

Music

Textbook

Music



Now let's program the micro:bit to make music!

Melodies

The micro:bit can also play sounds and melodies through its speaker output. Watch [here](#) to get a better idea of how sound works on the micro:bit:



A [melody](#) is a series of musical sounds that make up a song. We can program our micro:bit to play melodies by using the following code.

```
1 music.play_melody("C D E F G A B C5 ", 120)
```

C is the lowest sounding note and C5 is the highest. You can adjust the sound or repeat sounds by placing the note names in different orders.

Presets

micro:bit has some melodies already saved.

Preset	Code
Mystery	<code>music.play_melody("E B C5 A B G A F ", 120)</code>
Gilroy	<code>music.play_melody("A F E F D G E F ", 120)</code>
Falling	<code>music.play_melody("C5 A B G A F G E ", 120)</code>
Hopeful	<code>music.play_melody("G B A G C5 B A B ", 120)</code>
Tokyo	<code>music.play_melody("B A G A G F A C5 ", 120)</code>
Paris	<code>music.play_melody("G F G A - F E D ", 120)</code>
Rising	<code>music.play_melody("E D G F B A C5 B ", 120)</code>
Sitka	<code>music.play_melody("C5 G B A F A C5 B ", 120)</code>
Scale	<code>music.play_melody("C5 B A G F E D C ", 120)</code>

Tempo

The [tempo](#) is how fast your melody plays. BPM means beats per minute. The higher the tempo, or beats per minute, the faster it plays. The tempo is the last number inside the parentheses. The default tempo is 120, or 120 beats per minute.

```
1 music.play_melody("C5 G B A F A C5 B ", 120)
2 music.play_melody("C5 G B A F A C5 B ", 70)
```

Practice changing the tempo on your melody to a higher number and then to a lower number to hear the difference.

Stop All Sounds

If you want to stop making sounds, you can use this piece of code.

```
1 music.stop_all_sounds()
```

Volume

You can also change the volume of the sound on the micro:bit. The default is 127. To change the volume, change the number in the parentheses of this code.

```
1 music.set_volume(98)
```

Adopted from microbit.org platform

Critical Thinking Questions

- Imagine you're composing a short piece of music for a video game. How would you adjust the speed (tempo) of your melody to make a scene feel exciting and fast-paced, versus a calm and peaceful scene?
- If you wanted to create a simple musical alarm clock, why would it be important to be able to control the loudness (volume) of the melody? What are the pros and cons of having it very loud or very soft?
- Think about how different emotions are conveyed in music. How can simply changing the order of notes in a melody, or choosing higher versus lower notes, affect the feeling or message a short piece of music communicates?

Questions (10)

1. What will happen when you run these two lines of code one after another?

MULTIPLE CHOICE

```
music.play_melody("C D E F G A B C5 ", 120) music.play_melody("C D E F G A B C5 ", 200)
```

Choose the correct answer:

- A. Both melodies play at the same speed
- B. The first melody plays slower than the second
- C. The first melody plays faster than the second
- D. Only the second melody plays

2. A student wants to make their melody play very quietly. What should they do with this code?

MULTIPLE CHOICE

```
music.set_volume(127) music.play_melody("G B A G C5 B A B ", 120)
```

Choose the correct answer:

- A. Change 127 to a higher number
- B. Change 127 to a lower number
- C. Change 120 to a lower number
- D. Remove the set_volume command

3. What will happen if you run this code while a melody is already playing?

MULTIPLE CHOICE

```
music.play_melody("C D E F G A B C5 ", 120) music.stop_all_sounds()
```

Choose the correct answer:

- A. Both melodies play together
- B. The second melody waits for the first to finish
- C. The first melody stops and no sound plays
- D. Only the second melody plays

4. A student wants their music to play twice as fast as the default speed. What tempo should they use?

MULTIPLE CHOICE

`music.play_melody("C D E F G A B C5 ", ?)`

Choose the correct answer:

- A. 60
- B. 120
- C. 240
- D. 480

5. You want to create a sound-based game where different gestures play different preset melodies. What programming concepts do you need to combine?

MULTIPLE CHOICE

Choose the correct answer:

- A. Only music commands
- B. Music commands and gesture detection
- C. Only gesture detection
- D. Music commands and temperature sensors

6. What is wrong with this melody code?

MULTIPLE CHOICE

`music.play_melody(C D E F G A B C5, 120)`

Choose the correct answer:

- A. Missing quotation marks around the notes
- B. Wrong tempo number
- C. Notes are in wrong order
- D. Missing spaces between notes

7. You want to create a musical alarm that plays the "Tokyo" melody very loudly and very fast when the temperature gets too hot. What values should you use?

