The M (Maqam/Makam - Mode) App
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Abstract: Byzantine modes, Turkish makams, Arabic maqams and Greek folk modes are four modal music systems having a very similar build and expression. These music traditions interacted, in various ways, with each other's history and musical heritage, development and essence.

The M app is a glossary which guides you through basic characteristics, similarities and differences of these four official music theory systems, as they are taught today. One can use this app for didactic purposes, in order to have a clear image of each maqam/makam – mode, its characteristics and the way they sound, based on each tradition’s unique character. M app is not meant to replace a tuner but can be a great tool that will help you decode your listening and/or performance.

It contains many of the most popular maqams/makams, the Byzantine modes and the Greek folk modes individually but also in juxtaposition, based on the nomenclature or intervallic structure. Even though it does not include any historical background on how these traditions ended up using these systems, it cites all the bibliographical references used for further research.

Keywords: Maqam, Makam, Echos, Modality, Didactics of Byzantine and Oriental Music.

Introduction

The Maqam/Makam - Mode app is a mobile and tablet application which provides basic characteristics of four official music theory systems, as they are taught today.¹ A tool that guides you through Turkish Makam (pl. Makamlar), Arabic Maqam (pl. Maqamaat), Byzantine Modes (Echoi) and Greek Folk Modes (Laikoi Dhromoi).

¹ As they are taught in Universities or music schools and as they are presented in reliable sources such as books, articles and/or online.
These four traditions are strongly based on rules of melodic structure and development. Although they differ from one another in theory, intervallic subdivisions and tuning systems, they share a mutual idea of developing a musical composition as well as scale-names and scale categorization. Maqam/Makam - Mode app does not give any historical background on how or why these four traditions ended up using these systems but for this presentation it is necessary to briefly describe the common central axis around which they develop.

Because these civilizations have flourished in neighboring areas, it is widely accepted that they share common history that spans across many centuries. The coexistence of these civilizations was of course the cause of major influences between them. Focusing on music - as being one of the main pillars of any tradition/culture/civilization, we observe here many common characteristics that build a general frame of modality (mainly melodic), expressed through microtonal music theory systems. An exception to this are Greek Folk modes, a system which became equally tempered. At the same time there are many differences in important details which are the attributes of those four traditions. It is those differences that form each tradition’s unique character.

Maqam/Makam – Mode app presents the basic characteristics of 25 Turkish Makams, 24 Arabic Maqams, the 8 Byzantine modes (along with some main branches of them) and 14 Greek folk modes. Apart from each mode that the user can check separately, it gives the option of juxtaposing modes which belong in different traditions but share the same name or intervallic structure.

This proposal is based on the trial version of the app. The trial version’s mode selections might be limited but one can fully understand its functions. The publication of the full version is scheduled for 2020.² Maqam/Makam - Mode app is very easy to use. There is an optional introduction for every step the user might want to take, which explains the features of M app, how they appear on the screen and the way that they can be accessed and used, as well as the characteristics of each of the four theory systems.

**Opening the Maqam/Makam – Mode APP**

The first page (Fig. 1) of the application gives two options to the user. On the right there is the option of the general introduction. The information given in there includes a description of how the application works, a list of the four music theory systems and the details that the user will receive on each mode separately. It explains

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the notations used (staff notation and alphabetical notation) as well as the features on makam selection page and the information on the main page of the modes.

Figure 1
The first page of the Maqam/Makam – Mode APP

The page that is used as an example in the general introduction is the first page of makam Rast of the Turkish makam tradition (Fig. 2). All the characteristics explained in this page delineate the character of each mode and therefore define each mode’s name.
Figure 2

Makam Rast in Turkish tradition

In the center there is the main set of notes that form this makam, on staff notation (No 9); below the notes there are brackets that designate the main stem structure of the Makam (No 10) meaning the tetrachords and pentachords that form the makam. Above the notes (No 8) there is the intervallic structure of the makam expressed by the subdivisions of the corresponding theory system. On the upper left side there is the name of the makam (No 12) - as it is written in English and as it is written in the language of origin. In the upper middle part of the screen, button No 1 gives the option of listening to the selected makam. The next button to the right (No 2) is the selection of page – in case a mode combines two (or sometimes three) different main structures. Button No 3 is the mode extension information, meaning how the makam develops below the Root and above the Octave. Button No 4 is the Juxtaposition of the relative or homonym modes/makams. Button No 5 gives information about the accidentals used in each theory system and button No 6 takes you to the mode selection page. Either the users click on “next” or had skipped the general

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introduction at the opening page, they would find themselves at the “selection” page (Fig. 3).

