

Forever Function

Textbook

Forever Function



Right now, your code will run one time from top to bottom. It will run each time you hit the "Play" button.

Let's learn how to make it repeat over and over again forever. We will use a function to do this.

A [function](#) is a chunk of code that gives extra instructions.

Let's start by adding two icons, one small heart and one big heart.

```
1 basic.show_icon(IconNames.SMALL_HEART)
2 basic.show_icon(IconNames.HEART)
```

Currently, this code will run one time when we hit "Run" and then stop. What if we want it to repeat over and over again?

The Forever Function

We do this by adding a forever function. When we create a function, we use the word `def` to signal that the code is a function. For this example the name of the function is `on_forever`, so it looks like this.

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

So to review, this code has a function named `on_forever()` .

Don't forget to use the parentheses and the colon after the name of the function!

The code `basic.forever(on_forever)` is also needed to make the function run. This is the function call. This tells the function to start running.

Now, we add the code we want to repeat over and over again beneath the function name.

```
1 def on_forever():
2     basic.show_icon(IconNames.SMALL_HEART)
3     basic.show_icon(IconNames.HEART)
4 basic.forever(on_forever)
```

IMPORTANT! Make sure you indent your code one space. For everything inside the forever function, indent it one space by using the **TAB key**.

This example shows a heart that goes from little to big over and over again. It looks like a beating heart!

You can put as many code commands you want in the forever function! Try playing around with adding more commands.

Adopted from microbit.org platform

Critical Thinking Questions

- Imagine you have a robot that needs to continuously monitor a factory for problems. Why would a program that runs over and over again without stopping be essential for this robot's job, compared to one that only runs once?
- Think about an automated system in your daily life, like a sprinkler system for a garden or a blinking traffic light. How does the idea of a "loop" that repeats commands endlessly help these systems work reliably and efficiently?
- When might it be a problem if a program was designed to run forever, without any way to stop it or change what it's doing? Give a specific example where this continuous repetition might cause issues.

Questions (10)

1. A student wants to create a blinking light that repeats continuously. They write this code but it only blinks once. What do they need to add to make it repeat forever?

MULTIPLE CHOICE

Choose the correct answer:

- A. Add more show_icon commands
- B. Wrap the code in a forever function
- C. Add a pause command
- D. Use show_leds instead

2. What syntax error needs to be fixed in this code?

MULTIPLE CHOICE

```
def on_forever() basic.show_number(5) basic.show_number(10) basic.forever(on_forever)
```

Choose the correct answer:

- A. Missing colon after on_forever()
- B. Missing quotation marks around the numbers
- C. forever needs to be capitalized
- D. Both A and C are wrong

3. You want to create a program that shows your name, then shows your age, and repeats this pattern forever. How many commands will you need inside your forever function?

MULTIPLE CHOICE

Choose the correct answer:

- A. 1 command
- B. 2 commands
- C. 3 commands
- D. 4 commands

4. A student creates a forever function but their animation runs too fast to see clearly. What should they add inside the function to slow it down?

MULTIPLE CHOICE

Choose the correct answer:

- A. More show commands
- B. A clear_screen command
- C. Pause commands between the actions
- D. A second forever function

5. You want to create a beating heart effect that alternates between a small heart and big heart with a pause between each. How should you structure the code inside your forever function?

MULTIPLE CHOICE

Choose the correct answer:

- A. Show small heart, show big heart, pause once at the end
- B. Show small heart, pause, show big heart, pause
- C. Pause first, then show both hearts
- D. Show both hearts at the same time, then pause

6. A student asks why they need to use def at the beginning of their forever function. What is the best explanation?

MULTIPLE CHOICE

Choose the correct answer:

- A. def makes the code run faster
- B. def tells Python that you are creating a function
- C. def is short for "default" settings
- D. def makes the code repeat forever

7. You create a forever function that shows 5 different icons in sequence. A friend asks how many times the icons will display when you run the program. What should you tell them?

MULTIPLE CHOICE

Choose the correct answer:

- A. Exactly 5 times, then it stops
- B. 10 times total, then it stops
- C. It will keep showing the sequence over and over until you stop the program
- D. Only once, then you have to press run again

8. A student wants to create a program that shows "Loading..." text and then three dots appearing one by one, repeating this pattern forever. They write the forever function but the dots appear too quickly. What is the best solution?