MULTIPLE CHOICE

if temp > 30: music.set_volume(?) music.play_melody("B A G A G F A C5 ", ?)

Choose the correct answer:

- A. Volume: 50, Tempo: 60
- B. Volume: 200, Tempo: 200
- C. Volume: 10, Tempo: 300
- D. Volume: 127, Tempo: 30

8. A student wants to create a simple piano where button A plays one note and button B plays a different note. What approach should they take?

MULTIPLE CHOICE

Choose the correct answer:

- A. Use preset melodies for each button
- B. Create custom single-note melodies for each button
- C. Use the same melody with different tempos
- D. Use only volume changes

9. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 play_melody("C D E F G A B C5 ", 120)
```

10. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 music.setVolume(98)
```

Robotics Challenges (5)

1. Melodies

Challenge

Textbook

Melodies

Play the following three melodies on the micro:bit, in this order:

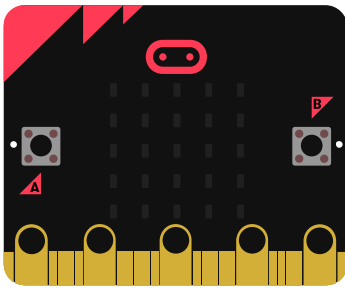
SCALE melody

MYSTERY melody

HOPEFUL melody

Requirements

- Create the Scale melody. Follow the order from the preset chart
- Create the Mystery melody. Follow the order from the preset chart
- Create the Hopeful melody. Follow the order from the preset chart



Micro:bit board with a red 'A' and a red 'B' on the screen.

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forever

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2. Verses and Chorus

Challenge

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Verses and Chorus

Many songs have areas that repeat. Some songs have verses with new words and a chorus that repeats. Repetition is very important when creating music!

- Create a program that repeats a melody twice in a for loop.
- Then plays a different melody after.
- Then, it repeats a melody twice in a second for loop.
- Then it plays a final fourth melody after the second for loop.

Requirements

- Create a for loop to repeat a melody twice.
- Inside the for loop, add a melody.
- After the first for loop, add a melody



Micro:bit board with a green 'A' and a green 'B' on the screen.

Search

def on_forever():

pass

basic.forever(on_forever)

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Explorer

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3. Tempo Buttons

Challenge

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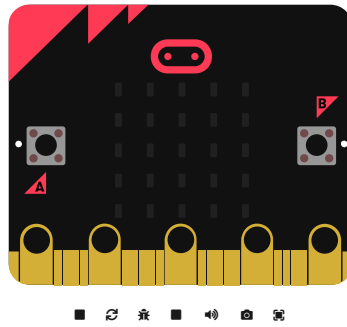
Tempo Buttons

Create a program that plays the same melody at different tempos.

1. If the button A is pressed, play the melody at the fastest tempo allowed, (500)
2. If the button B is pressed, play the melody at the slowest tempo allowed, (40)
3. If neither button is pressed, display the **HAPPY** icon.

Requirements

- Create the forever function
- If the button A is pressed, play the melody at a tempo of 500 bpm
- Elif the button B is pressed, play the melody at a tempo of 40



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forever

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4. Metronome

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Metronome

A metronome is a tool that musicians use to keep time while making music. It repeats the same sound at a certain tempo. The musician plays it so they can know how fast or slow to play their music.

Create a program that works like a metronome!

The program will play the A note with a break between the note over and over at a tempo of **120** beats per minute.

```
music.play_melody("A - A - A - A - ", 120)
```

If the gesture is **logo_up**, play the metronome at 120 bpm.

If the gesture is **logo_down**, play the metronome at 200 bpm.

Else, display the **EIGHT_NOTE** icon.

Requirements

- Create the forever function

Step 1

Create the forever function.

