Progressive Music Examples

prepared for a workshop at

Scratch@MIT

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Scratch is developed by the Lifelong Kindergarten Group at the MIT Media Lab. See http://scratch.mit.edu.
Performamatics is an NSF-funded interdisciplinary project at UMass Lowell. See http://performamatics.org.

Program Source Locations

http://scratch.mit.edu/users/performamatics

Gallery: "Scratch@MIT, August 13, 2010"
http://scratch.mit.edu/galleries/view/90913

Table of Examples

Important Note

The timing of virtually all music scripts can be improved by setting Turbo Speed. To do this, select:

Edit ➔ Set Single Stepping... ➔ Turbo Speed

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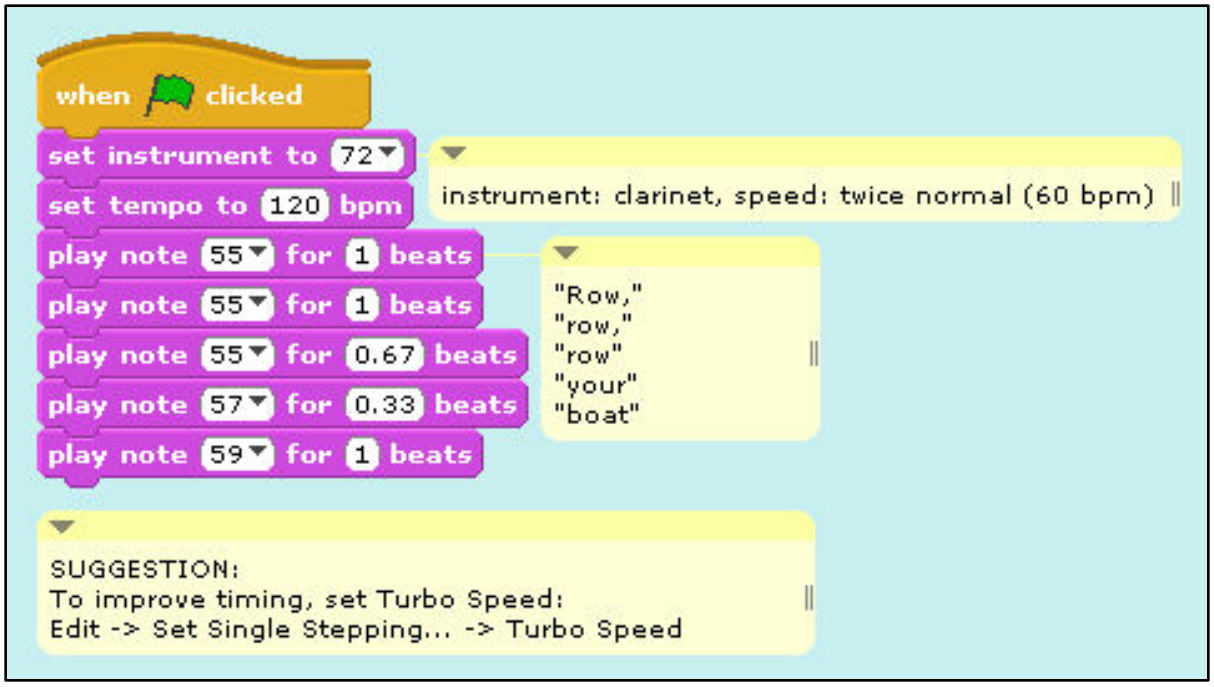
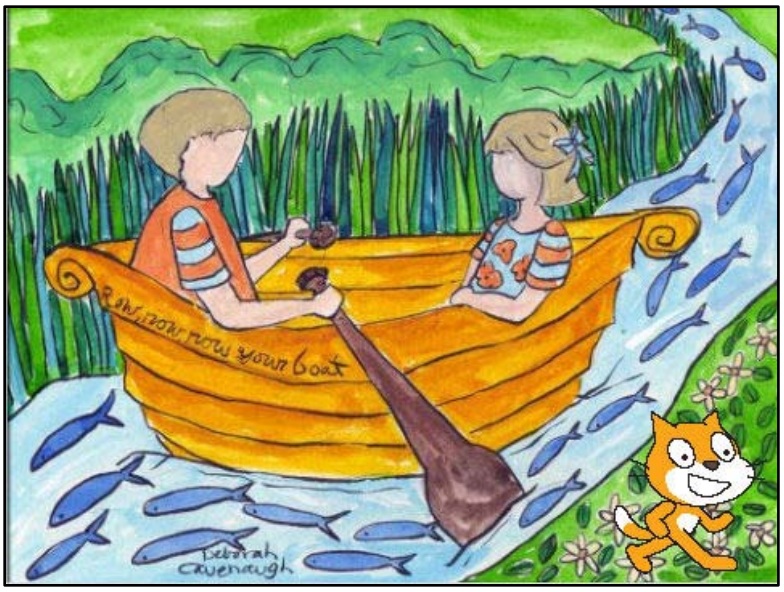
Progressive Music Examples

No. 1: Playing Notes

Single Script



Output Window



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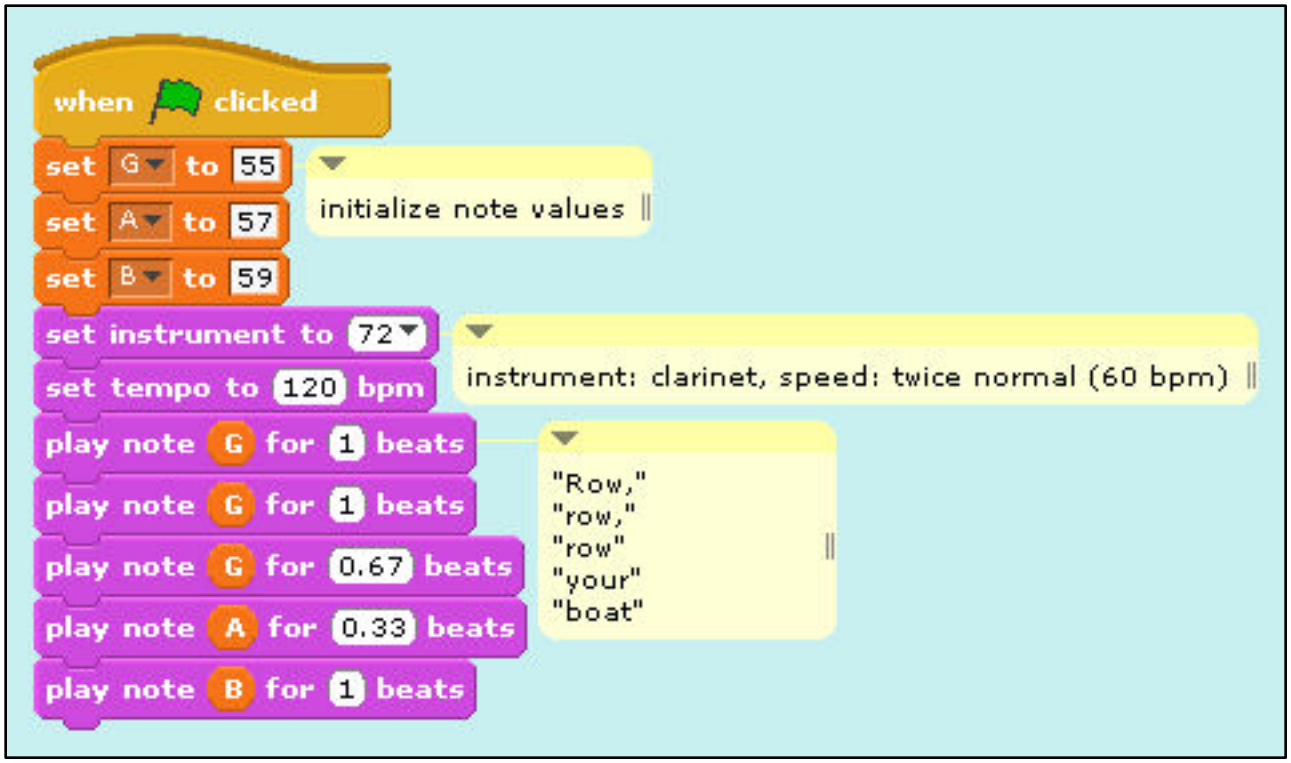
Progressive Music Examples

