

Homework Assignment #1

Computer Music Representations and Models: MAE - Politecnico di Milano

General instructions

There are two HomeWork Assignments (HWA) for *Computer Music Representations and Models* (CMRM), each worth 20% of the final grade, and this is HWA No. 1. HWAs can be done individually, or in groups of two students. Please keep in mind that the all students of the same group will be given the same grade, irrespective of their contribution, therefore please make sure that all members contribute equally to the assignment.

For this HWA, it is advisable to form a group that includes a student with some background in music. This HWA is divided in two equally important parts, one concerning rhythmic analysis, and one covering harmonic analysis, described in the following two Sections. Once you complete the assignment you will be asked to turn it in using a method that will be notified within the next few days.

Part 1 - Rhythmic Analysis

For this part of the assignment, you are expected to select one rhythmically challenging musical piece from the list in the Table that follows, listen to it carefully, analyze it, and fill out the template Excel table provided.

Fill out the excel table with the following information:

1. Homework Number
2. Homework group composition (names and emails)
3. Title, author, and link of the musical piece that the table refers to
4. Global notes on rhythmic organization and periodicities

Then segment the musical piece in groups of measures, each exhibiting a uniform rhythmic structure, and fill out the table segment by segment (one row per segment) with the following information

1. Beginning and end of the segment (indicating both minutes/seconds on the video, and the measure's number)
2. Rhythmic structure of the segment using an appropriate format:
 - a. metric signature or, where applicable, a signature in the notation of Brian Fernyhough, as well as its reduction to a single signature (see slides).
e.g. $6/4:5/4=30/4$;
 - b. also specify, if applicable, the metric subdivision as you perceive it:
e.g. $19/8=(7+7+5)/8$
3. Comments on the structure of the segment (e.g. are there alternate representations?)

If you feel you need more space to explain what you gathered about the rhythmic structure of the piece, use additional cells of the Excel file.

List of proposed pieces

You are encouraged to pick a piece from the selection below, which are already ordered (approximately) in growing order of rhythmic complexity. The scale of rhythmic complexity that I used is organized as follows:

1. simple rhythmic signature with no syncopation, mostly in downbeat
2. simple rhythmic signature with elements of syncopation (e.g. funky, or south American rhythms)
3. simple rhythmic signature with simple polyrhythmic elements and possible signature changes. It may exhibit odd signatures, but with no or just a few rhythmic modulations. It could also be an even signature with an uneven subdivision.
4. complex rhythmic structure with multiple modulations, and a mixture of competing rhythmic elements superimposed with each other (poly-rhythmic or polymetric elements).
5. extremely complex rhythmic structure with abundance of overlaying rhythmic elements that makes it very difficult to discern the structure at the very first listen.

The selection of pieces below exhibits a rhythmic complexity of three or more. You should choose a piece that suits your abilities and musical background. Although I would much prefer you to pick a piece one of the pieces listed below, you can decide to select a piece of your own choice as long as it exhibits a minimal rhythmic complexity of at least 3 out of 5 (see description above).

Author/Performer	Title	Difficulty	Link
Genesis	Dance on a Volcano	3	https://youtu.be/TBcnjx05a1s
Mike Oldfield	Tubular Bells	3	https://youtu.be/bv_4sZCLlrQ
Porcupine Tree	Don't hate me	3	https://youtu.be/XrTtxWBfswk?list=OLAK5uy_melf7n-1oMVzQb8xD6cXMPUp4oDjpx-oM
Sting	Love Is Stronger Than Justice	3	https://youtu.be/hpFslVLck-Q
Yellowjackets	Green House	3	https://youtu.be/ARw5OoQaYoM
Yshay Afterman and Itamar Erez	Desert Song	3	https://youtu.be/Mser742Lq5Q
Esperanza Spalding	I know you know	3	https://youtu.be/ONfQmoouvyTY
Dhafer Youssef	Satyagraha	4	https://youtu.be/YN6pJi6uJw
Avishai Cohen	Smile	4	https://youtu.be/tL61H4m97l4?list=RDtL61H4m97l4
Avishai Cohen	Morenika	4	https://youtu.be/8feO_XMN_tg
Han Beyli	Jeyran	4	https://youtu.be/Xmt4P1Bflc
King Crimson	Discipline	4	https://youtu.be/NZHdA32d16k
Snoop Dogg	A fresh pair of panties	4	https://youtu.be/IWYZ9sxIjkM
Tigran Hamasyan	Love Song	4	https://youtu.be/7kwQrE19G2w
Shai Maestro Trio	Treelogy	4	https://youtu.be/25VnjSDwglw
Amira Medunjanin	Oj ti momče Ohrigjanče	4	https://youtu.be/SlltKwfWI4U
Porcupine Tree	Anesthetize	4	https://youtu.be/MSEQZ8reJA4
Alfredo Rodriguez	New World (challenge)	4	https://youtu.be/SF2YjUPdizQ
Alfredo Rodriguez	Lemonade (challenge)	4	https://youtu.be/tW-lhVjrVni
Alfredo Rodriguez	Quarantine (challenge)	4	https://youtu.be/DNMkDLVUV3c
Radiohead	Pyramid Song	4	https://youtu.be/3M_Gg1xAHE4
Yshay Afterman	Or	5	https://youtu.be/h1xTDiqLQic
Meshuggah	Clockworks	5	https://youtu.be/oFiDcazicdk
Ron Minis	Pale Blue Dot	5	https://youtu.be/HHURvrHI-UI
Distorted Harmony	Misguided	5	https://youtu.be/QsJ1Au5cdFM
Gavin Harrison	Cheating the Polygraph	5	https://youtu.be/qtPMleTKpyw
Dhafer Youssef Quartet	Dance Of The Invisible Dervishes (first piece)	5	https://youtu.be/BkvYsbhrsYw