MULTIPLE CHOICE

Choose the correct answer:

- A. Remove some of the dots
- B. Add pause commands after each dot appears
- C. Use a different forever function for each dot
- D. Put all the dots in one show_string command

9. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 function on_forever():
2     basic.show_icon(IconNames.SMALL_HEART)
3     basic.show_icon(IconNames.HEART)
4 basic.forever(on_forever)
```

10. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 def on_forever():
2     basic.show_icon(IconNames.FACE)
3     basic.show_icon(IconNames.DUCK)
4 basic_forever(on_forever)
```

Robotics Challenges (5)

1. Heart Beating Forever

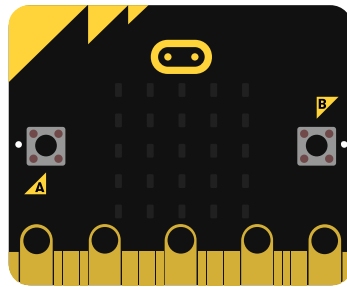
Heart Beating Forever

Create a program that looks like a heart beating. It will show the **HEART** icon and the **SMALL_HEART** icon in a forever function. That way it will keep working over and over again, to look like a beating heart.

1. Create the forever function `on_forever()`:
2. Inside the forever function, display the **HEART** icon. Don't forget to indent!
3. Inside the forever function, display the **SMALL_HEART** icon. Don't forget to indent!

Requirements

- ☐ Create the forever function
- ☐ Inside the forever function, display the **HEART** icon. Don't forget to indent!



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2. Cheering Forever!

Cheering Forever!

Create a program that will repeat a string forever.

Your string should say **Keep Going!**

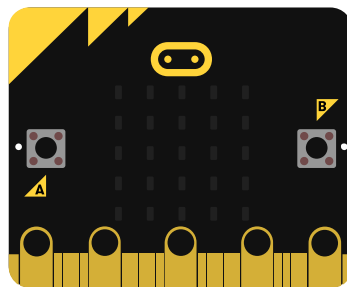
1. Create the forever function
2. Inside the forever function, display the string **Keep Going!**

Requirements

- ☐ Create the forever function
- ☐ Inside the forever function, display the string **Keep Going!**

Answer Key

Submit



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3. Facial Expressions

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Facial Expressions

Create a program that shows a smiley face making different expressions. Try making it talk or frown or make an O. Put your program in a forever function.

Use at least 5 different images in your program.

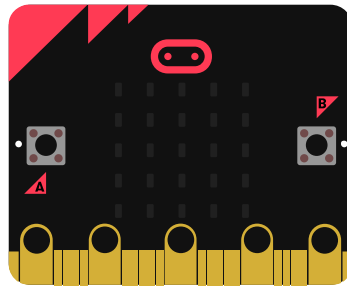
These images will be displayed using the LED lights.

Requirements

- Create the forever function
- Inside the forever function, show 5 different images

Answer Key

Submit



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4. Countdown

Challenge

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Countdown

Create a program that will count down from 5 to one and then displays an image of a rocket ship.

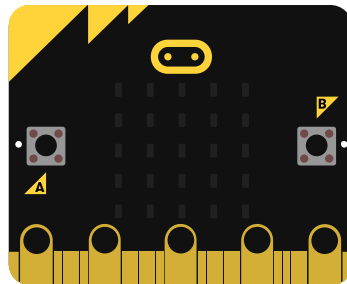
The micro:bit will display the number 5, then the number 4, all the way down to the number 1.

Then, it will display an image that looks like a rocket ship. (You will make this yourself)

It will repeat this countdown in a forever function.

Requirements

- Create the forever function
- The micro:bit will display the number 5, then the number 4, all the way down to the number 1.
- Then, it will display an image that looks like a rocket ship. (You will make this yourself)



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5. Flip Book Animations

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Flip Book Animations

Create an animation that repeats over and over. Have you seen flip books that look like images are moving when you flip through them quickly?

Create an animation with at least 10 images that is in a forever function.

Requirements

Create the forever function

Inside the forever function, add 10 images

Answer Key

Submit

Step 1

Create the forever function.