No. 2: Playing Notes Using Variables

Single Script



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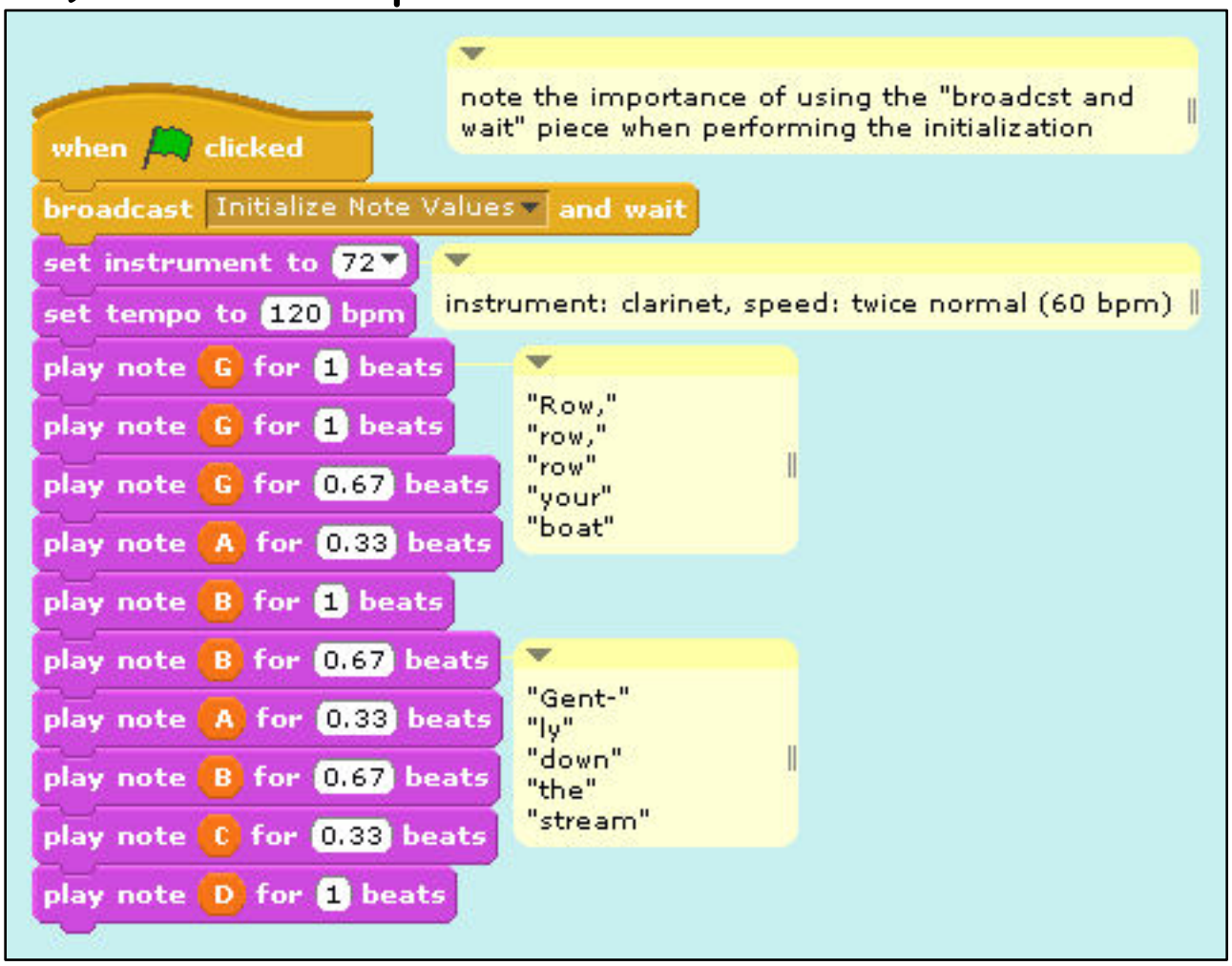
Progressive Music Examples

No. 3: Separating Initialization

Two Scripts

(3a) **Main** Script

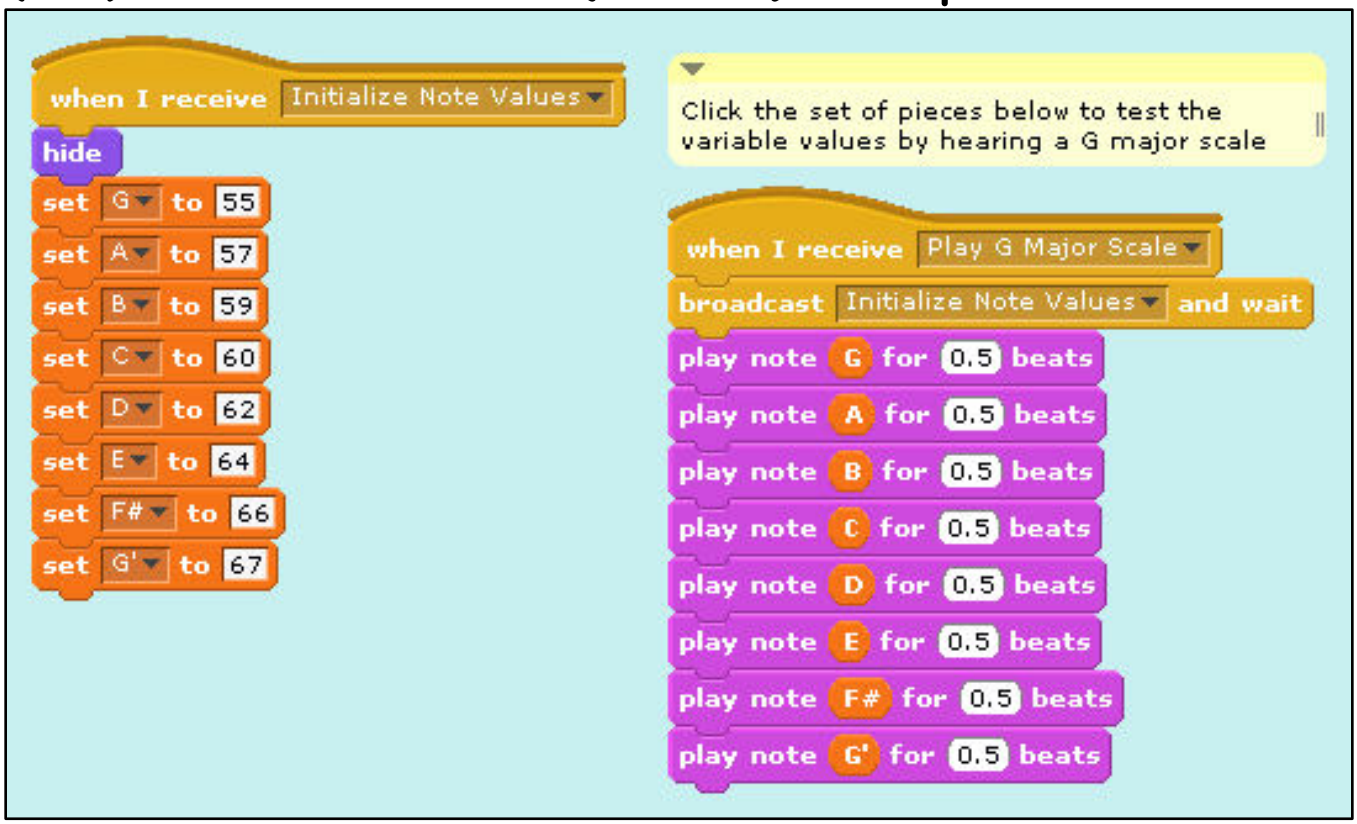


continued on next page

Progressive Music Examples

No. 3: Separating Initialization (cont'd)

(3b) **Initialization ("Init")** Script



end of Example 3

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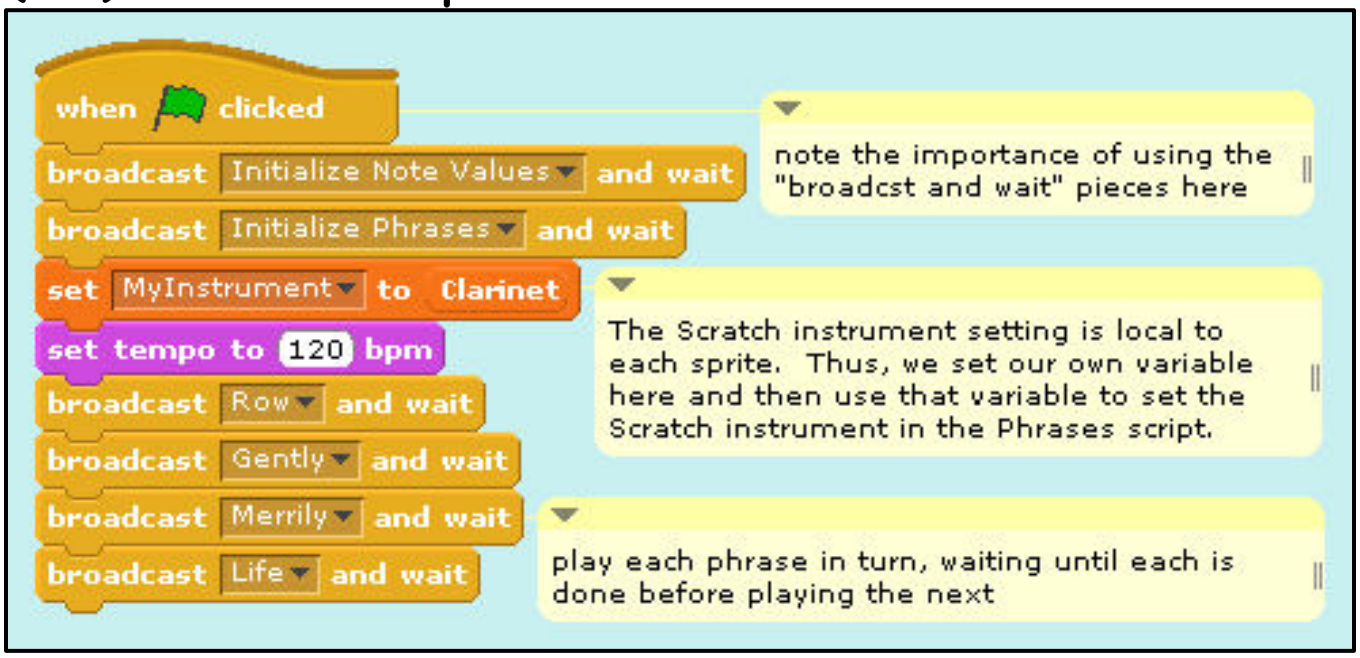
Progressive Music Examples

