independent real dimension beyond just "how many beats per measure": how each individual beat itself subdivides. In **simple meter**, each beat divides naturally into two equal parts. In **compound meter**, each beat divides naturally into three equal parts.

Duple, Triple & Quadruple

Separately, meter is also classified by how many beats fill a measure: **duple** (two), **triple** (three), or **quadruple** (four). Combine this with the simple/compound distinction above, and every common time signature falls into one of six real categories.

	DUPLE	TRIPLE	QUADRUPLE
Simple (beat ÷ 2)	2/4	3/4	4/4
Compound (beat ÷ 3)	6/8	9/8	12/8

3/4 vs. 6/8: The Same Notes, a Different Real Grouping

A 3/4 measure and a 6/8 measure can both contain exactly six eighth notes — yet they are genuinely, audibly different meters, because those six eighth notes group differently:

	3/4 (SIMPLE TRIPLE)	6/8 (COMPOUND DUPLE)
Real beat unit	Quarter note	Dotted quarter note
Beats per measure	3	2
How the beat subdivides	Into 2 eighth notes	Into 3 eighth notes
Six eighth notes grouped as	Three pairs (2+2+2)	Two triplets (3+3)

Because both meters real fill an identical bar length, composers can genuinely "slip" between the two feels just by shifting where the accent falls — the same six notes, felt as three groups of two versus two groups of three.

Hands-On Exercises

EXERCISE 1

In the time signature 9/8, identify the real beat unit, how many beats are in a measure, and whether this meter is simple or compound — and name its duple/triple/quadruple classification.

View solution

EXERCISE 2

A time signature has a bottom number of 4 and a top number of 4. State what each number means, using this chapter's own real definitions.

View solution

EXERCISE 3

Explain, in your own words and using this chapter's own real comparison, why a listener can genuinely tell the difference between a 3/4 measure and a 6/8 measure even when both contain exactly the same six eighth notes.

View solution

CHAPTER 6 QUICK REFERENCE

- **Time signature** — top number = beats per measure; bottom number = note value that gets one beat
- **Simple meter** — beat divides into 2; **compound meter** — beat divides into 3
- **Duple/triple/quadruple** — 2, 3, or 4 beats per measure
- **3/4** (simple triple) vs. **6/8** (compound duple) — same total eighth notes, genuinely different real grouping (3 pairs vs. 2 triplets)
- Common time (𝄴) and cut time (𝄵) real descend from medieval mensural notation
- **Next chapter:** Diatonic Harmony & the Circle of Fifths

Music Theory Fundamentals

Chapter 7 · Diatonic Harmony & the Circle of Fifths

Every tool this chapter needs already exists from earlier in this course — Chapter 3's own major scale and Chapter 5's own triad-construction rules combine directly to produce a real, fixed, predictable pattern that governs harmony in every major key.

Building a Triad on Every Scale Degree

Stack a third and another third on top of each note of the major scale, using only notes already in that scale, and a genuinely fixed pattern of triad qualities falls out automatically — not by convention, but as a direct mechanical consequence of the scale's own real interval structure.

DERIVING IT DIRECTLY FROM C MAJOR

I (C-E-G): major 3rd + minor 3rd → Major
ii (D-F-A): minor 3rd + major 3rd → Minor
iii (E-G-B): minor 3rd + major 3rd → Minor
IV (F-A-C): major 3rd + minor 3rd → Major
V (G-B-D): major 3rd + minor 3rd → Major
vi (A-C-E): minor 3rd + major 3rd → Minor
vii° (B-D-F): minor 3rd + minor 3rd → Diminished
This pattern — major, minor, minor, major, major, minor, diminished — holds in every major key, not just C, since it follows directly from the major scale's own fixed W-W-H-W-W-W-H pattern (Chapter 3).