Flip Book Animations Step 1 of 3



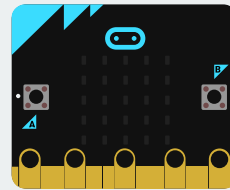
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```
1 def on_forever():
2     pass
3     basic.forever(on_forever)
4
```



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Answer Keys & Solutions

Questions

1. A student wants to create a blinking light that repeats continuously. They write this code but it only blinks once. What do they need to add to make it repeat forever?

MULTIPLE CHOICE

Correct Answer:

- | | |
|----------------------------------------|-------------|
| A. Add more show_icon commands | ✗ Incorrect |
| B. Wrap the code in a forever function | ✓ Correct |
| C. Add a pause command | ✗ Incorrect |
| D. Use show_leds instead | ✗ Incorrect |

Explanation:

To make code repeat continuously, you need a special function structure.

2. What syntax error needs to be fixed in this code?

MULTIPLE CHOICE

Correct Answer:

- | | |
|-----------------------------------------------|-------------|
| A. Missing colon after on_forever() | ✓ Correct |
| B. Missing quotation marks around the numbers | ✗ Incorrect |
| C. forever needs to be capitalized | ✗ Incorrect |
| D. Both A and C are wrong | ✗ Incorrect |

Explanation:

Something is missing in the forever function.

3. You want to create a program that shows your name, then shows your age, and repeats this pattern forever. How many commands will you need inside your forever function?

MULTIPLE CHOICE

Correct Answer:

- A. 1 command ✗ Incorrect
- B. 2 commands ✓ Correct
- C. 3 commands ✗ Incorrect
- D. 4 commands ✗ Incorrect

Explanation:

Count what you want to show: name and age.

4. A student creates a forever function but their animation runs too fast to see clearly. What should they add inside the function to slow it down?

MULTIPLE CHOICE

Correct Answer:

- A. More show commands ✗ Incorrect
- B. A clear_screen command ✗ Incorrect
- C. Pause commands between the actions ✓ Correct
- D. A second forever function ✗ Incorrect

Explanation:

To control timing in animations, you need to add delays between actions.

5. You want to create a beating heart effect that alternates between a small heart and big heart with a pause between each. How should you structure the code inside your forever function?

MULTIPLE CHOICE

Correct Answer:

- A. Show small heart, show big heart, pause once at the end ✗ Incorrect

B. Show small heart, pause, show big heart, pause

✓ Correct

C. Pause first, then show both hearts

✗ Incorrect

D. Show both hearts at the same time, then pause

✗ Incorrect

Explanation:

For a smooth beating effect, you need timing between each heart size.

6. A student asks why they need to use def at the beginning of their forever function. What is the best explanation?

MULTIPLE CHOICE

Correct Answer:

A. def makes the code run faster

✗ Incorrect

B. def tells Python that you are creating a function

✓ Correct

C. def is short for "default" settings

✗ Incorrect

D. def makes the code repeat forever

✗ Incorrect

Explanation:

The word def has a specific purpose in Python for creating functions.

7. You create a forever function that shows 5 different icons in sequence. A friend asks how many times the icons will display when you run the program. What should you tell them?

MULTIPLE CHOICE

Correct Answer:

A. Exactly 5 times, then it stops

✗ Incorrect

B. 10 times total, then it stops

✗ Incorrect

C. It will keep showing the sequence over and over until you stop the program

✓ Correct

D. Only once, then you have to press run again

✗ Incorrect

Explanation:

Think about what "forever" means in the context of this function.

8. A student wants to create a program that shows "Loading..." text and then three dots appearing one by one, repeating this pattern forever. They write the forever function but the dots appear too quickly. What is the best solution?

MULTIPLE CHOICE

Correct Answer:

- A. Remove some of the dots ✗ Incorrect
- B. Add pause commands after each dot appears ✓ Correct
- C. Use a different forever function for each dot ✗ Incorrect
- D. Put all the dots in one show_string command ✗ Incorrect

Explanation:

When animations happen too fast, you need to control the timing between each step.

9. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 function on_forever():  
2     basic.show_icon(IconNames.SMALL_HEART)  
3     basic.show_icon(IconNames.HEART)  
4 basic.forever(on_forever)
```

Correct Solution:

```
1 def on_forever():  
2     basic.show_icon(IconNames.SMALL_HEART)  
3     basic.show_icon(IconNames.HEART)  
4 basic.forever(on_forever)
```

Explanation:

The word function needs to be something else.

10. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 def on_forever():
2     basic.show_icon(IconNames.FACE)
3     basic.show_icon(IconNames.DUCK)
4 basic_forever(on_forever)
```

Correct Solution:

```
1 def on_forever():
2     basic.show_icon(IconNames.FACE)
3     basic.show_icon(IconNames.DUCK)
4 basic.forever(on_forever)
```

Explanation:

An underscore needs to be replaced with something else.