No. 4: Separating Phrases

Three Scripts

(4a) **Main** Script



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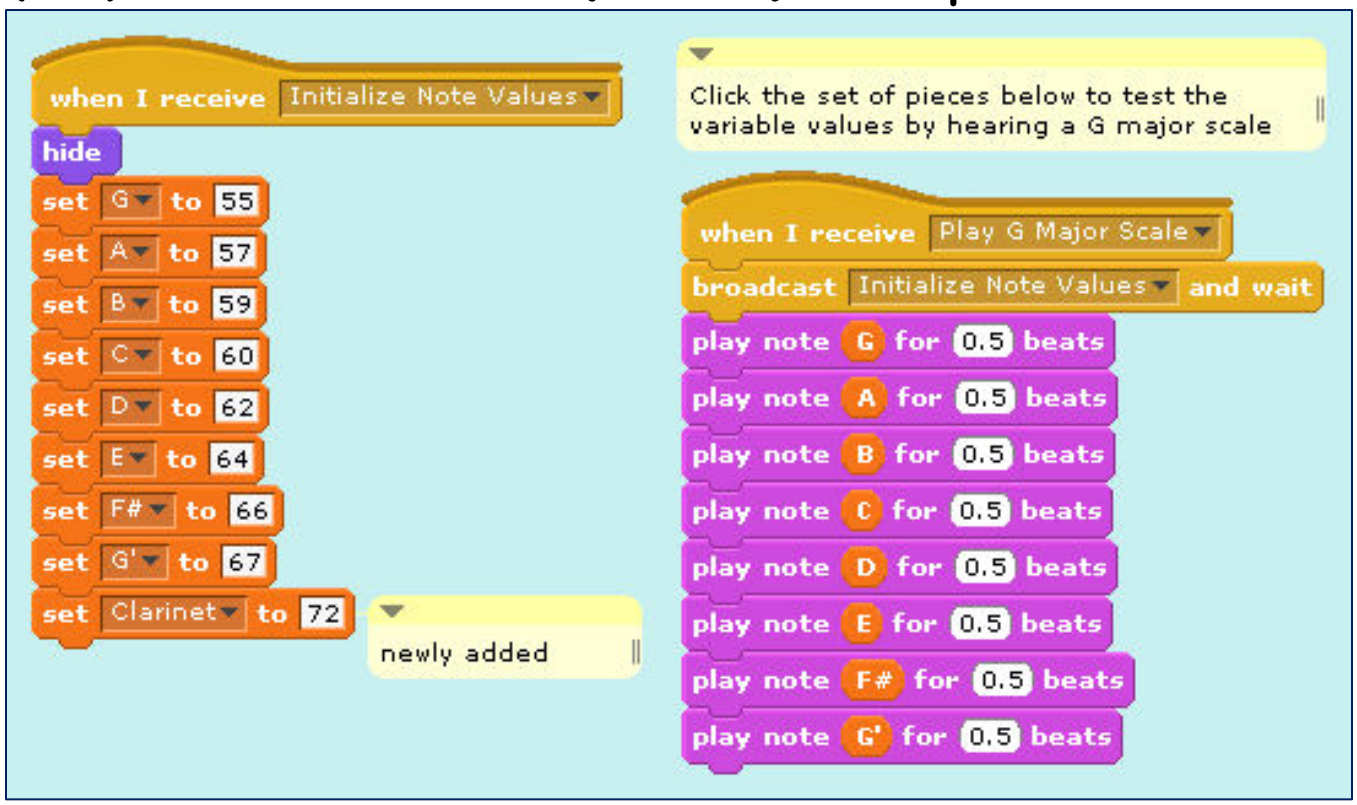
Progressive Music Examples

No. 4: Separating Phrases (cont'd)

(4b) **Initialization ("Init")** Script



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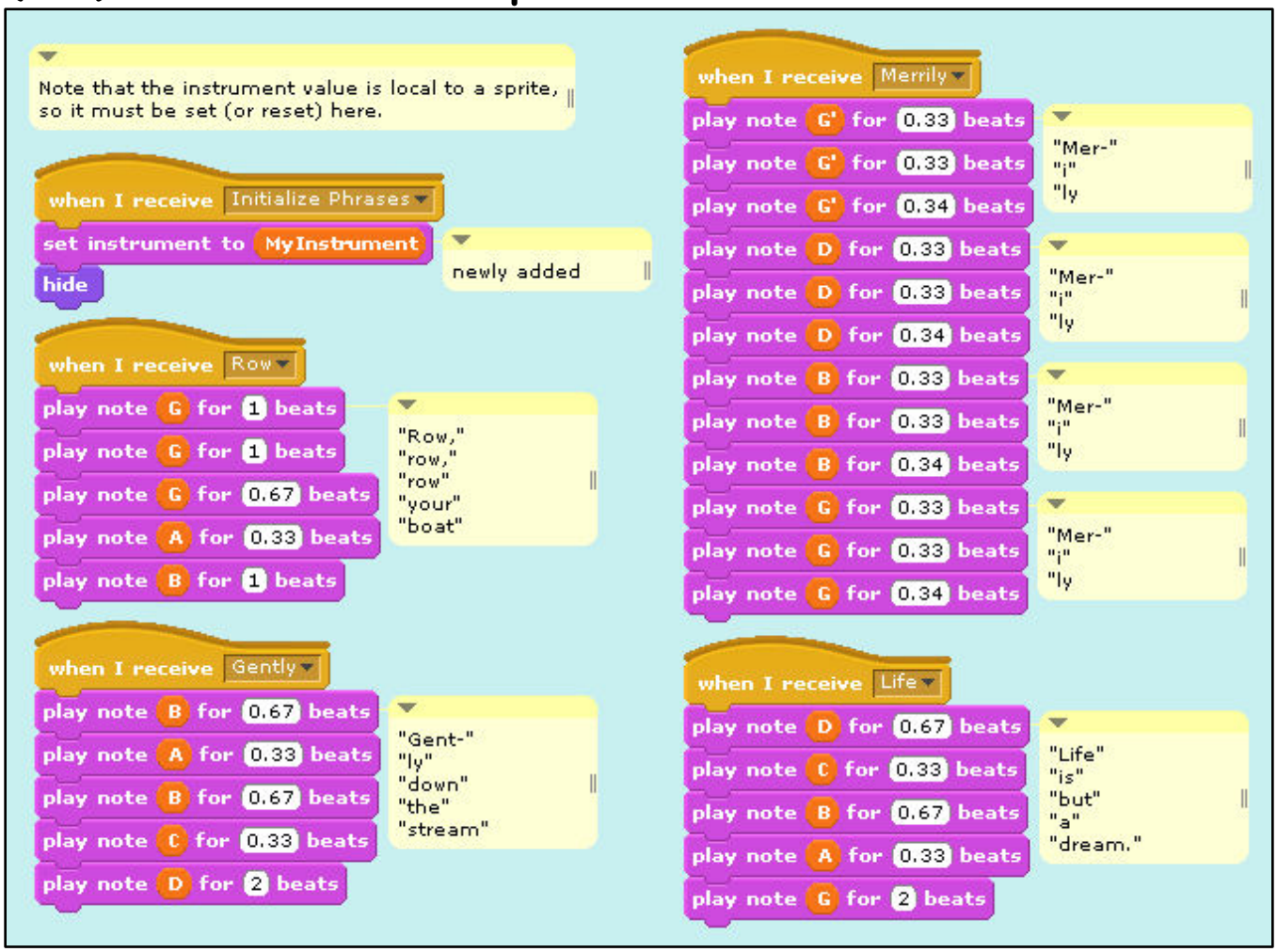
No. 4: Separating Phrases (cont'd)

(4c) **Phrases** Script



end of Example 4

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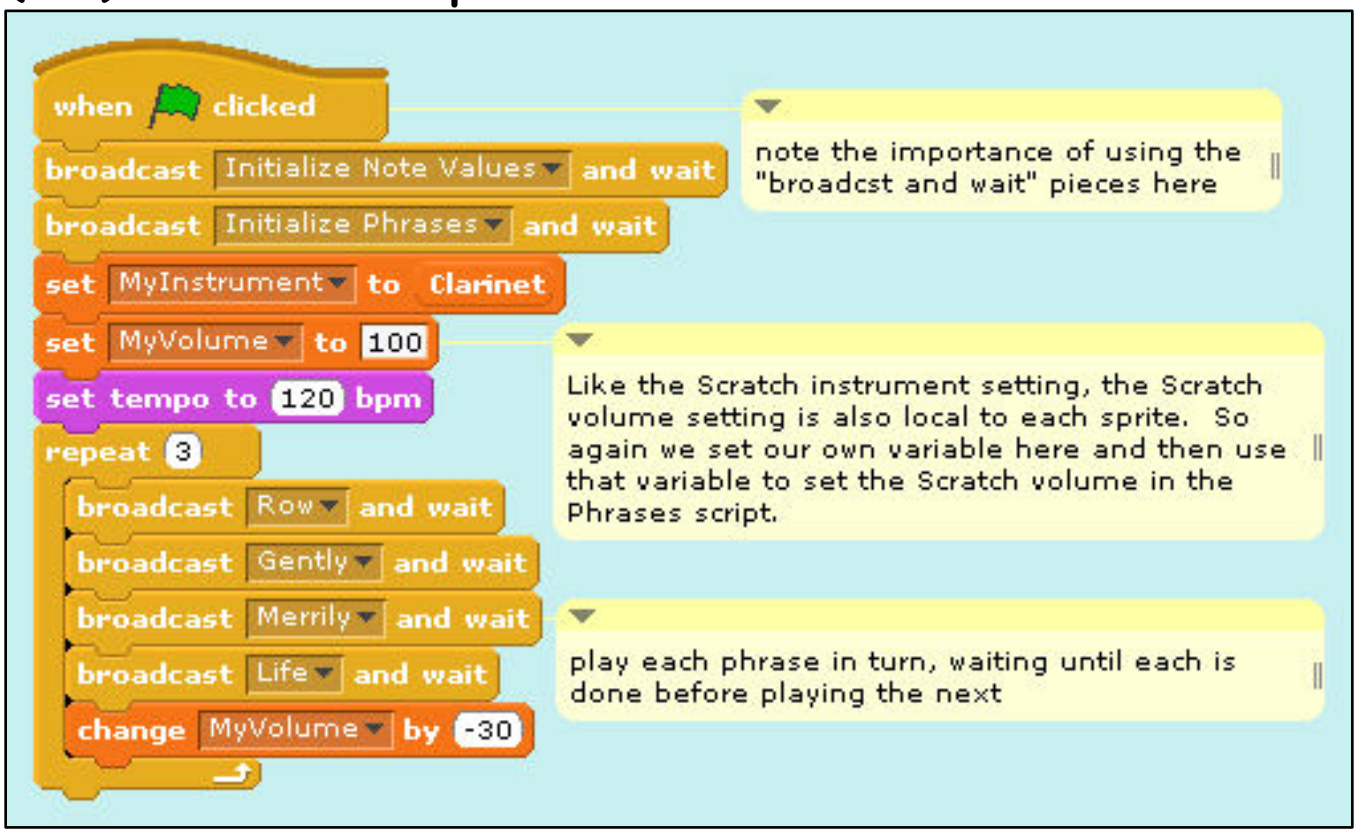
Progressive Music Examples