The “selection” page lists the four theory systems and gives two options for each tradition which are “view” and “info”. In “info” one can be informed about the basic characteristics of the theory system selected. That will help the user in decoding the information given in each makam page separately. By clicking the “view” button the user is transferred to the mode selection page. Now in detail, by clicking “view” in Turkish Tradition we are transferred on the page of Turkish makam selection.

**Turkish Makam selection pages**

Before going further into explaining how each mode selection page works, it is important to determine from which time period onwards the Turkish music system is considered official as well as its basic characteristics. The official theory system of
Turkish Classical music is the Arel – Ezgi (AE) system. It was formed around 1930 and was recognized and adopted as the official system in the 1950s.\(^4\)

**Turkish and Arabic** musical cultures as they are defined by current borders, develop through maqam art music. The word Makam originates from the Arabic word Maqam (مقام) meaning place, location or position.\(^5\) Maqam/Makam is a system of melodic types, melodic formulas, intervallic structures, figures and patterns (microstructure). When these basic tools are combined, they form a set of rules for melodic development, improvisation and/or fixed composition (macrostructure).

Turkish Makam Theory names at least 270 modes (makams) which are categorized into families. In practice there are 40 to 50 makams in regular use. The **Turkish music system** uses staff notation. It divides the octave into 53 parts called komma(s) (TR. pl. kommalar), the whole step equals to 9 kommas, the small semitone equals to 4 kommas and the big semitone to 5 kommas. The accidentals that are used are for intervals of 1, 4, 5, 8 and 9 kommas (sharps and flats).\(^6\)

Selecting “view” from Turkish Makams and then Rast makam, brings the user to Fig. 4.\(^7\) There, one can check the main characteristics of Rast makam: the Root, the dominant, the leading tone and the direction of its melodic development. Rast makam consists of a pentachord – which is the lower part of the main makam structure, and a tetrachord – which is the higher part.

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\(^6\) [https://www.notlar.net/system_of_music_theory.htm](https://www.notlar.net/system_of_music_theory.htm) (16/8/2019).

\(^7\) Pages shown in this article are from the trial version and that is why there is no selection of “listening”. For the same reason only three makam selections are available.
As mentioned before, 9 kommas equal to a whole step; therefore G to a is a whole step, a to b—one komma flat is a “small step”, b—one komma flat to c is a big semitone and c to d is another whole step.

This sequence of intervals expressed with the numbers 9 – 8 – 5 – 9 always represents the Rast pentachord in the Turkish tradition. The intervals remain the same for the Rast tetrachord 9 – 8 – 5. In general, a pentachord has the intervals of the homonym tetrachord plus a whole step at the top.

The round buttons on the upper right corner – as mentioned before – give extra information about the makam we’ve selected. The first one on the left informs us of how many basic structures this makam uses. In this case Makam Rast has two. The one that consists of a Rast pentachord and a Rast tetrachord, and the second one which consists of a Rast pentachord and a Buselik tetrachord (Fig. 5).
The second round button is the extension of the makam (Fig. 6). In this page we get information on how Rast makam develops below the Root and above the octave. So makam Rast has a Rast tetrachord below the Root and might have a Rast or a Buselik pentachord above its Octave.
The information button (i) reminds the user of the accidentals used in each theory system, by popping up a window. These are the Turkish music theory’s accidentals (Fig. 7).
The fourth button from the left which is marked with the logo of the application, compares the selected makam, which is makam Rast of Turkish tradition, to the modes of the other three systems that have the same name or intervallic structure (Fig. 8). Here we have TR Rast, AR Rast, Rast of the Greek folk modes and Plagal of the Fourth mode from Byzantine music. Plagal of the Fourth has the same intervallic sequence with Turkish Rast, meaning whole step, smaller step, big semitone and whole step – followed by a whole step – small step and a big semitone. In Byzantine theory the correspondent intervals are called larger tone, smaller tone, smallest tone.
Figure 8
Makam Rast (Turkish), Maqam Rast (Arab), Mode Rast (Greek) and Plagal of the Fourth Mode (Byzantine) at one glance

Arabic Maqam selection pages

By selecting the round button “home”, the user goes back to the “selection” page.

The Arabic music until the beginning of the 20th century was expressed through a variety of theory system versions which is easy for somebody to grasp considering the great diversity of the Arab countries (from Morocco to Lebanon, Syria and Iraq). In an attempt to unify these countries’ music theory system under the title of “Arabic music” and “Arabic music theory”, the official System of 24 Quarter Tones was created at the Cairo Conference in 1932. Arabic Makam Theory names 90-110 modes (maqams) which are categorized into families. Arabic music system uses staff notation and it divides the octave into 24 quarter tones. The whole step equals to 4
quarter tones and the semitone 2 quarter tones. It uses accidentals for all quarter tones of a whole step (sharps and flats). By taking two steps, “VIEW” from Arabic Maqams and then Rast, the user can see the structure of Arabic Rast.