Metronome Step 1 of 4

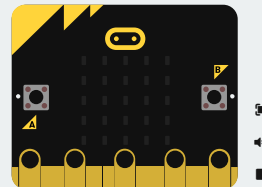
1

Next

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```
1 def on_forever():
2     pass
3     basic.forever(on_forever)
4
```



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5. Music and Temperature

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Music and Temperature

Create a program that will display the **FABULOUS** icon and play the Sitka melody if the temperature goes above 30 degrees.

Else, it will display the **QUARTER_NOTE** icon.

Requirements

- Create the forever function
- Inside the forever function, create a variable named temp.
- Create an if statement to check if the variable named temp is greater than 30
- If the variable named temp is greater than 30, display the icon named FABULOUS

Step 1

Create the forever function

Music and Temperature Step 1 of 4



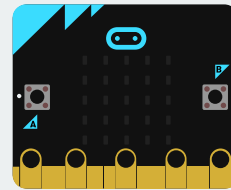
1

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```
1 def on_forever():
2     pass
3     basic.forever(on_forever)
4
```



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Answer Keys & Solutions

Questions

1. What will happen when you run these two lines of code one after another?

MULTIPLE CHOICE

Correct Answer:

- A. Both melodies play at the same speed ✗ Incorrect
- B. The first melody plays slower than the second ✓ Correct
- C. The first melody plays faster than the second ✗ Incorrect
- D. Only the second melody plays ✗ Incorrect

Explanation:

Higher tempo numbers mean faster playback speed.

2. A student wants to make their melody play very quietly. What should they do with this code?

MULTIPLE CHOICE

Correct Answer:

- A. Change 127 to a higher number ✗ Incorrect
- B. Change 127 to a lower number ✓ Correct
- C. Change 120 to a lower number ✗ Incorrect
- D. Remove the set_volume command ✗ Incorrect

Explanation:

Lower volume numbers make quieter sounds, just like turning down a radio.

3. What will happen if you run this code while a melody is already playing?

MULTIPLE CHOICE

Correct Answer:

- A. Both melodies play together ✗ Incorrect
- B. The second melody waits for the first to finish ✗ Incorrect
- C. The first melody stops and no sound plays ✓ Correct
- D. Only the second melody plays ✗ Incorrect

Explanation:

The `stop_all_sounds()` command immediately stops any music that is playing.

4. A student wants their music to play twice as fast as the default speed. What tempo should they use?

MULTIPLE CHOICE

Correct Answer:

- A. 60 ✗ Incorrect
- B. 120 ✗ Incorrect
- C. 240 ✓ Correct
- D. 480 ✗ Incorrect

Explanation:

The default tempo is 120, so twice as fast would be 120×2 .

5. You want to create a sound-based game where different gestures play different preset melodies. What programming concepts do you need to combine?

MULTIPLE CHOICE

Correct Answer:

- A. Only music commands ✗ Incorrect
- B. Music commands and gesture detection ✓ Correct
- C. Only gesture detection ✗ Incorrect
- D. Music commands and temperature sensors ✗ Incorrect

Explanation:

You need to detect movement gestures and then play specific melodies based on those gestures.

6. What is wrong with this melody code?

MULTIPLE CHOICE

Correct Answer:

- | | |
|---|-------------|
| A. Missing quotation marks around the notes | ✓ Correct |
| B. Wrong tempo number | ✗ Incorrect |
| C. Notes are in wrong order | ✗ Incorrect |
| D. Missing spaces between notes | ✗ Incorrect |

Explanation:

The melody notes must be written as a string, which means they need quotation marks.

7. You want to create a musical alarm that plays the "Tokyo" melody very loudly and very fast when the temperature gets too hot. What values should you use?

MULTIPLE CHOICE

Correct Answer:

- | | |
|----------------------------|-------------|
| A. Volume: 50, Tempo: 60 | ✗ Incorrect |
| B. Volume: 200, Tempo: 200 | ✓ Correct |
| C. Volume: 10, Tempo: 300 | ✗ Incorrect |
| D. Volume: 127, Tempo: 30 | ✗ Incorrect |

Explanation:

High volume numbers make loud sounds, and high tempo numbers make fast music.

8. A student wants to create a simple piano where button A plays one note and button B plays a different note. What approach should they take?

MULTIPLE CHOICE

Correct Answer:

A. Use preset melodies for each button

✗ Incorrect

B. Create custom single-note melodies for each button

✓ Correct

C. Use the same melody with different tempos

✗ Incorrect

D. Use only volume changes

✗ Incorrect

Explanation:

A piano plays individual notes, so each button should play a melody with just one note.

9. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 play_melody("C D E F G A B C5 ", 120)
```

Correct Solution:

```
1 music.play_melody("C D E F G A B C5 ", 120)
```

Explanation:

This code is missing music.

10. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 music.setVolume(98)
```

Correct Solution:

```
1 music.set_volume(98)
```

Explanation:

This code needs an underscore.