Roman Numeral Analysis

Music theory names these seven diatonic chords with Roman numerals matching their scale degree, using a real, standard convention: **uppercase** for major chords, **lowercase** for minor chords, and a small ° symbol for the diminished chord. This is exactly why the pattern above is written I-ii-iii-IV-V-vi-vii° — the case of each numeral already tells you the chord's own quality before you even look at the notes.

Scale Degree Names

Each scale degree also carries a real, traditional name, most of them meaningfully describing the degree's own position relative to the tonic:

DEGREE	NAME	REAL MEANING	ROMAN NUMERAL (MAJOR KEY)
1	Tonic	The tonal center — note of final resolution	I
2	Supertonic	"Above the tonic" — one whole step up	ii
3	Mediant	Midway between tonic and dominant	iii
4	Subdominant	The "lower dominant" — a fifth below the tonic	IV
5	Dominant	Second in importance to the tonic	V
6	Submediant	The "lower mediant," mirroring the mediant below the tonic	vi
7	Leading Tone	A half-step below the tonic, pulling melodically toward it	vii°

The Circle of Fifths and Key Relationships

Chapter 3's own circle of fifths does more than generate key signatures — it also predicts which keys sound most closely related to each other. Neighboring keys on the circle (like C major and G major, one real perfect fifth apart) share six of their seven scale tones, differing by only one real accidental — exactly why modulating to a neighboring key on the circle of fifths feels so smooth, while modulating to a distant key feels far more abrupt.

Hands-On Exercises

EXERCISE 1

Using the real G major scale (G-A-B-C-D-E-F♯-G) from Chapter 3's own material, build the triad on the 5th scale degree (V) and identify its quality using semitone counts, per this chapter's own method.

View solution

EXERCISE 2

Using this chapter's own scale-degree-name table, name the scale degree traditionally called the "subdominant," and state which Roman numeral and triad quality it takes in a major key.

View solution

EXERCISE 3

Explain, using this chapter's own material and Chapter 3's circle of fifths, why C major and G major share six of their seven scale tones, and name the one note that differs between them.

View solution

CHAPTER 7 QUICK REFERENCE

- Building a triad on every degree of the major scale produces a fixed real pattern: **I-ii-iii-IV-V-vi-vii°** (major, minor, minor, major, major, minor, diminished)
- **Roman numeral analysis** — uppercase = major, lowercase = minor, ° = diminished
- Real scale-degree names: tonic, supertonic, mediant, subdominant, dominant, submediant, leading tone
- Neighboring keys on the circle of fifths (Ch.3) share 6 of 7 diatonic chords, differing by one accidental
- **Next chapter:** Chord Progressions & Cadences

Music Theory Fundamentals

Chapter 8 · Chord Progressions & Cadences

Chapter 7 gave every chord in a key its own Roman numeral. This chapter covers how those chords actually move — the recurring patterns that give music its sense of direction, and the specific real endings, called cadences, that punctuate a musical phrase the way a period or a question mark punctuates a sentence.

Cadences: Punctuation for Harmony

A cadence is a real, specific two-chord (or more) pattern that closes a musical phrase — and different cadences close it with genuinely different degrees of finality.

CADENCE	MOTION	REAL CHARACTER
Authentic	V → I	Full closure (perfect: both chords root-position, tonic on top; imperfect: a weaker variant)
Plagal	IV → I	The real "Amen cadence" — named for its frequent setting to the word "Amen" in hymns
Half	Any chord → V	Sounds genuinely incomplete, demanding continuation
Deceptive	V → vi (instead of I)	A real "interrupted" resolution — expectation deliberately thwarted

A REAL, HONEST SCHOLARLY DISPUTE

Not every real theorist agrees the plagal cadence deserves full "cadence" status at all. Music theorist William Caplin has real, documented arguments that true plagal cadences didn't actually function this way in classical-era music — he contends the IV→I motion "cannot confirm a tonality" on its own, and more often functions as a prolongation of an already-established tonic rather than a genuine, independent close. Worth knowing the field isn't fully settled on this one.