Part 2 – Harmonic Analysis

This part of the assignment is devoted to identifying and denoting specific aspects of the harmonic progression of a piece. This will be done in two steps:

- Analysis of a leadsheet
 - choose **one** of the 16 available leadsheets (see table below, and uploaded zip file)
- Analysis of an arrangement corresponding to the selected leadsheet
 - for the leadsheet that you selected, pick one of the 3 available performances/arrangements.

Notational remarks

Harmonic notations in leadsheets are often inconsistent, therefore it is important to offer some explanations:

- The subscript “MI” denotes a minor chord, the subscript “MA” denotes a major chord (it refers to whether the third is major or minor). The subscript MA, however, is normally omitted, and MI is often replaced by a minus sign (-)
- The subscript “Maj” followed by “7” indicates a “major seventh” on a major chord (MA is omitted) with, also known as “delta chord”, or Δ)
- The superscript “7” indicates that a “minor seventh” (dominant chord)
- The superscript 7(b5) (minor seventh flat-five, often written omitting the parentheses, i.e. as “7 b5”) is by default associated to a minor chord (e.g. $C_{MI}^{7(b5)}$) and denotes a **half-diminished chord**, which we denoted in the harmony slides with a subscript \emptyset (as defined in slide 43). This means, therefore, that C_{\emptyset} (or $C_{MI}^{7(b5)}$) will be made of the following notes: C–E \flat –G \flat –B \flat , corresponding to two minor intervals separating the bottom three notes, and a major interval separating the top two. This chord corresponds to the chord tones (2:1 subsampling) of the Locrian scale. Notice that sometimes the subscript “ \emptyset ” is replaced by the superscript “o7” (easier to typeset).
- One chord that does not correspond to the chord tones (2:1 subsampling) of any modal scale is the diminished chord, denoted by a superscript “o” (e.g. C^o , comprising C–E \flat –G \flat –B $\flat\flat$, or C–E \flat –G \flat –A) The diminished chord is obtained from a half-diminished chord by simply further lowering the seventh of a half tone (one tone below the delta chord). The diminished chord is built by stacking three minor intervals on top of each other.

This means that the chords of the leadsheet can also be re-written in the same notation as in the course slides as follows:

- $C_{MI}^7 \rightarrow C-7$
- $B_{Maj}^{b7} \rightarrow B^b\Delta$
- $E_{Maj}^{b7} \rightarrow E^b\Delta$
- $A_{MI}^{7(b5)} = A_{MI}^{o7} \rightarrow A_{\emptyset}$
- $G_{MI} \rightarrow G-$
- $A_{MI}^{7(b5)(b7)} \rightarrow A^o$
- etc...

Assignment

A. Analysis of the leadsheet

Select one of the 16 available leadsheets, each corresponding to a well-known standard. The titles and numbering of the leadsheets are collected in a table at the end of this Section, and the leadsheets are all included in a zip file uploaded in Beep. A leadsheet, as mentioned in class, is a barebone description of a musical piece, consisting of a melodic sketch and a simplified chord progression, with few or no frills/embellishments. A leadsheet is the starting point for jazz performers or for composers, when they want to develop a version of an arrangement of that piece.

When you choose the leadsheet, take into account the level of complexity that I denoted in the table below, on a scale from 1 to 5. All the selected leadsheets contain some elements of complexity (change of reference scale, harmonic surprises, etc.). Make your choice based on the level of expertise/competence of your group.

The following can be done by simply **looking at the sequence of chords** on the leadsheet.

Annotate a printout of the leadsheet and add annotations as follows:

1. Identify, mark down (using colors), and annotate anything you can hear of the harmony. For example:
 - **Dominant V-I resolutions:** Mixolydian (dominant seventh) – Ionian (delta chord)
 - **Major II-V-I turnarounds:** Dorian (minor seventh) – Mixolydian (dominant seventh) – Ionian (delta chord)
 - **Minor II-V-I turnarounds:** Locrian (half-diminished) – Mixolydian (dominant seventh) – Dorian (minor seventh) or similar...
 - **Extended dominants** (see slide No. 94 in the harmony slideset): three or more dominant chords that progress in perfect-fifth root motion
 - **Secondary dominants**, if any and if you can hear them...
 - **Chord substitutions:** if you can identify any of them (subdominant, tritone, relative minor, etc.), mark them down along with the chords that have been replaced and name the substitution.
 - **Change of scale (harmonic surprise):** e.g. a major II-V-I (dorian-mixolydian-ionian) entails no change of scale, but if you replace the dorian (II) with a subdominant, this implies a change of scale. A tritone substitution also implies a change of scale, though it leaves the leading tones unchanged. An easy way to perform this check is to simply sing or play the scale and judge “if it fits” the chord progression.
2. Some leadsheet also includes some alternate chord progressions between parentheses. Comment on them (e.g. do they correspond to known chord substitutions?)

