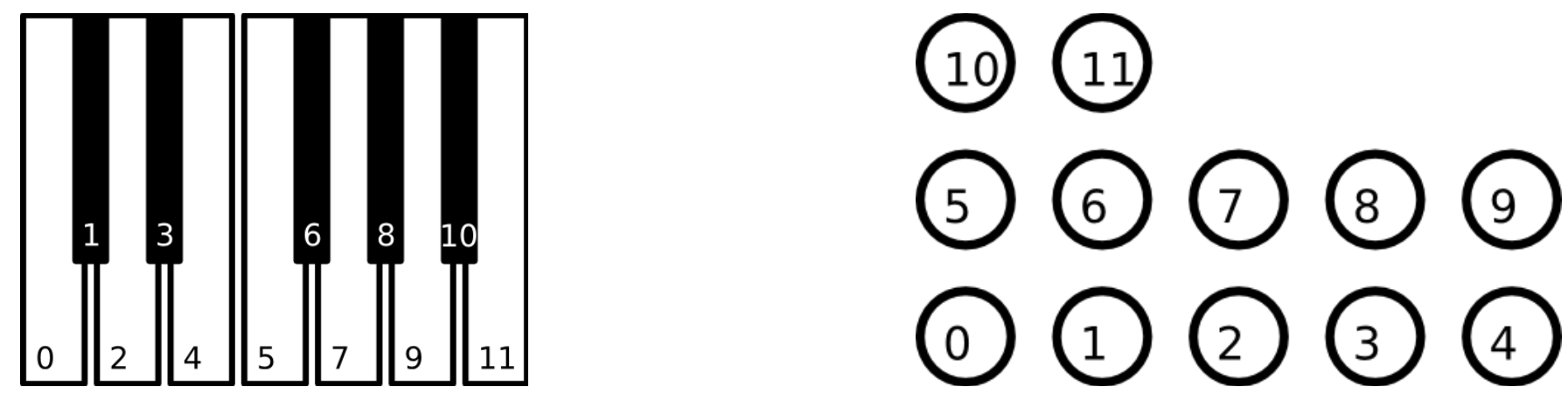


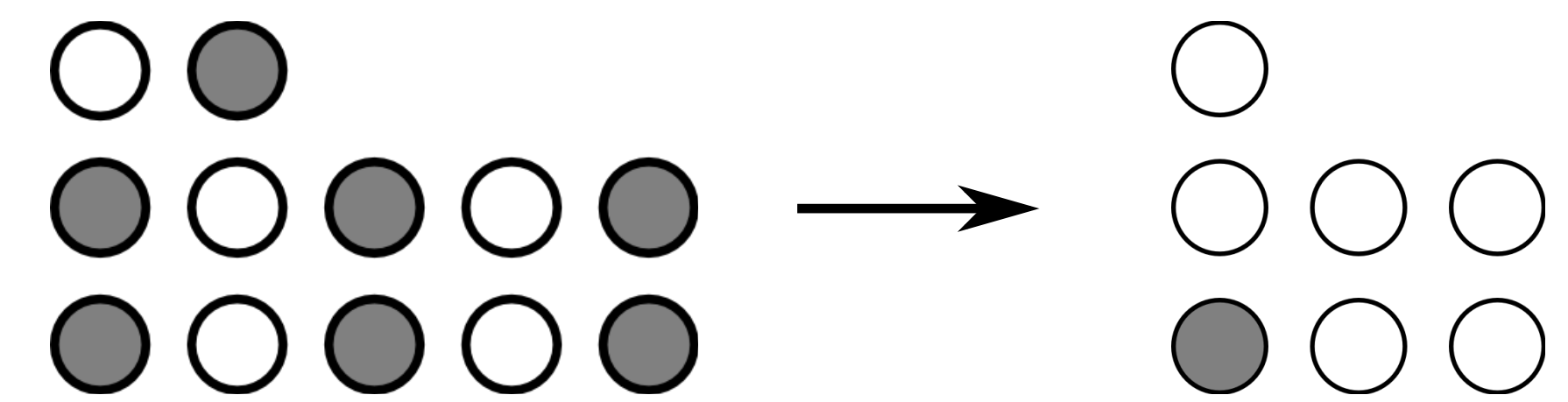
Plane Tessellation with Musical Scale Tiles and Bidimensional Automatic Composition

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The arrangement of the chromatic-scale notes in instruments tuned in fourths looks like an L-shaped tile.