No. 5: Looping and Fading

Three Scripts

(5a) **Main** Script



(5b) **Initialization ("Init")** Script

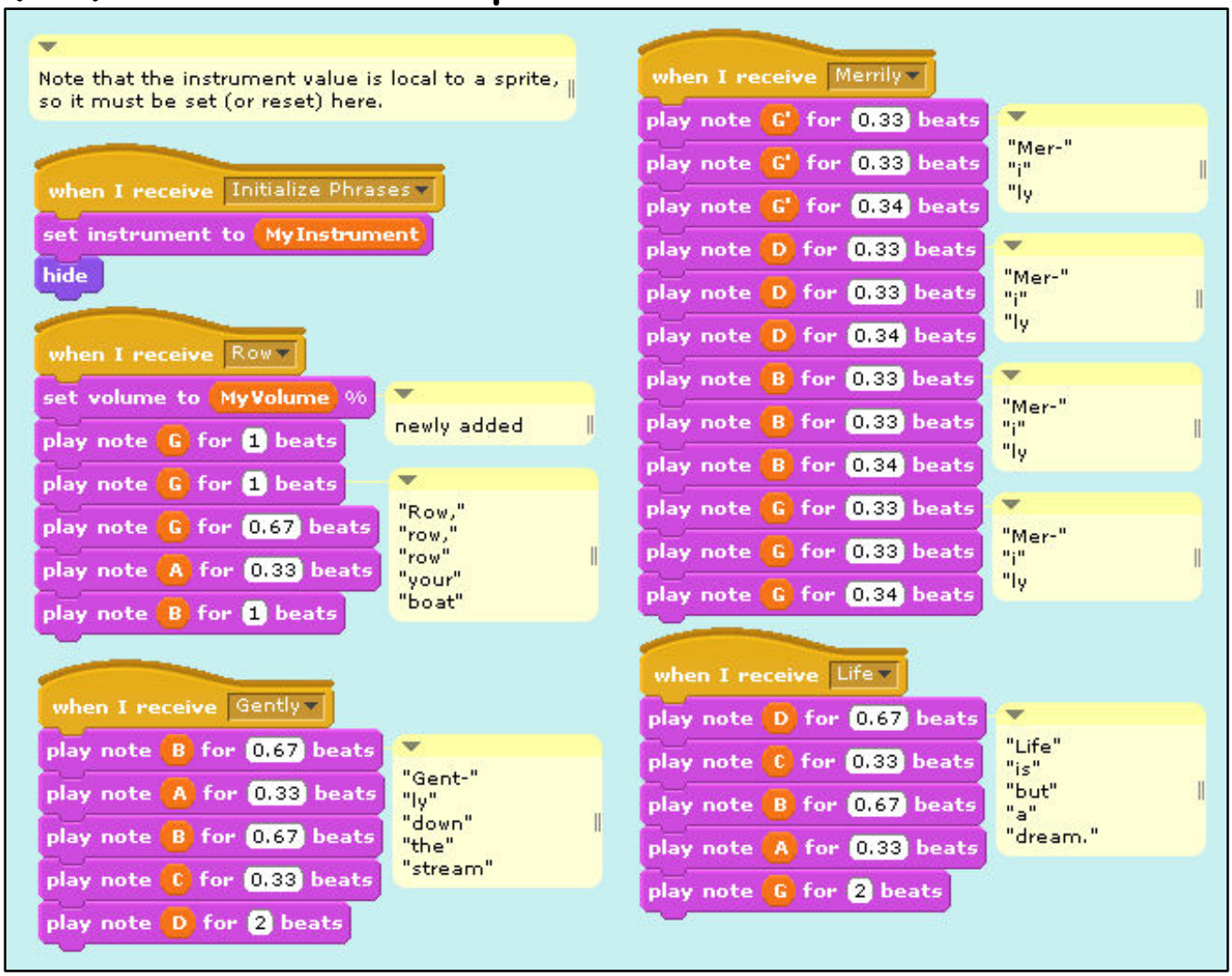
(same as on page 12)

continued on next page

Progressive Music Examples

No. 5: Looping and Fading (cont'd)

(5c) **Phrases** Script



end of Example 5

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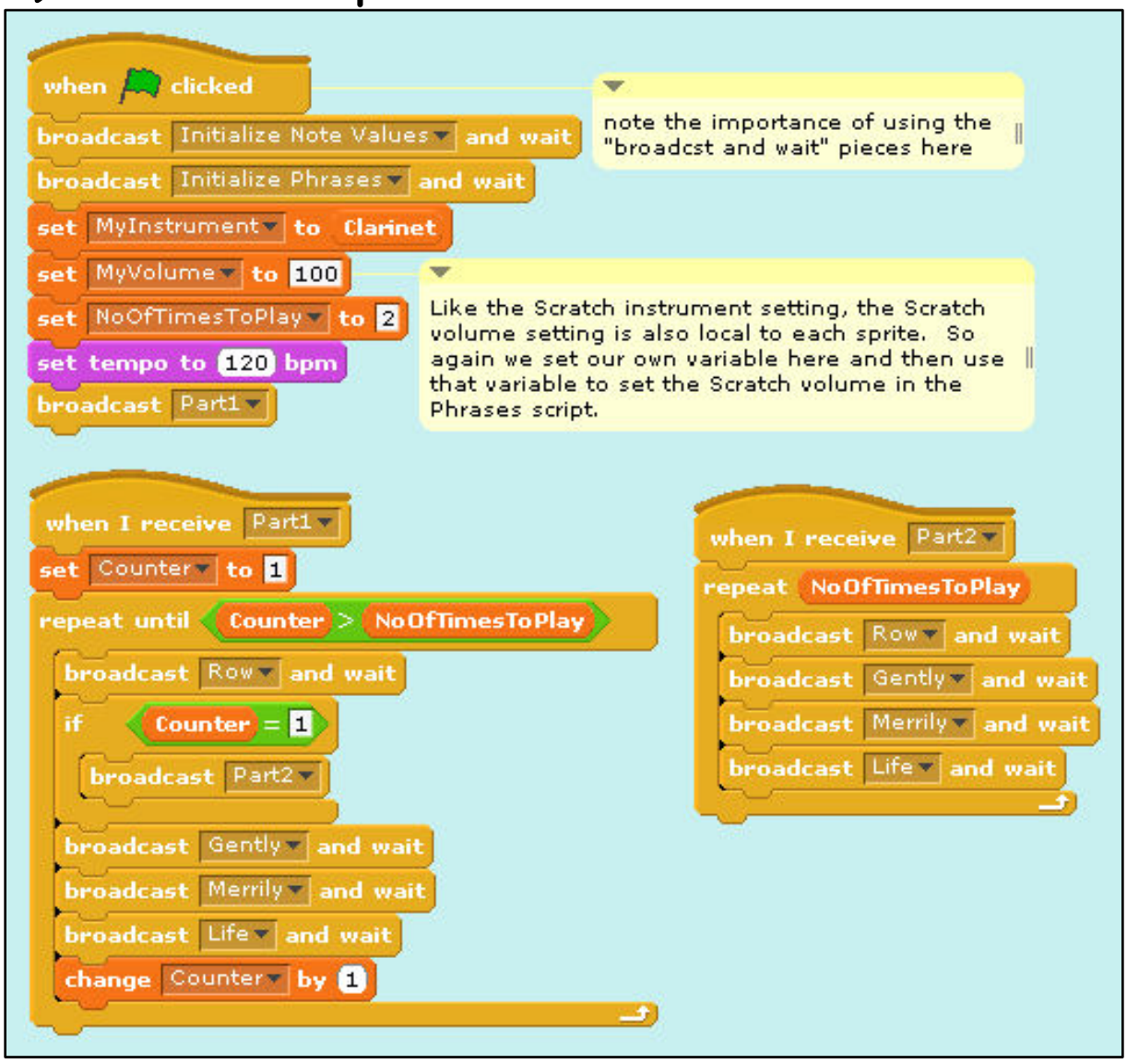
Progressive Music Examples