B – Analysis of a performance/arrangement

In the table at the end of this Section, you will find three links for each leadsheet, each corresponding to a different arrangement/performance of that particular piece. The links are ordered in growing order of complexity/richness. Pick the arrangement that you prefer (the one that matches your abilities) and identify and describe (again, to the best of your abilities) the differences between the performance you selected and the indications on the leadsheet. In particular, annotate:

- Newly added sections (intro, bridge...) with respect to the leadsheet
- Differences in the rhythmic structure with respect to the leadsheet
- Presence of harmonic changes or substitutions with respect to the leadsheet
- Presence of modulations (key/tonality) with respect to the leadsheet

Please write the description in a word file and refer to the leadsheet by measure number.

Grading scheme

The Homework Assignment will be graded based on the following grading scheme

	Complexity	Completeness	Correctness	Effort	Originality/ extra info
Rhythmic analysis	5%	14%	14%	12%	5%
Leadsheet analysis	2.5%	7%	7%	6%	2.5%
Perform. analysis	2.5%	7%	7%	6%	2.5%

The maximum grade attainable is 30, but if the HWA is turned in by **Thursday Dec 9** (before midnight, see instructions on WeBeep) you will get a bonus of 3 points. If you turn it in after that date but before HWA grades are published (end of Jan 2021), you will get the full grade without bonus. If you turn it in after that date, you will get a penalty of 5 points. I highly recommend turning both HWAs by the deadline in order to optimize effort and keep the pace.

Table of links

No.	leadsheet difficulty	Title	Link 1 (easier)	Link 2 (medium)	Link 3 (harder)
1	3	How high the moon	https://youtu.be/T8Ji4uG4cac	https://youtu.be/HcNRf66TXHQ	https://youtu.be/UM8ZmcPAmXU
2	3	M*A*S*H (Suicide is painless)	https://youtu.be/e2ZaFg40vqY?list=PLbybvvgGlijtb7b3Kj6e6k3F4zBkKQ6tyD	https://youtu.be/b5y2fxomZyI	https://youtu.be/ECtNyyLEW7E
3	3	Have You Met Miss Jones	https://youtu.be/2G8UTMtY0JM	https://youtu.be/s76aFlmPhzw	https://youtu.be/G3jtb4G-6HI
4	3	I'm Through with Love	https://youtu.be/9mK_BXmhiyM	https://youtu.be/pi2Pvg3TUDE	https://youtube/Ahh9FqEq- M
5	3	Polkadots and Moonbeams	https://youtu.be/mJOUAcrS0_c	https://youtu.be/GD2l7VwQpbg	https://youtu.be/4NTxWQfMSSA
6	4	Ribbon in the Sky	https://youtu.be/Nd4YHyReUHM	https://youtu.be/xMIjsDh0Zw8	https://youtu.be/UuJs54vgE2k
7	4	Skylark	https://youtu.be/oDnStrx4g9M	https://youtu.be/Si9MCBzrfyk	https://youtu.be/x_ZPceluIsY
8	4	Someday my Prince will Come	https://youtu.be/-aiwpxtszwk	https://youtu.be/bLMgByykpLs	https://youtu.be/5Wd--YgSCfA
9	4	I Can't Help It	https://youtu.be/ocmxBV1p1TA	https://youtu.be/re3MOe1SBOs	https://youtu.be/qSl6rMPZIGU
10	4	The Days of Wine and Roses	https://youtu.be/AgVUGzrzJ20	https://youtu.be/JadIhlihTFw	https://youtu.be/FURRac9rSUQ
11	4	You are the sunshine of my heart	https://youtu.be/SbenaOqv4yQ	https://youtu.be/j6lDPZ6CDLU	https://youtu.be/YEuX7gle0vA
12	4	This Masquerade	https://youtu.be/mAFC3f_bjfg	https://youtu.be/sgl1hQmjITY	https://youtu.be/OxeQP058epE
13	4	The Christmas Song	https://youtu.be/BcNu6yEDWfU	https://youtu.be/L70jsue-wEg	https://youtu.be/o9CusMKhoqk
14	5	Peace	https://youtu.be/9FAX_tf_4pI	https://youtu.be/pmtYs_k8W0E	https://youtu.be/B0HkVeTlzUA
15	5	Waltz for Debby	https://youtu.be/d60tS3nG67s	https://youtu.be/dH3GSrCmzC8	https://youtu.be/O6pVm6qoBbU
16	5	Giant Steps	https://youtu.be/30FTr6G53VU	https://youtu.be/PukuQPUKfyU	https://youtu.be/1-wglNPGzrQ

Notice that the links might point to versions that have been performed in a different key from that of the leadsheet.