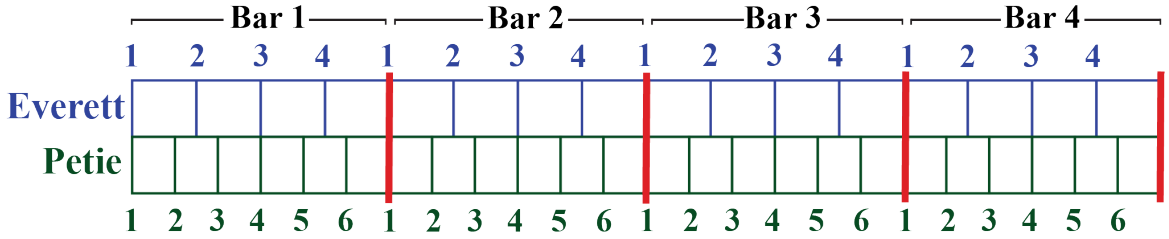
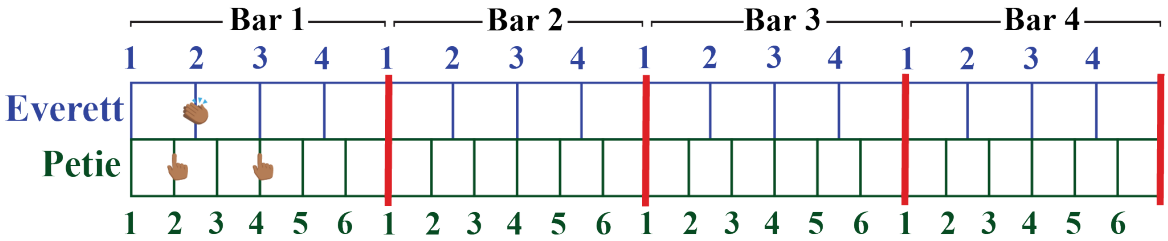
Problem of the Week
Problem B and Solution
Playing to the Beat

Problem

A "bar" is a segment of music, broken up into evenly spaced "beats". In music class, Everett claps his hands in a rhythm with four beats per bar. Petie taps on his desk in a rhythm with six beats per bar. The first four bars for Everett and Petie are shown in the diagram. The numbers above the vertical lines indicate the beat number in each bar for Everett and the numbers below the vertical lines indicate the beat number in each bar for Petie.



(a) In Bar 1, Everett claps on the second beat. After that, Everett claps on every third beat (so his next clap is on the first beat in Bar 2). Petie taps on the second and fourth beats in every bar. The diagram below shows Everett's clap and Petie's taps in Bar 1. Complete the diagram to show their taps and claps over the next three bars. In Bar 1, Everett claps between Petie's two taps. When does Everett next clap between Petie's two taps in a bar?



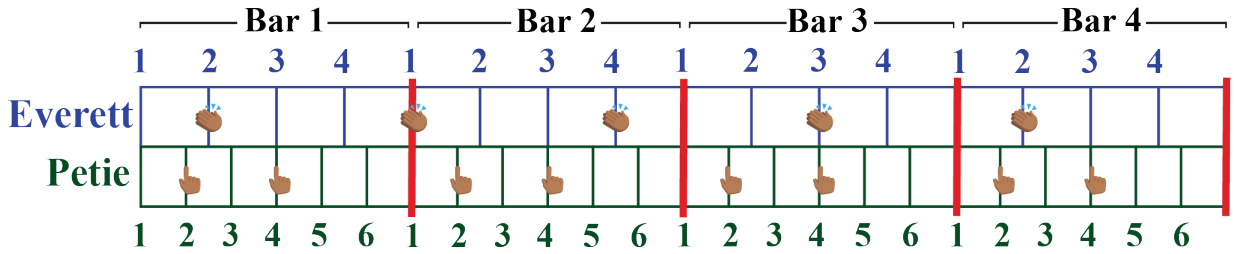
(b) If Petie and Everett continue tapping and clapping this way, does a repeated pattern of sounds occur? If so, how many bars are there in this pattern before it repeats?

(c) How could Petie change his approach so that, in every bar, at least one of Everett's claps happens between Petie's two taps?

SUGGESTION: Work with a classmate to tap and clap in Everett's and Petie's rhythms.

Solution

(a) The completed diagram is shown.



Everett next claps between Petie's two taps in Bar 4.

(b) Notice that Bar 4 matches Bar 1. Thus, a repeated pattern of sounds occurs after there are three bars in the pattern. That is, the pattern repeats every three bars.

(c) Answers will vary. Petie could tap on the first and sixth beats in each bar. Alternatively, Petie could tap on the second and sixth beats in each bar.