No. 6: Playing a Round with One Instrument

Three Scripts

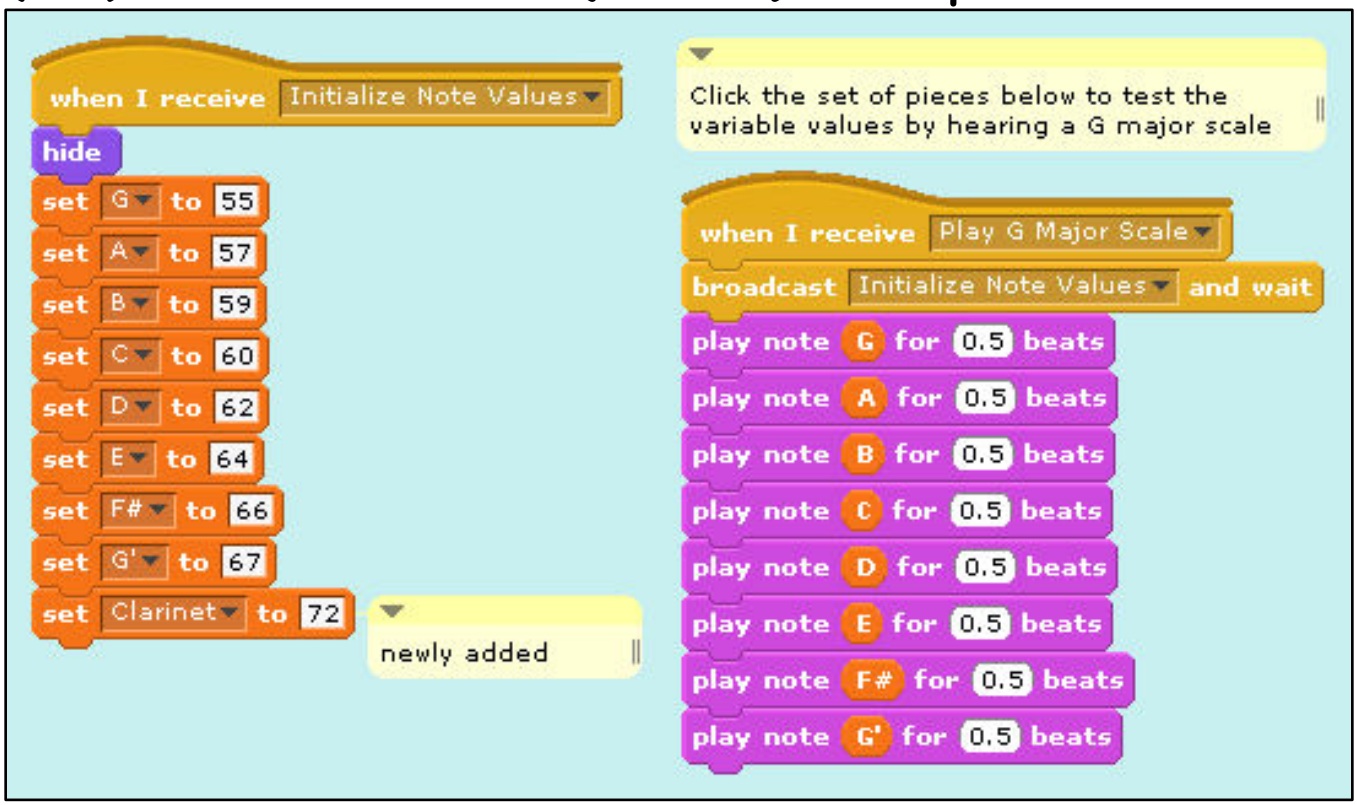
(6a) **Main** Script



Progressive Music Examples

No. 6: Playing a Round with One Instrument (cont'd)

(6b) **Initialization ("Init")** Script



(6c) **Phrases** Script

(same as on page 16)

end of Example 6

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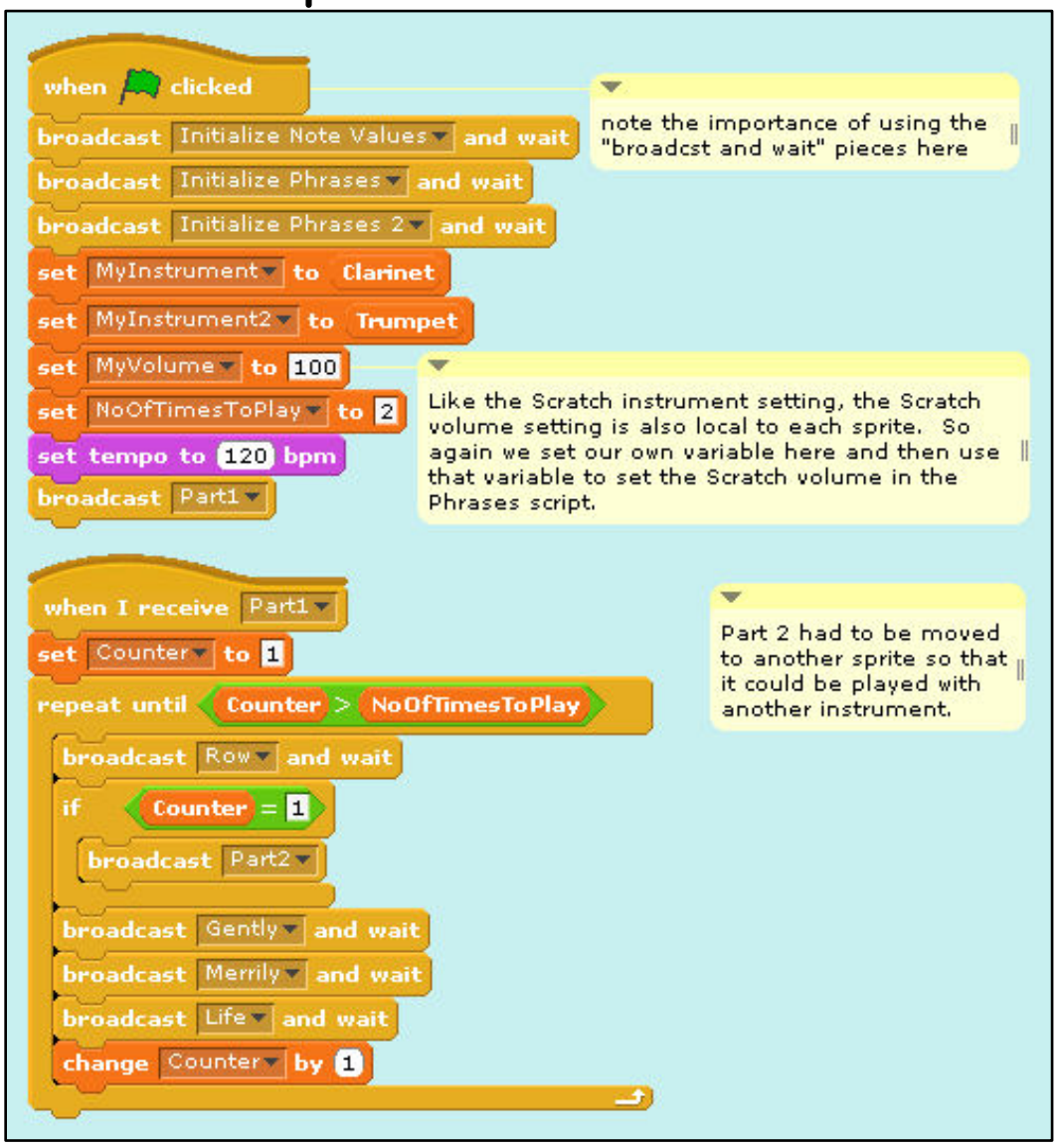
Progressive Music Examples

No. 7: Playing a Round with Two Instruments

Five Scripts

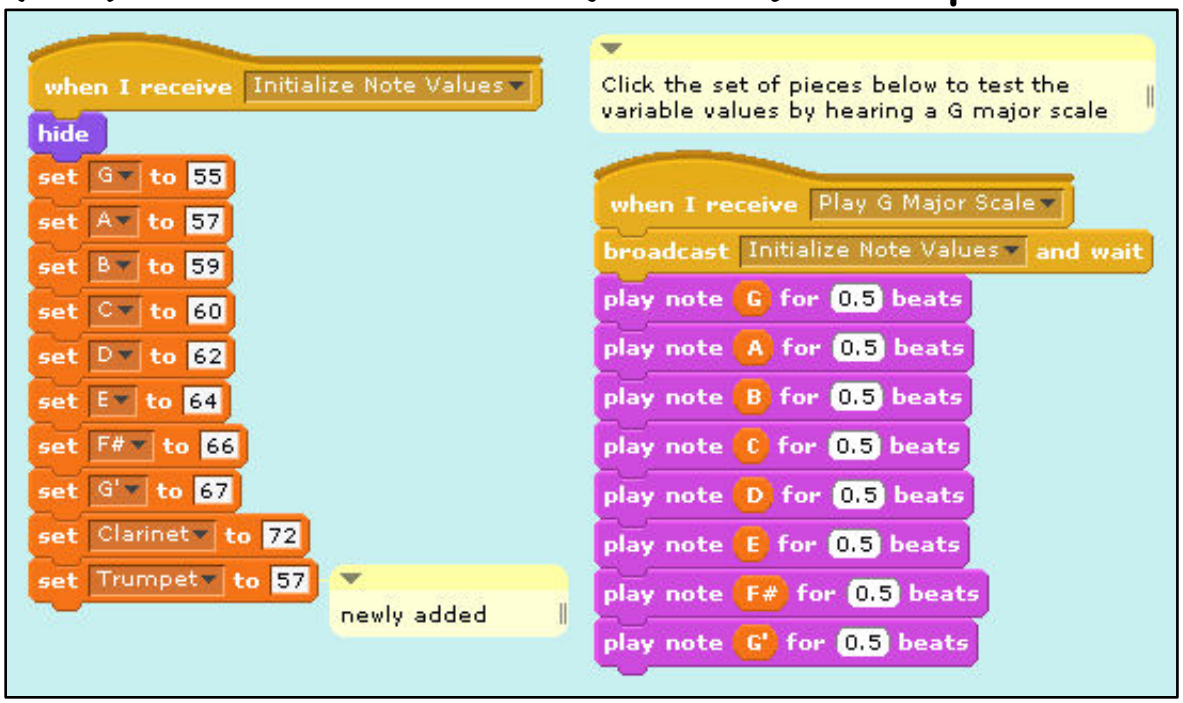
(7a) **Main** Script



Progressive Music Examples

No. 7: Playing a Round with Two Instruments (cont'd)