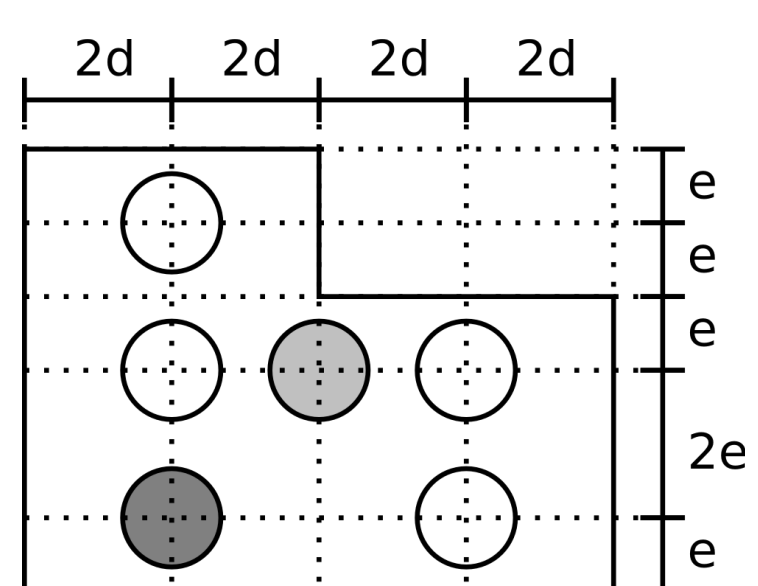


And, with some note-shifts, other scales behave like that as well.