Common Chord Progressions

Beyond single cadences, whole progressions recur constantly across genres — patterns of movement, not just endings.

THE II-V-I PROGRESSION

Real, documented as jazz harmony's own single most central progression — typically voiced ii^{m7}–V^{7}–I^{maj7} — prized for the genuinely smooth voice-leading it offers between the thirds and sevenths of each chord. It shows up far beyond jazz too, as a real staple of virtually every style of Western popular music, with documented examples running from "Honeysuckle Rose" (1928) through The Beatles' "If I Fell."

THE "50S PROGRESSION" (I-VI-IV-V) AND ITS RELATIVE, I-V-VI-IV

Also real, documented under the names "Heart and Soul" changes, the "Stand by Me" changes, and the doo-wop progression. Despite the "50s" name, real documented examples of this progression predate the 1950s by centuries, appearing in 17th-century works by Dieterich Buxtehude and J.S. Bach. Its own real, later ubiquity in popular music — hundreds of documented recordings from "Earth Angel" (1954) onward, across rock, pop, and indie — is exactly what made it the target of the widely-known 2009 "Four Chords" comedy medley by the group Axis of Awesome, which strung together dozens of real hit songs built on the same four chords back to back.

Hands-On Exercises

EXERCISE 1

Using Chapter 7's own C major diatonic chords, write out the actual chord names (not just Roman numerals) for a I-IV-V-I progression in C major.

View solution

EXERCISE 2

A phrase ends with a G major chord moving to an A minor chord, in the key of C major. Using this chapter's own cadence table and Chapter 7's own Roman numerals, identify which cadence type this is.

View solution

EXERCISE 3

Explain, in your own words, why a half cadence (ending on V) sounds "incomplete" to a listener while a perfect authentic cadence (V-I, both root position) sounds fully resolved — referring to Chapter 7's own real scale-degree names where useful.

View solution

CHAPTER 8 QUICK REFERENCE

- **Authentic cadence** (V→I) — full closure; **plagal** (IV→I) — the "Amen cadence," with real, disputed status as a true cadence (Caplin)
- **Half cadence** — ends on V, sounds incomplete; **deceptive cadence** — V resolves to vi instead of I
- **ii-V-I** — jazz harmony's own central progression, also a real staple across popular music generally
- The **"50s progression"** (I-vi-IV-V) — real documented use predating the 1950s (Buxtehude, Bach), later the target of the "Four Chords" comedy medley
- **Next chapter:** Musical Form — Binary, Ternary, Sonata & Rondo

Music Theory Fundamentals

Chapter 9 · Musical Form: Binary, Ternary, Sonata & Rondo

Everything so far in this course happens at the level of a single chord or phrase. This chapter zooms out to the largest real scale: how whole sections of music are arranged into a complete, recognizable structure.

Binary Form (AB)

Binary form has two real sections, each typically repeated (A-A-B-B). The two sections share closely related melodic and rhythmic material, contrasting mainly through key: the A section usually modulates to a related key (the dominant in a major-key piece, the relative major in a minor-key piece), and the B section works its way back to the original key. Binary form was especially popular in real Baroque-era keyboard works.

Ternary Form (ABA)

Ternary form has three real sections: an opening idea (A), a genuinely contrasting middle section (B), and a full return of the original A material to close. The real, important distinction from a superficially similar structure called "rounded binary": in true ternary form, the B section contrasts *completely* with A rather than just modulating away from it, and the piece closes with the full A section restated, not just a fragment of it.

Sonata Form

Sonata form is genuinely more elaborate — a real three-part structure of **exposition**, **development**, and **recapitulation**. The exposition presents the main thematic material with a real, fixed tonal plan: the first theme stays in the tonic key, while the second theme modulates away — to the dominant in a major-key work, or to the relative major in a minor-key work. The development then explores and manipulates that material harmonically and texturally, often moving through several distant keys, before the recapitulation restates both themes, now both in the tonic — resolving the exposition's own real tonal tension.