(7b) **Initialization ("Init")** Script



(7c) **Phrases** Script

(*same as on page 16*)

(7d) **Part2** Script ➔

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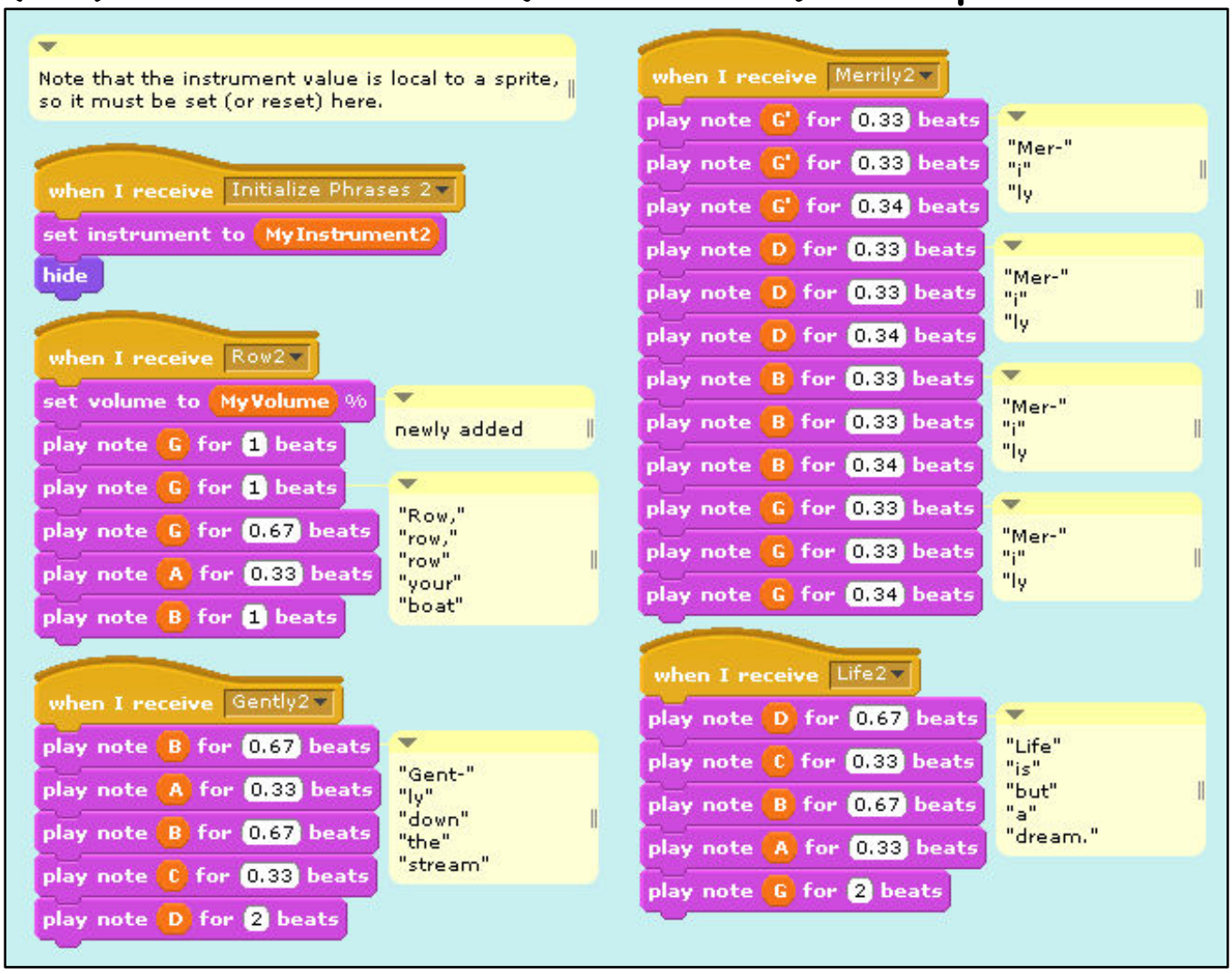
Progressive Music Examples

No. 7: Playing a Round with Two Instruments (cont'd)

(7e) Instrument2 ("Instru2") Script



end of Example 7

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Progressive Music Examples

No. 8: Storing Notes and Rhythms in Lists

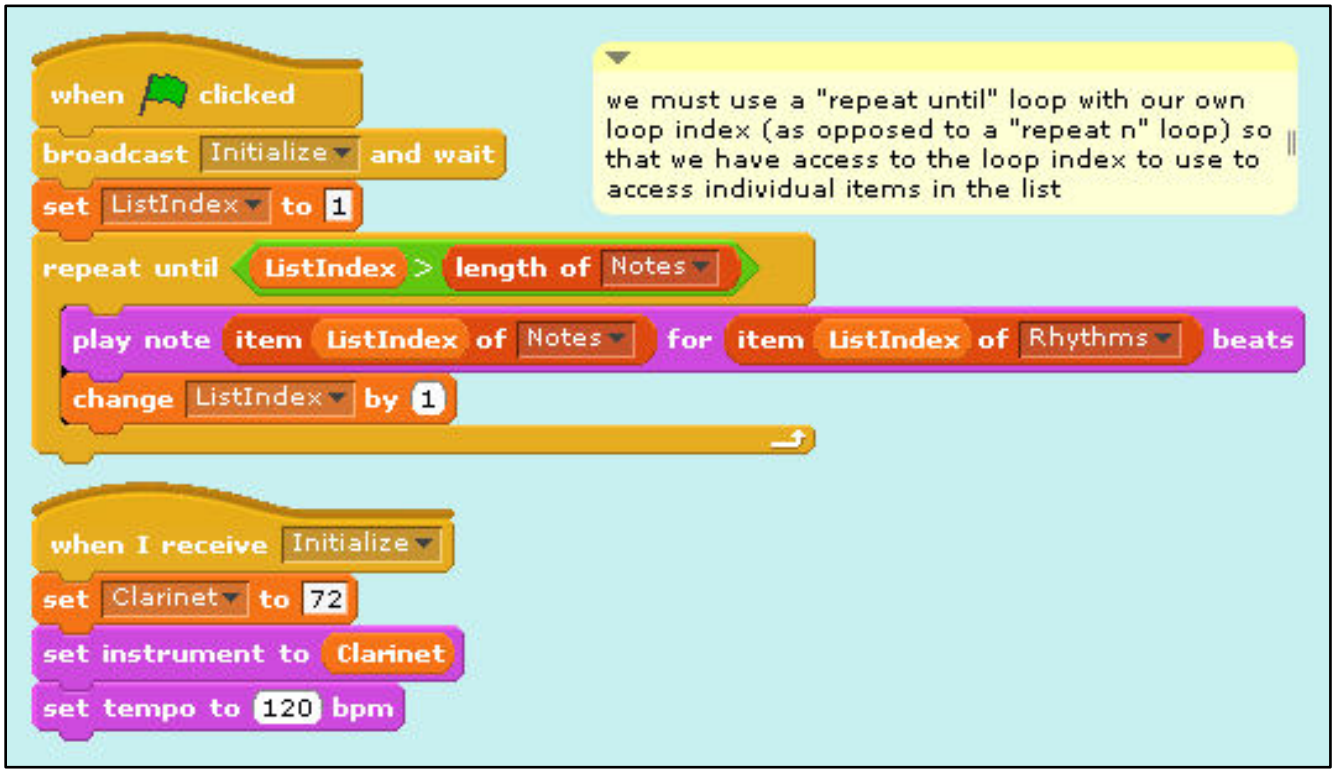
Output Window

continued on next page

Progressive Music Examples

No. 8: Storing Notes and Rhythms in Lists (cont'd)

Single Script



end of Example 8

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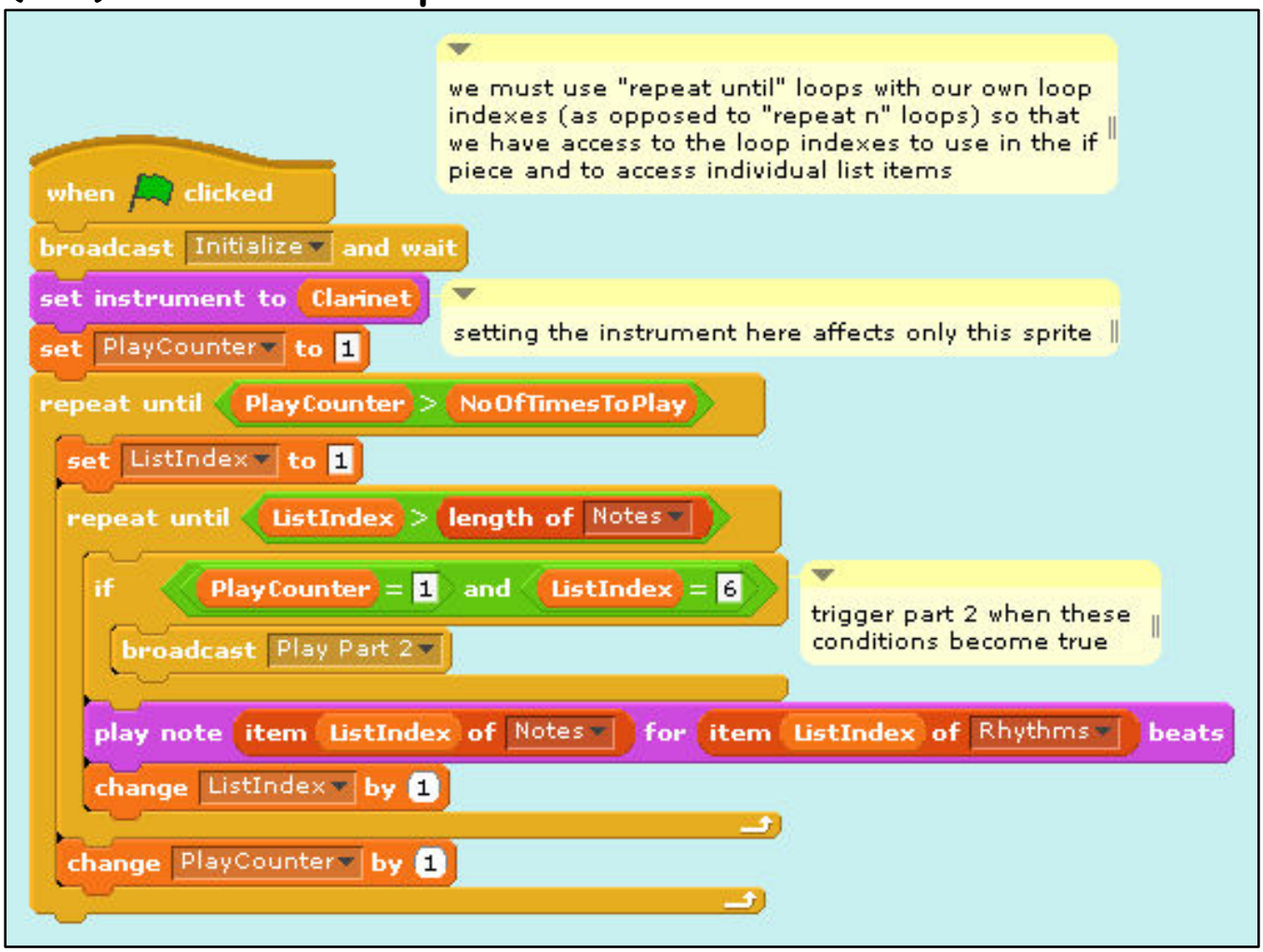
Progressive Music Examples