Figure 9
Arabic Maqam Rast, structure 1

As shown in Fig. 9, maqam Rast consists of two disjunct Rast tetrachords, meaning that they are separated by a whole step. In the second page there is the second possible structure of Arabic Rast makam which is a Rast tetrachord – whole step – and a Nahawand tetrachord (Fig. 10).

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The use of these two versions completes the Arabic Rast maqam character.

Below are the extension of the maqam (Fig. 11), the accidentals used in the 24 quarter tone system (Fig. 12) and the juxtaposition page (Fig. 8), which is the same as in Turkish Rast makam.
Figure 11
Arabic Maqam Rast, extensions
Byzantine Mode selection pages

Back to “selection” page again, the user can click on Byzantine modes “info”. The system recognized and adopted as official for Byzantine music was completed in 1883 by the Musical Commission of the Ecumenical Patriarchate and was first published in 1888. Byzantine music in both ecclesiastic and secular music uses Octaechia. Byzantine “Octaechia” or “Oktoechos” (Ὀκταηχία, ὸκτώηχος), etymologically derived from the Greek words “Okto” (όκτω) which means eight, and the word “echos” (ἠχος) meaning sound or mode, is a system of eight modes. Each one of these eight modes includes various branches of their main structure. These different variations are based mainly on the musical texture of a composition, i.e. the ratio between the number of tones per syllable.

The Byzantine music system is not staff notation based, but a neumatic system. The neumes that constitute this system denote no specific pitch of their own. They are relative to each other and are defined by the initial given tone (signature) in the
beginning of a text or a phrase. The Byzantine neumatic system is called “Parasemantike” (παρασημαντική). The theory divides the octave into 72 parts called moria, the whole step equals to twelve (12) moria and the semitone to six (6) moria. The accidentals that are used are for intervals of 2, 4, 6, 8, 10 and 12 moria (sharps and flats). This APP transcribes BM modes (“echoi” – ἤχοι) to staff notation for those not familiar with the neumatic system (“Parasemantike” - παρασημαντική) and also for making the comparison of the four systems easier.9

In Byzantine music selection page there are three rows of buttons. The eight modes can be selected from the second and the third row. On the top row there are four selections that give main characteristics for each mode that is selected (Fig. 13).

Figure 13
First Byzantine Mode, with four structures of internal organization

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The First Byzantine mode if transferred on staff notation, consists of this set of notes which can be organized in one of the four possible main structures (tetrachords and pentachords). On top of the notes there are the corresponding Byzantine signatures for each melodic scale degree.

The second page of the First mode shows the descending version of the mode (Fig. 14).

Figure 14
First Byzantine Mode, descending scale

The extension of the First mode gives a tetrachord or a pentachord below the Root and a tetrachord above the Octave (Fig. 15). In Fig. 16, the accidentals used in Byzantine music texts are shown in the second and the third column, along with their equivalent sharps and flats, in the 4th and 5th columns, in order to transfer Byzantine music to staff notation.
Figure 15
First Byzantine Mode, extensions
As noted, the top row of buttons in Byzantine mode selection page refers to each mode selected. For example if the user selects the first mode, he/she can check the intonation formula of the selected mode, its dominant tones, its possible attractions and its cadences.

In these three systems mentioned before, all notes except the Root and the Dominant tones, are frequency sensitive to the direction and development of the melody. It is expected that the “weaker” notes will be attracted by the “stronger” ones, in order to emphasize them. These possible attractions are very important and although we cannot precisely determine their frequency, their performance is of great importance. On that note, the sharps and flats that are used do not specify an absolute frequency, but rather are an “area” of a note. For these notes and intervals (that are created) the performer should not follow the exact subdivisions of theory but think of them as a frame inside which he/she can carefully move according to the respective oral tradition, in order to create the desirable result.
Greek Folk Mode selection pages

Although there is no other reference in this APP about Greek traditional music, it should be mentioned that it uses a microtonal system, which can be explained through Byzantine music theory. That is the reason why there is no separate section about Greek traditional music in this app.

**Greek folk** music is a branch (an evolution) of Greek traditional music; a combination of Byzantine modes, Turkish makam and Western classical music. It is the only one from the four systems mentioned in this app, that is not microtonal. It is an equal tempered music system with harmony comping, using scales called “Dhromoi” - “modes” (lit. meaning roads, ways) and it uses staff notation, along with the tuning and accidentals of the European equally tempered system.