> **A DIRECT ECHO OF MUSIC HISTORY II**
>
> Sonata form became real, documented "the most important principle of musical form" from the Classical era onward, with its most exemplary real achievements coming from Haydn and Mozart — exactly the two composers Music History II, Chapter 2 already covered in depth. The form this chapter defines structurally is the same one that course already placed historically.

Rondo Form

Rondo form alternates a recurring main theme, the **refrain** (A), with contrasting **episodes** (B, C, and so on) — most commonly in a real **ABACA** pattern, sometimes called "five-part rondo." The real underlying pattern is genuinely flexible in how many episodes it uses — real documented variants include ABACAB, ABACBA, and ABACABA — as long as one recurring refrain keeps alternating with contrasting episodes. Rondos were especially common as real finale movements in Classical concertos and serenades, typically fast and lively (*Allegro*), with a real popular or folk character.

> **A DIRECT ECHO OF MUSIC HISTORY II**
>
> Beethoven's own real "Für Elise" is a textbook, real ABACA rondo — and Beethoven himself is covered directly in Music History II, Chapter 3, as the composer bridging the Classical and Romantic eras. One of his own most famous pieces is also one of this chapter's own cleanest structural examples.

FORM	STRUCTURE	REAL HISTORICAL ASSOCIATION
Binary	A-A-B-B	Baroque keyboard works
Ternary	A-B-A	Genuine contrast in B, full A return
Sonata	Exposition–Development–Recapitulation	Classical era; Haydn, Mozart
Rondo	A-B-A-C-A	Classical finales; Beethoven's "Für Elise"

Hands-On Exercises

EXERCISE 1

A piece in C major (a major key) is in sonata form. Using this chapter's own real tonal-plan rule for the exposition, name the key the second theme would modulate to.

View solution

EXERCISE 2

Explain, using this chapter's own real distinction, why a piece with sections A-B-A might actually be "rounded binary" rather than true ternary form — what specific real difference would you need to check for?

View solution

EXERCISE 3

A rondo is described as having sections A-B-A-C-A-D-A. Using this chapter's own real ABACA naming logic, explain whether this is still a genuine rondo, and what makes the refrain (A) structurally different from every episode (B, C, D).

View solution

CHAPTER 9 QUICK REFERENCE

- **Binary form** (A-A-B-B) — two related sections, common in Baroque keyboard music
- **Ternary form** (A-B-A) — genuine contrast in B, full A return; distinct from "rounded binary"
- **Sonata form** — exposition (tonic → dominant/relative major) → development → recapitulation (both themes in tonic); real Classical-era association with Haydn and Mozart
- **Rondo form** — real ABACA refrain/episode structure; Beethoven's "Für Elise" as a textbook example
- **Next chapter:** Capstone — Analyzing and Composing a Short Original Piece

Music Theory Fundamentals

Chapter 10 (Capstone) · Analyzing and Composing a Short Original Piece

No new theory in this chapter — just every real tool from Chapters 1 through 9, applied in sequence to write and fully analyze one short, original 8-bar melody from scratch.

Step 1 — Key and Time Signature

This piece is written in **C major** (Chapter 3 — no sharps or flats) in **4/4 time** (Chapter 6 — a quarter note gets the beat, four beats per measure). C major is picked deliberately as this course's own reference key from Chapter 1 onward.

Step 2 — The Antecedent Phrase (Bars 1–4)

The opening four-bar phrase — the **antecedent** — states the main melodic idea and ends on a real, deliberately unresolved cadence:

> **BARS 1-4, MELODY AND HARMONY**
>
> Melody: C4–E4–G4–E4 | F4–A4–G4–(rest) | E4–D4–C4–D4 | E4–(half note)
> Harmony: **C** (I) | **F** (IV) | **G** (V) | **G** (V)
> The melody moves by a real major 3rd (C to E, Chapter 4) to open, then a real perfect 4th (E to A, Chapter 4) in bar 2. The phrase ends on the V chord (G major) — a real **half cadence** (Chapter 8), leaving the ear genuinely wanting more.