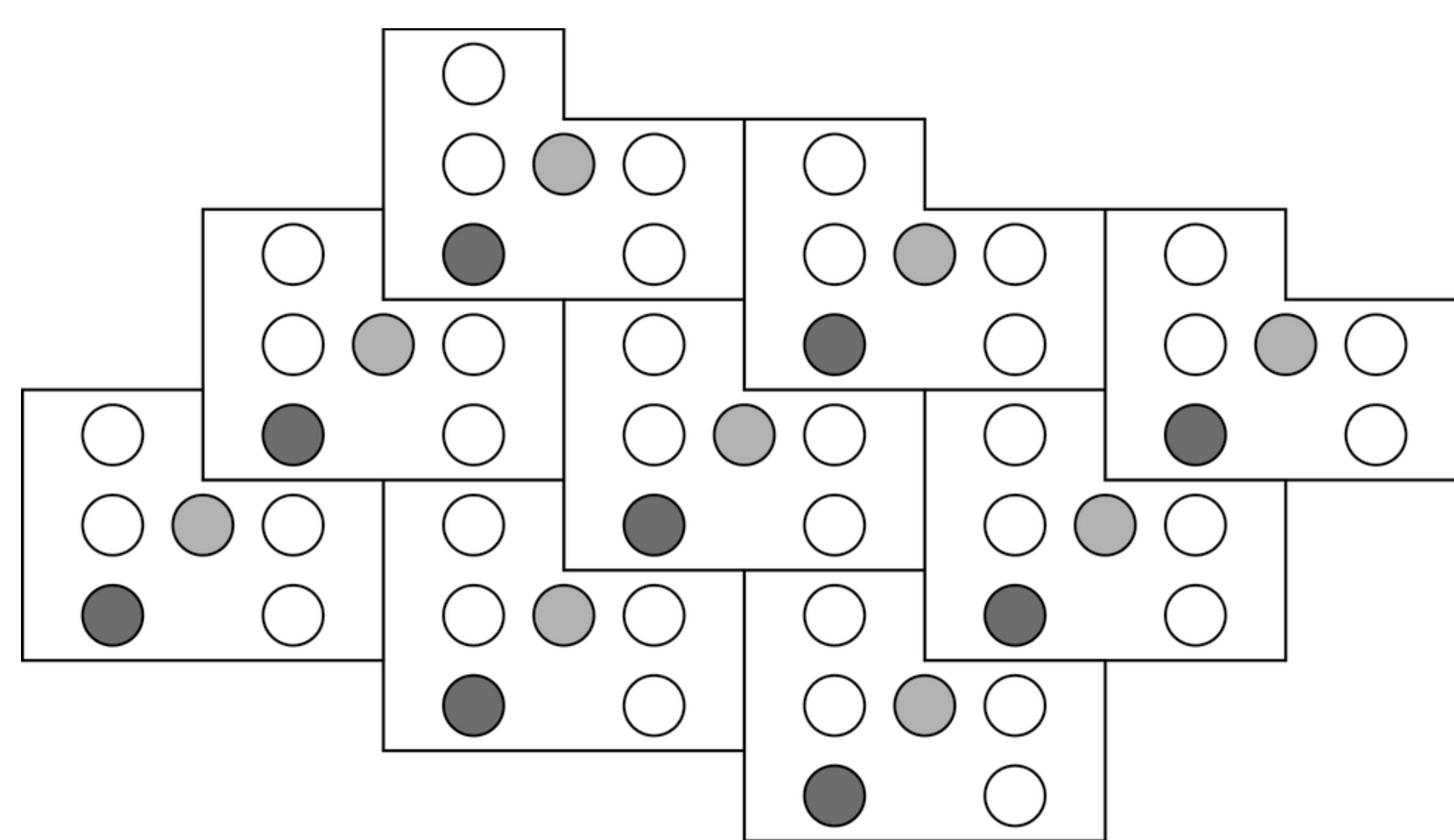


We present a method for arranging the notes of certain musical scales (pentatonic, heptatonic, Blues Minor and Blues Major) on the plane, by using a plane tessellation with especially designed musical scale tiles. We also discuss the use of the idea as a design-guideline for bidimensional automatic composition algorithms.

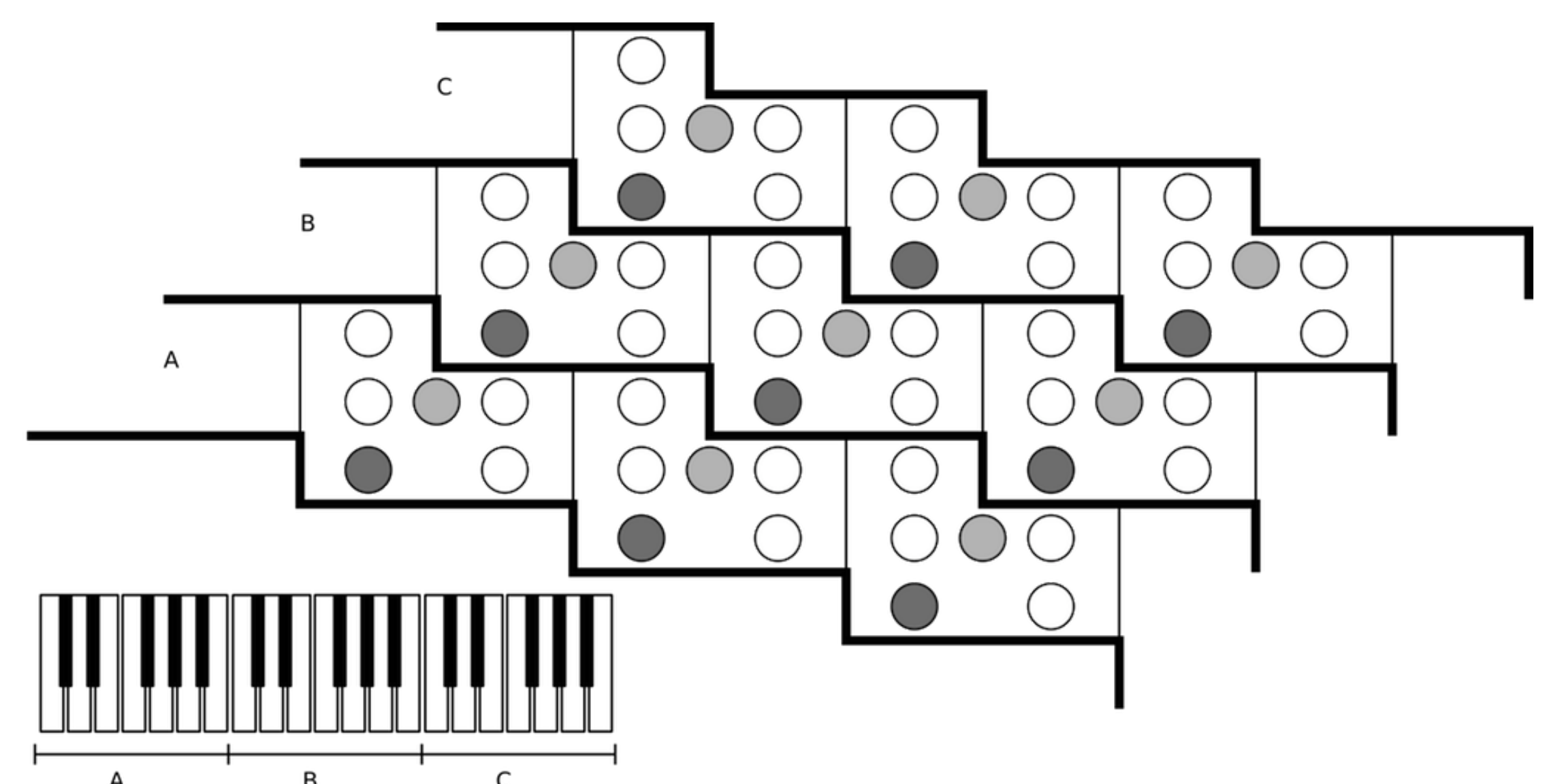
This is the Blues Minor Scale tile. Remember that such scale has 6 notes: root, minor third, perfect fourth, augmented fourth (blue note), perfect fifth and minor seventh.