Although harmony is very important for this music, melodic movement as well as other maqam characteristics are of greater importance. Theory names 13-16 modes (dhromoi).

The Greek Folk modes system was formed during the 20th century. Having its roots in Piraeotiko Rembetiko it developed into Folk (Laiki) music through the work (performances, teachings and recordings) of some well-known bouzouki players mainly after 1946. Folk (Laiki) music can also be defined as the popular music of that time. This theory system is received, preserved and transmitted orally through original compositions of bouzouki players between the decades of 1930s – 70s. It is only after 1975 that there are valuable attempts to put on paper the general frame of the rules and characteristics of the Greek folk music style. Since there is no official system today, there are some differences in theory from one source to another, and few idiomatic musical expressions that cannot fit into general rules.11

In the Greek modes of the M APP, one can select mode Rast (Fig. 17).

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10 Rembetiko music that flourished in Piraeus after 1922 through bouzouki, as opposed to Smyrneiko Rembetiko that used violin, santur, kanun and oud.

Greek folk mode Rast has the same intervallic structure with the major scale of the European classical music. Since it uses the equal tempered scale, its intervals are tones or semitones. To avoid any confusion, the names that are used in Greek folk tetrachords and pentachords are shown in *quotation marks* (marked with an asterisk). The correspondent European classical music system terminology is shown *in parentheses*.

Exactly as in Turkish makam and Arabic maqam selection pages, Greek mode pages give information about the possible stem structure of the mode (tetrachords and pentachords), the Root, its dominant note(s), reminder of the accidentals used and the option of juxtaposing the selected mode with the makams and Byzantine mode with which the selected mode shares the same name and/or the same/similar intervallic structure. The main difference between maqams/makams and Greek modes is the use of the extension button (“ext”). As mentioned, the “ext” button in Turkish and Arabic pages provided the user with information about the tetrachords and pentachords that are formed below the Root and above the Octave of the selected maqam/makam – mode.
In Greek folk modes, the same button gives information about the harmony comping.

Harmony is very important for the character of each mode, for example in Rast mode (Fig. 18) and in Major scale (mode) (Fig. 19) the Main and Secondary chords are different, although their intervallic structure is the same.

Figure 18
Greek Folk Mode Rast: harmonic structures
Conclusion

From a more general point of view, as opposed to European classical music where the set of notes within an octave defines the quality (and the name) of the scale, in Byzantine modes, Arabic and Turkish maqam and in Greek folk modes the structure of the main stem of the mode can be approached through multiple combinations of tetrachords and pentachords. The concept of the octave does exist but it is not of such great importance.

There are many common characteristics that build a general frame of modality (mainly melodic) expressed through these microtonal and equal tempered music theory systems. At the same time, there are many differences in important details which are the attributes of those four traditions that form each one’s unique character, depending on the cultural origin of the music performance. Therefore, there is an inability of theoretically describing in full all these vital details of performance. These small but important details can only be understood, analyzed, and performed through careful and in-depth listening. No set of rules or descriptions alone can produce the desirable “sound”.

In general, the creation of a theoretical framework like Maqam/Makam – Mode app, for the traditions mentioned above, can only help for didactic purposes, by giving the main pole around which the performer must move.
Reference List


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Biography: Anastassia Zachariadou got in 1998 her flute diploma in Thessaloniki. She studied "polyphonic flute and acoustics" with Isvan Matuz at Corvin University (Budapest). At the same time she expands her music studies in Greek and Arabic traditional music while studying Kanun in Greece and U.S. She graduates in 2003 from Berklee College of Music - Department of Music Performance / Flute. In Boston, Anastassia also apprenticed next to Emilio Lyons (2002-2007) “repairing and manufacturing woodwinds”. In the U.S. she taught flute and Kanun as well as participated in touring concerts and recordings. In 2014 she completed her postgraduate studies at Technical University of Istanbul, Department of Kanun performance with Halil Karaduman. From 2009 -2017 she taught Kanun at the University of Macedonia and to this day she has collaborated with renowned musicians from the Greek, Turkish and Egyptian traditional music scene. Since 2016 she is a PhD candidate in the Department of Music Studies at the Aristotle University of Thessaloniki. Bahari/ Flamenco Arabe trio is founded and they make their debut in 2017 where she sings, plays flute and qanun. In September 2019 she founded the company "The Music Fabrica" which specializes in woodwind repairs, courses/ workshops, music education software development and sound recordings. In 2019 she teaches Turkish and Arabic Makam at the Aristotle University of Thessaloniki and in February 2020 she releases (for iOs) the Maqam/Makam – Mode APP (M-APP) (the Android version has been published in April 2020).