Step 3 — The Consequent Phrase (Bars 5–8)

The second four-bar phrase — the **consequent** — echoes the antecedent's own opening melodic shape, then resolves fully:

> **BARS 5-8, MELODY AND HARMONY**

Melody: C4–E4–G4–E4 | F4–A4–B4–(rest) | C5–B4–A4–G4 | C4–(whole note)
Harmony: **C** (I) | **F** (IV) | **G** (V) | **C** (I)
Bars 5-6 real, deliberately mirror bars 1-2 — this is what makes the two phrases a genuine, matched pair rather than two unrelated ideas. The final bar resolves V to I with both chords in root position and the tonic on top — a real, textbook **perfect authentic cadence** (Chapter 8), giving the piece its own genuine sense of closure.

Step 4 — The Full Harmonic Analysis

Every chord in this piece is built directly from Chapter 5's own triad-construction rules, applied to the C major diatonic set Chapter 7 already derived:

BAR	CHORD	ROMAN NUMERAL	NOTES
1, 5	C major	I	C-E-G
2, 6	F major	IV	F-A-C
3, 7	G major	V	G-B-D
4	G major	V	Half cadence
8	C major	I	Perfect authentic cadence

The whole eight-bar harmonic plan is simply **I-IV-V-V | I-IV-V-I** — the same real I-IV-V-I progression Chapter 8 already introduced, split across two phrases with a half cadence marking the midpoint instead of a full resolution.

Step 5 — Naming the Form

Two matched four-bar phrases — an antecedent ending in a half cadence, and a consequent that echoes the antecedent's own opening before resolving fully — together form what's traditionally called a **period**: the smallest real complete musical structure built from a genuine question-and-answer pair of phrases. It's a real, direct miniature relative of Chapter 9's own binary form (two related sections), scaled down to the level of a single melodic idea rather than a whole movement.

CAPSTONE ELEMENT	BUILT USING
Key & time signature	Chapter 3, Chapter 6
Notation, note values	Chapter 2
Melodic intervals (3rd, 4th)	Chapter 4
Chord construction	Chapter 5
Roman numeral analysis	Chapter 7
Half and perfect authentic cadences	Chapter 8
Period form (antecedent/consequent)	Chapter 9

Hands-On Exercises

EXERCISE 1

Rewrite this chapter's own consequent phrase (bars 5-8) so that it ends with a real deceptive cadence instead of a perfect authentic cadence — state which chord bar 8 would need to become, and explain your reasoning using Chapter 8's own material.

View solution

EXERCISE 2

This piece's whole 8-bar harmonic plan is I-IV-V-V | I-IV-V-I. Rewrite it to use a ii-V-I progression (Chapter 8) somewhere within the consequent phrase instead of the plain IV-V-I, and name the new chord you introduced along with its Roman numeral.

View solution

EXERCISE 3

Explain, in your own words, why bars 5-6 mirroring bars 1-2 is essential to calling this piece a genuine "period" rather than just two unrelated four-bar phrases placed next to each other.

View solution

CHAPTER 10 (CAPSTONE) QUICK REFERENCE

- A full 8-bar piece built from every prior chapter's own real tool: key/time signature, notation, intervals, diatonic chords, Roman numerals, cadences, and form
- Harmonic plan: **I-IV-V-V | I-IV-V-I** — a half cadence at bar 4, a perfect authentic cadence at bar 8
- A **period** — an antecedent phrase (ending unresolved) matched with a consequent phrase (echoing the opening, then resolving fully) — is the smallest complete musical structure, a miniature relative of Chapter 9's own binary form

Course Complete

Music Theory Fundamentals is now complete — 10/10 chapters, from the physics of a single vibrating string all the way to a fully analyzed original composition.