The corresponding plane tessellation would be like this. Notice that columns having blue notes contain no other notes.

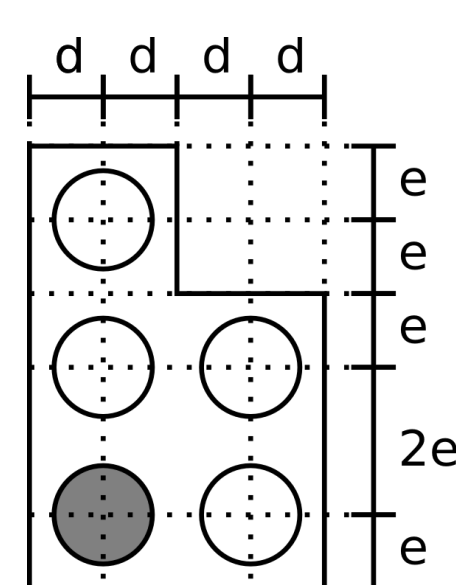


This figure shows the octave relation in the Blues Minor Scale tiling. Tiles in the same band (A, B, C, etc) are such that the fundamental frequencies associated with points having the same relative position in the corresponding tile are equal.

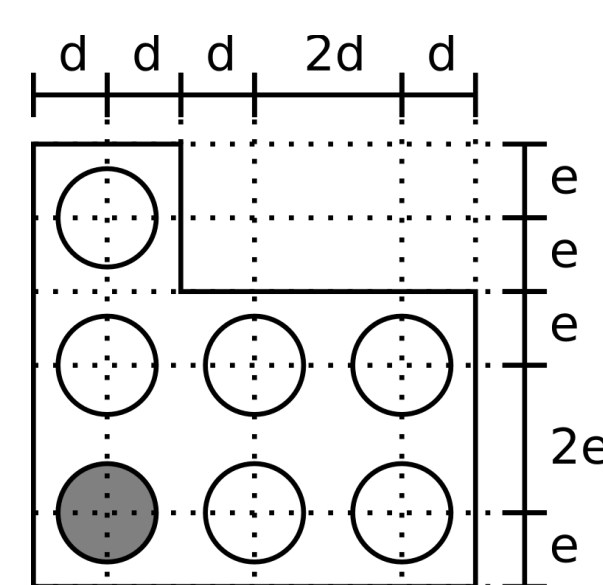


For the other mentioned scales, the tiling procedure is analogous. Tiles are as shown here.

