

Making A Musical Keyboard

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when green flag clicked
  play note 60 for 0.5 beats
  play note 62 for 0.5 beats
  play note 64 for 0.5 beats
  play note 65 for 0.5 beats

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The note is given by a number.

The length is given by the number of beats.

If you can read music, you can translate musical scores to code. If you can't, a little logical deduction and pattern recognition should get you going!

Challenge 1: Let's code Twinkle Twinkle Little Star!

The note numbers for the first line are given below.

60 60 67 67 69 69 67 65 65 64 64 62 62 60

The first staff of music is written on a five-line treble clef. It contains a sequence of notes: a quarter note on G4, an eighth note on A4, an eighth note on B4, a quarter note on C5, an eighth note on B4, an eighth note on A4, a quarter note on G4, and a half note on F#4. The notes are grouped into four measures by vertical bar lines.

Diagram of a piano keyboard showing the layout of the 72 keys. The keys are numbered 48 to 72. The black keys are numbered 4, 5, 5, 5, 6, 6, 6, 6, 7. The white keys are numbered 9, 1, 4, 6, 8, 1, 3, 6, 8, 0. The diagram shows the repeating pattern of black and white keys across the keyboard.

C D E F G A B C D E F G A B C

Once you have coded Twinkle Twinkle Little Star, you'll see you have a big long line of code. It's a real pain to try to fix any mistakes if you have gone wrong somewhere.

Lets **DECOMPOSE** the song into smaller blocks.

Challenge 2: Making a block for each line of the nursery rhyme.

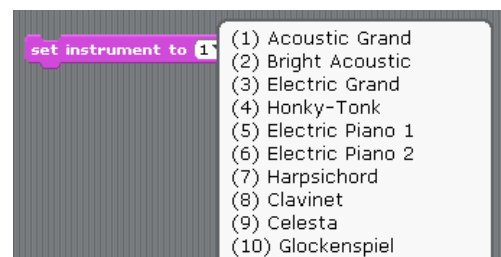
There are six lines in the rhyme, so we can make a 'songline' block for each one. But hang on! Do we need six different blocks? Study the pattern of notes carefully – you should be able to just use 3 'songline' blocks. Create each one and test that it sounds right.

Twinkle, twinkle little star,
How I wonder what you are.
Up above the world so high,
Like a diamond in the sky.
Twinkle, twinkle little star,
How I wonder what you are.

When you have completed the three blocks, make a 'Rhyme' block for the whole rhyme which will have a sequence of 'songline' blocks in the right order. Test your block to make sure it plays the whole rhyme correctly.

Challenge 3: Getting a band together.

Different sprites can play your rhyme by setting different instruments. Add 5 more sprites to your program. For each sprite, set a different instrument before calling the 'Rhyme' block. Test it to see if you now have an orchestra!



Challenge 4: Playing a round.

OK, now the fun really starts. Twinkle Twinkle Little Star is a rhyme that can be sung in a 'round'. The second sprite starts playing the first line, when the first sprite starts the second. The third sprite starts when the first sprite starts the third line and so on. Can you work out how to get your sprites playing a round?

Here's a hint: you need a 'leader' (the first sprite) to broadcast messages so the others know when to start.

Using your 'Rhyme' block as a guide, create a new 'Leader' block that plays the whole rhyme but also broadcasts messages at the end of each line.

Make sure each of the other sprites can then start when they receive the correct message signal.