No. 9: Playing a Round Using Lists

Three Scripts

(9a) **Main** Script



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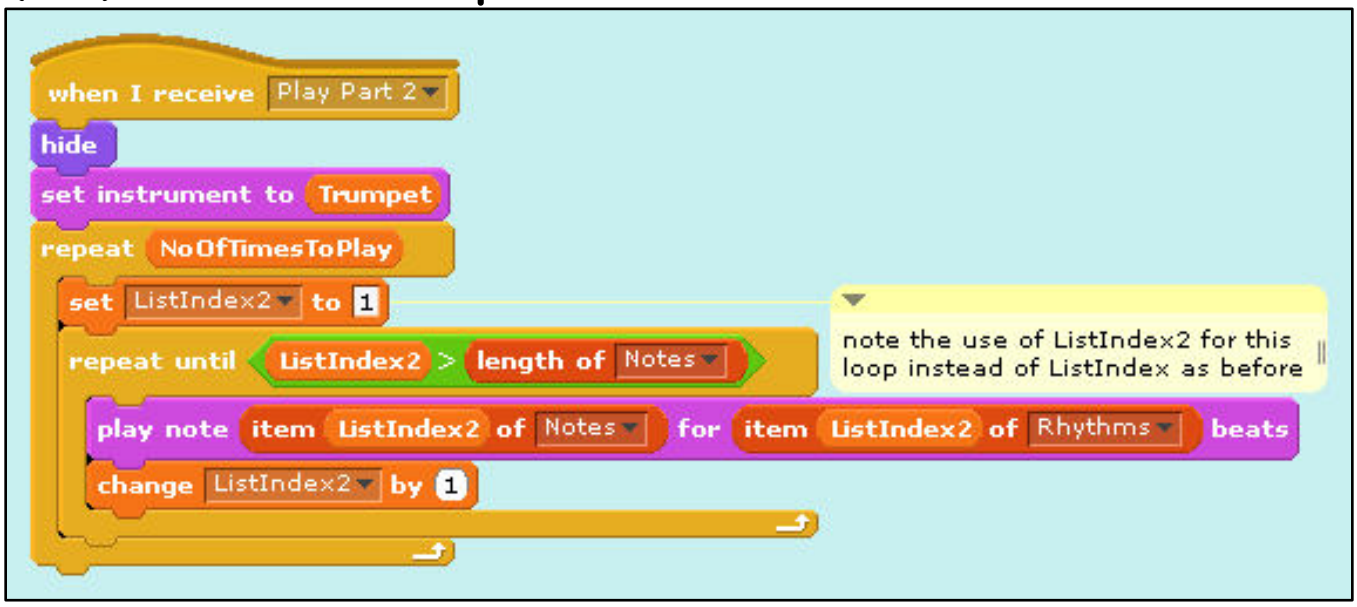
No. 9: Playing a Round Using Lists (cont'd)

(9b) **Initialization ("Init")** Script

(9c) **Part2** Script



end of Example 9

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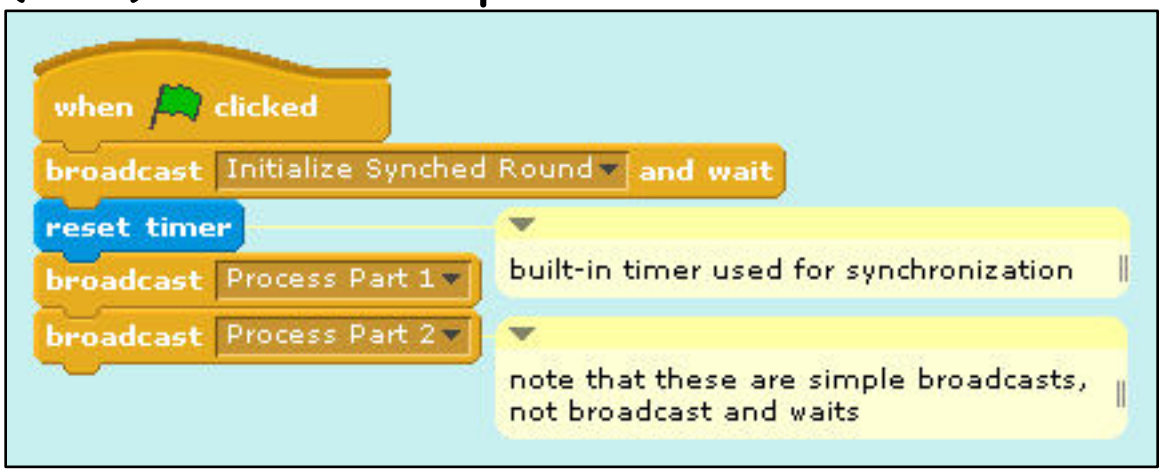
Progressive Music Examples