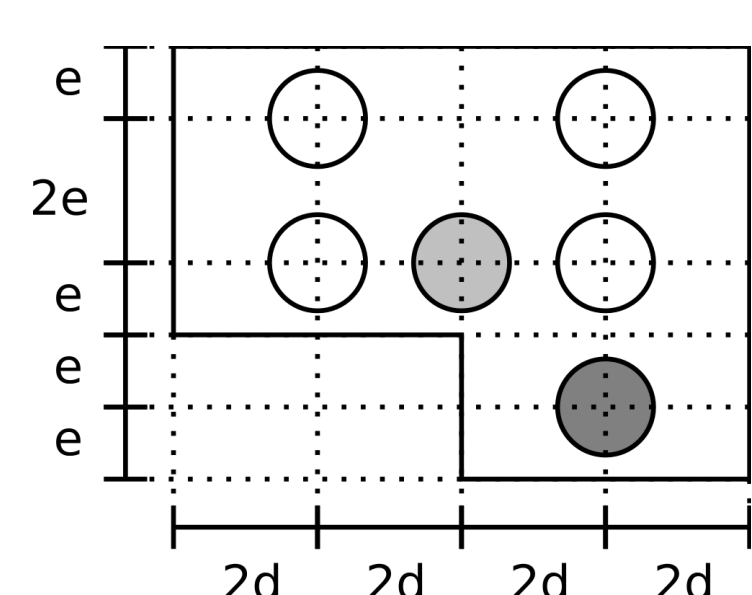
Pentatonic Scales



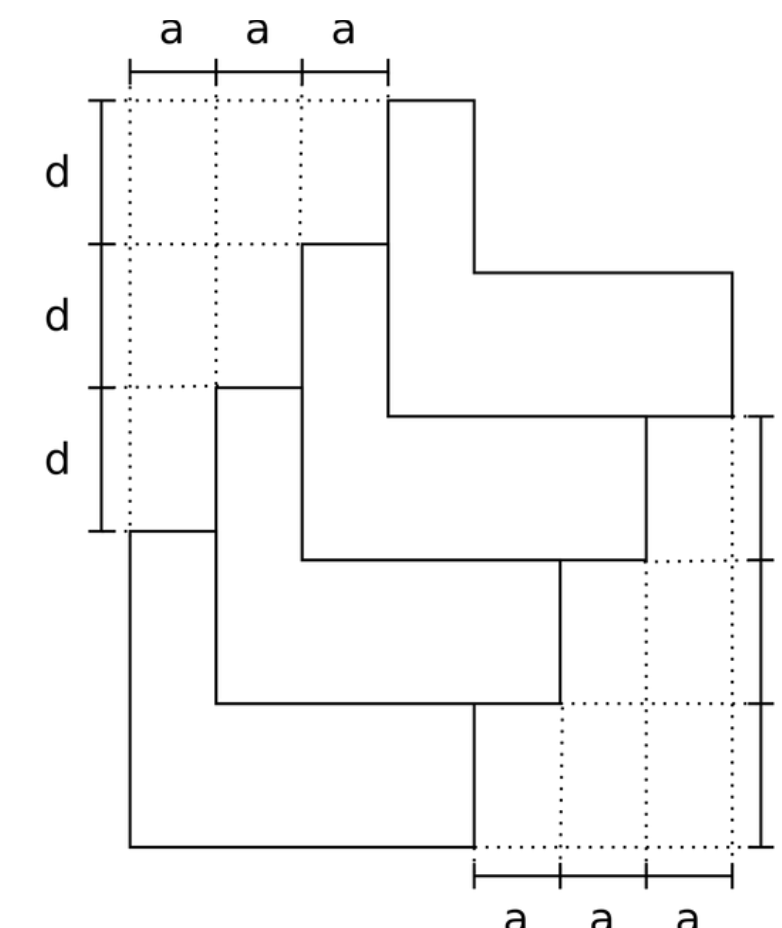
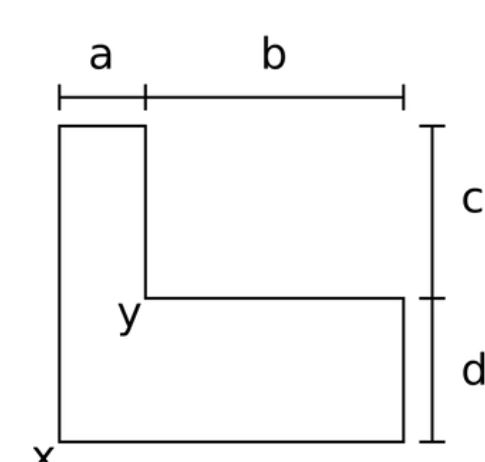
Heptatonic Scales