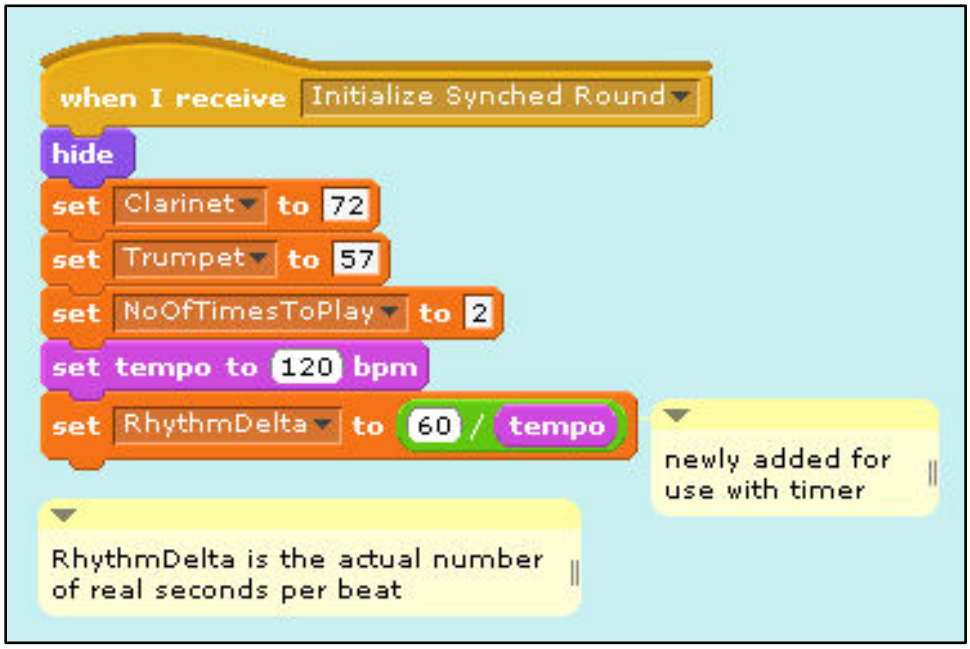
No. 10: Synchronizing Play from Lists

Four Scripts

(10a) **Main** Script



(10b) **Initialization ("Init")** Script



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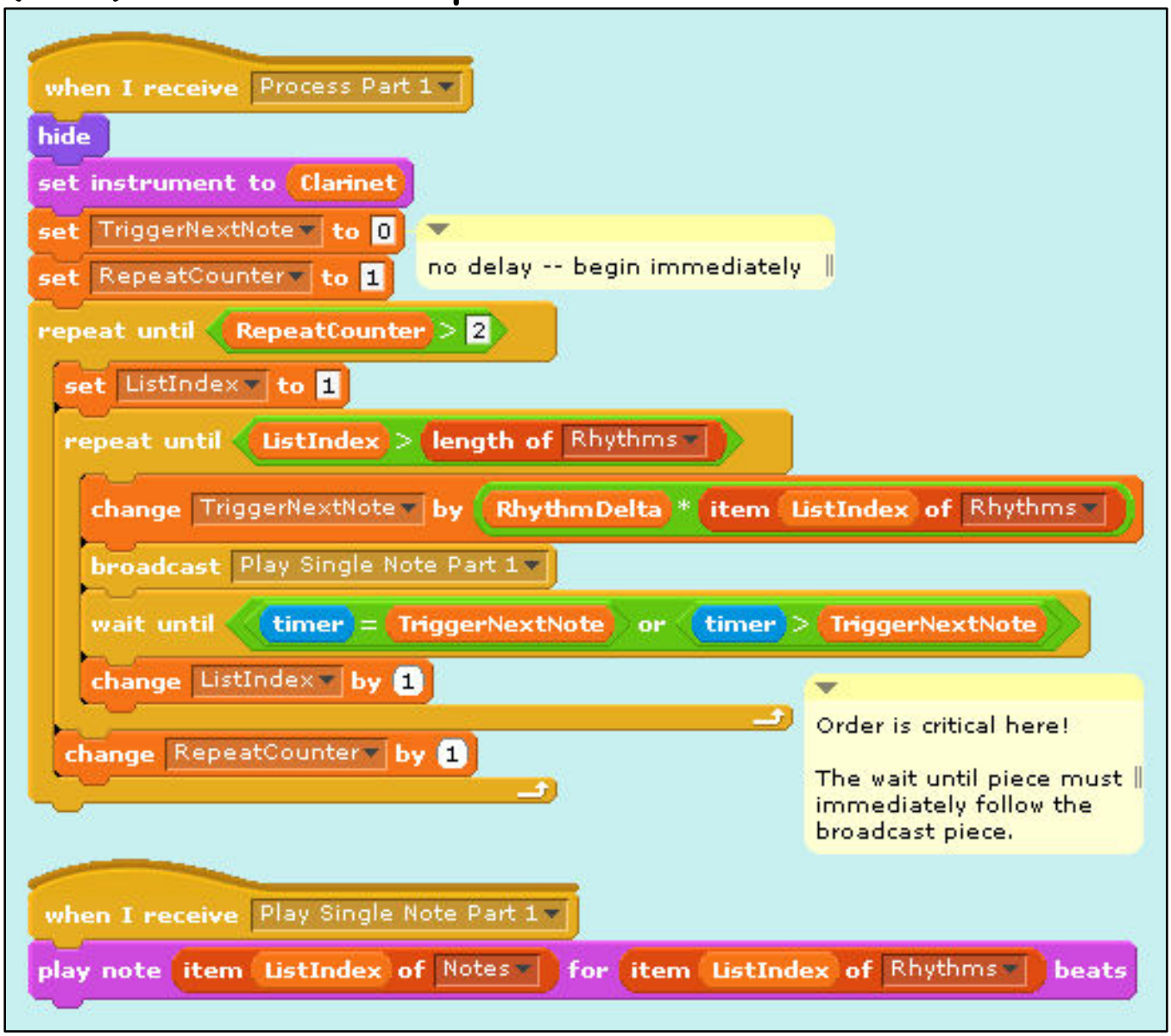
Progressive Music Examples

No. 10: Synchronizing Play from Lists (cont'd)

(10c) Part 1 Script



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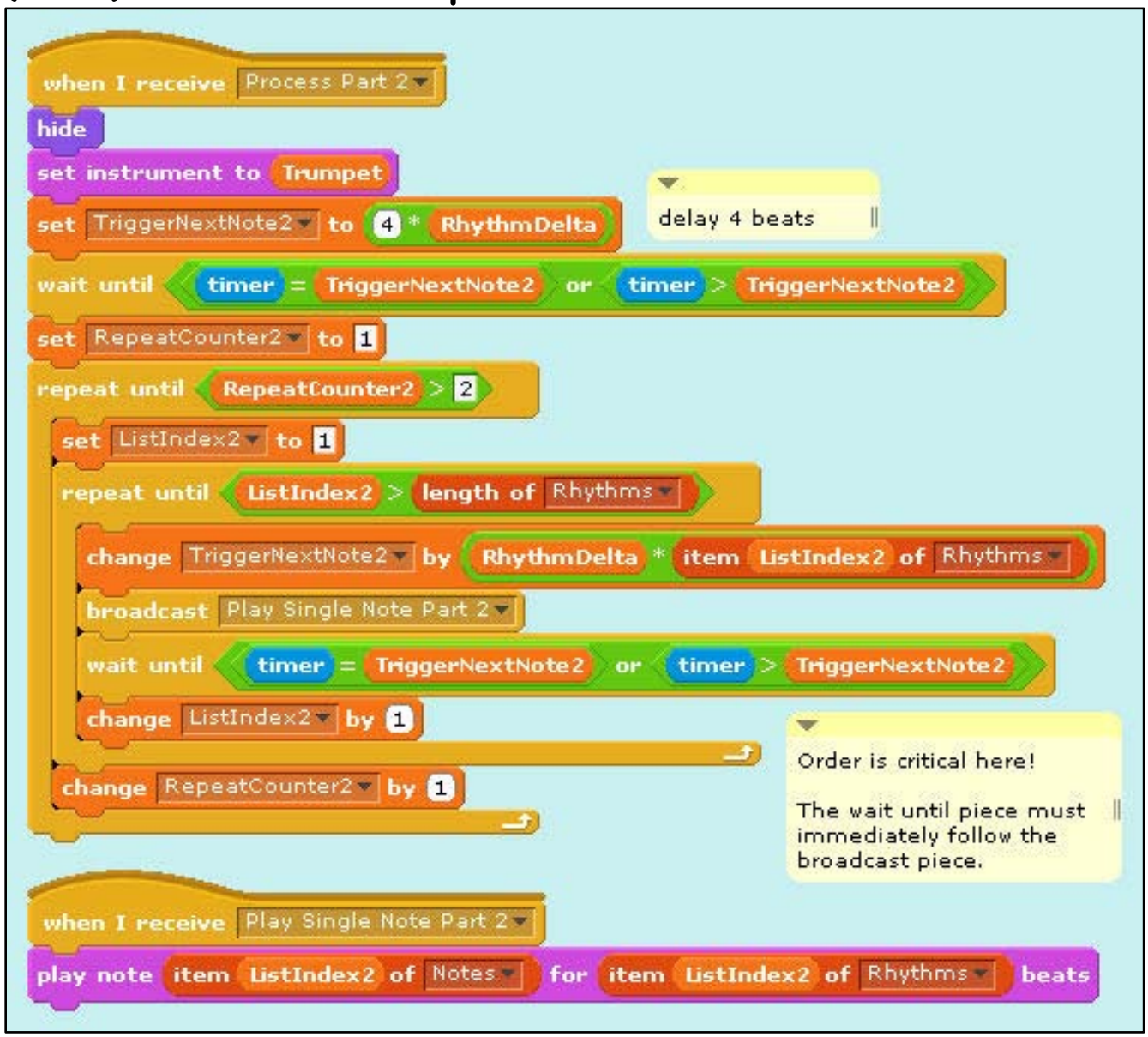
Progressive Music Examples

No. 10: Synchronizing Play from Lists (cont'd)

(10d) **Part 2** Script



end of Example 10

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Progressive Music Examples

Ideas for Extending the Examples

1. **Use a variable to set the tempo.**
   - Add a slider to the variable so that you can change the tempo in real time.
   - Find all the places you need to use the variable to reset the tempo when you change it in real time.
   - Which version of playing the round best stays synchronized when you change the tempo?

2. **Transpose the melody to another key.**
   - Create a variable to hold a pitch offset.
   - Find all the places you need to use that variable to play the melody in the new key.

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Ideas for Extending the Examples (cont'd)

3. **Increase the number of times that the round repeats.**
   - Do the parts stay in synch?
4. **Increase the number of parts that play simultaneously.** (Be sure to set Turbo Speed before you try this!)
   - When should each part "come in"?
   - How much should the first beat of each part be offset?
5. **Play the melody backwards.**
   - Can you play multiple parts backwards, too?

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Ideas for Extending the Examples (cont'd)

6. Make a round using the G-major scale.

- Put the note values for a G-major scale into a list. See page 10 for code that initializes and plays a G-major scale, but remember that you must use the integer values, not the variable names, to play notes from a list.
- Start Part 2 when Part 1 plays its third note (B, MIDI note #59).
- Add Part 3, starting when Part 1 plays its fifth not (D, #62).

Ideas for Extending the Examples (cont'd)

7. **Play random notes in the G-major scale.**
   - Start with the list created for the previous exercise.
   - Use the "pick random" piece in the Operators group to pick a random note from the list.
   - Play each note for 0.25, 0.50, 0.75, or 1.00 beats, also selected randomly.
   - Does the result sound musical?

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Ideas for Extending the Examples (cont'd)

8. Create a program that can play any <u>major</u> scale given any starting note.

- Store the starting note in a variable.
- For a major scale, the number of half-tones between each note is:

  2, 2, 1, 2, 2, 2, 1
- Another way to think about this is:

  Do + 2 ➔ Re + 2 ➔ Mi + 1 ➔ Fa + 2 ➔ Sol + 2 ➔ La + 2 ➔ Ti + 1 ➔ Do
- Create a list containing the changes between the notes, and then use a loop to process the list and play the scale.

Ideas for Extending the Examples (cont'd)

9. **Create a program that can play any <u>harmonic minor</u> scale given any starting note.**
   - For a harmonic minor scale, the number of half-tones between each note is:
     2, 1, 2, 2, 1, 3, 1
   - Create a new list containing these changes, but use the same loop that you created for the previous exercise to play this scale.

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Ideas for Extending the Examples (cont'd)

10. Create a program to play a major chord.

- A major chord is the 1st, 3rd, and 5th notes of the scale, usually complemented by the octave above the 1st note. Thus, a G-major scale has notes G (#55), B (#59), D (#62), and G' (#67).
- Another way to think about this is to compute the half-tone difference from the starting note: 0, 4, 7, 12.
- Set a starting note and then use a "broadcast" to play the four notes simultaneously.