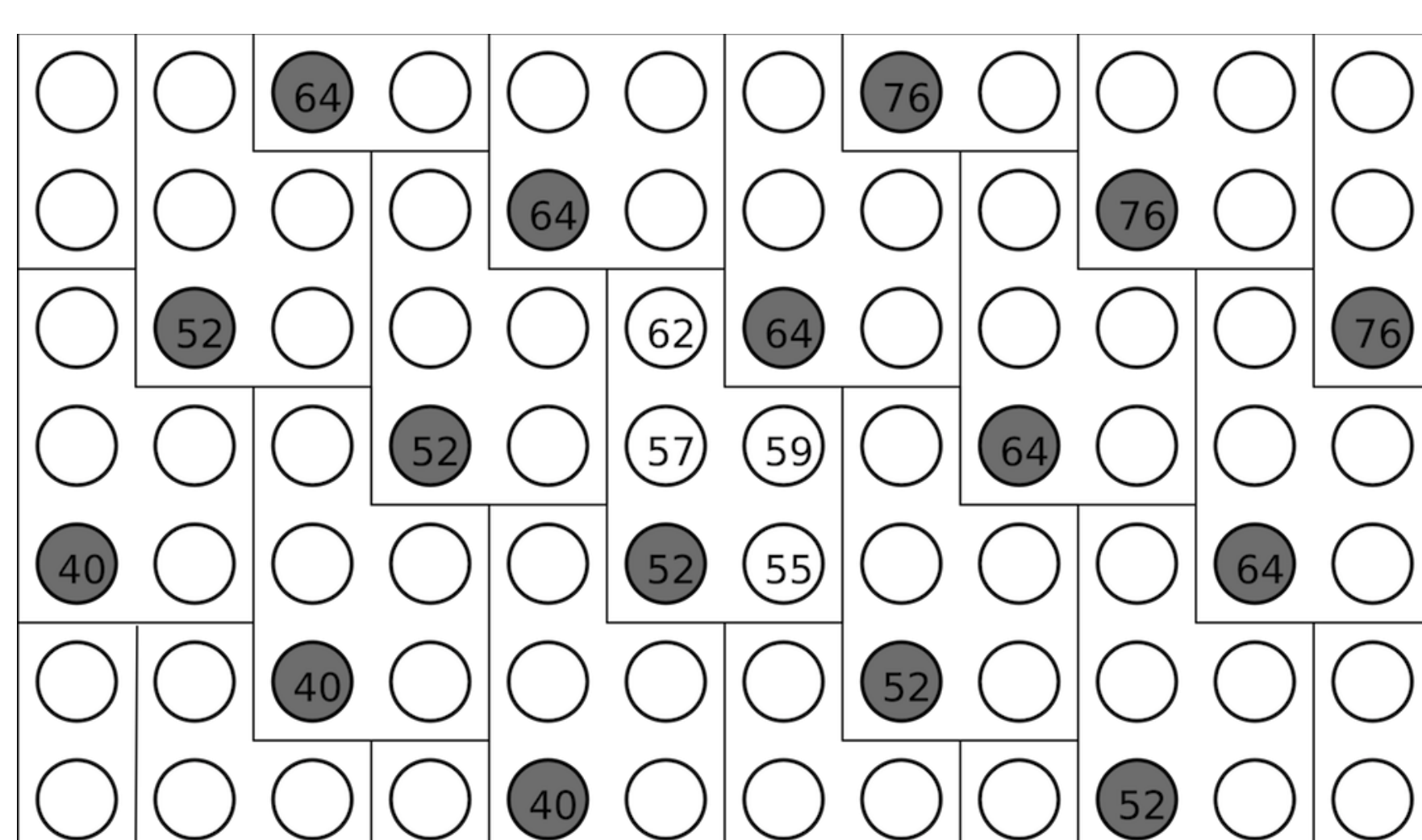
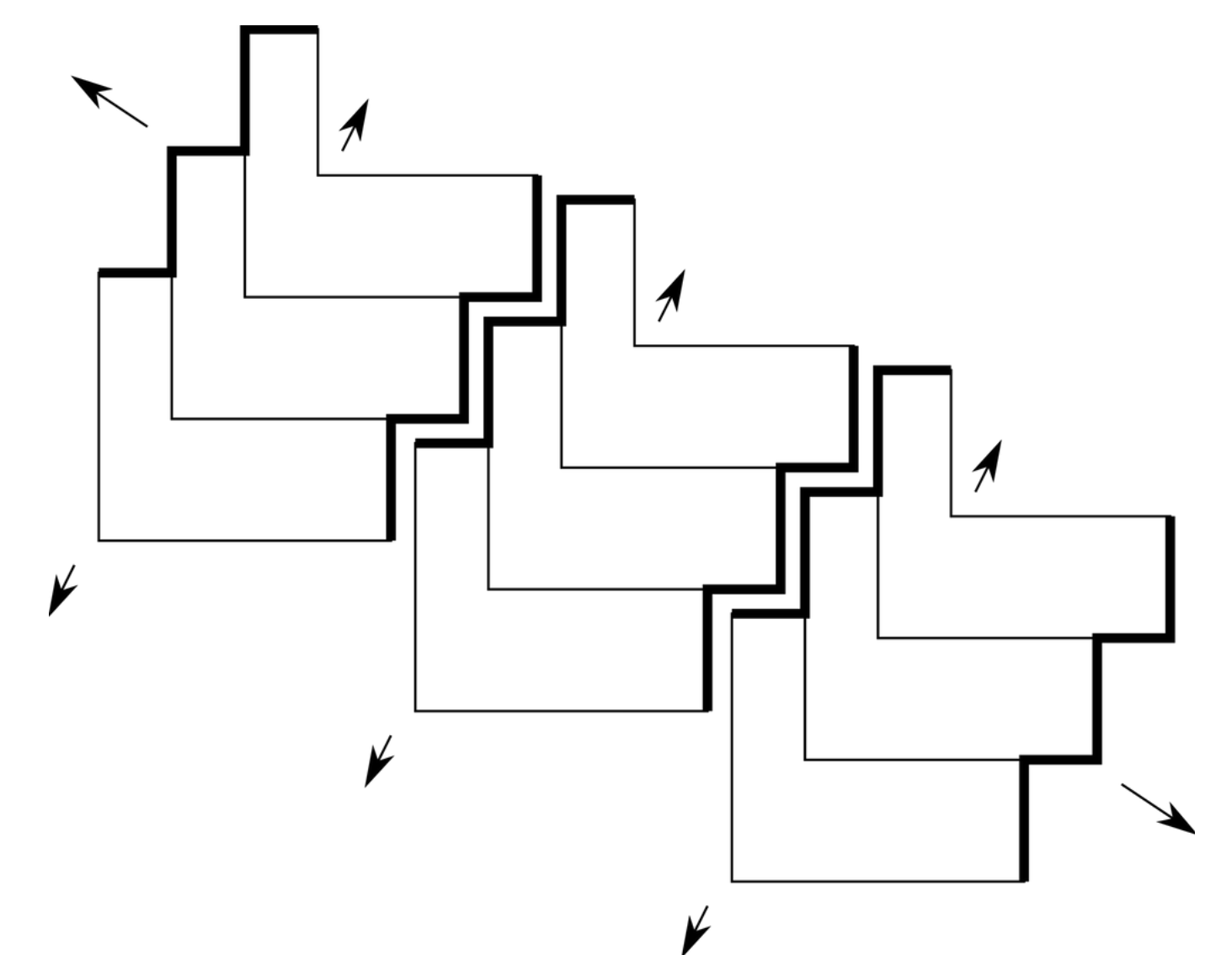
Blues Major Scale



All presented musical scale tiles have a common L-like shape, and the corresponding tessellation is such that corners x and y (as shown in this figure) meet.



It is easy to see that a plane tessellation with L-like tiles as shown previously is possible.



This figure represents a subset of the Minor Pentatonic Scale tessellation, in the key of E. Numbers represent MIDI-note codes. We believe the presented method of displaying musical scales in the plane is not only useful for multi-touch devices, but also when designing automatic composition algorithms whose result is for being played in instruments tuned in fourths. The guitarist, for example, besides thinking about the scale on which the improvisation is done, also uses more the notes which are at a short distance away from the current note.