

Moving the Turtle

Textbook

Moving the Turtle



A turtle can move in four directions:

1. Forward
2. Backward
3. Left
4. Right

The turtle moves forward or backward in the way it's facing. The little arrow is pointing the direction it's facing.

You can make it turn left or right by a certain amount. This turns the turtle that direction the number of degrees. So 90 degrees to the right would turn it horizontally to the right. 180 degrees would turn it around.

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(50)
5 turtle.left(90)
6 turtle.forward(50)
```

Try the code to see what happens!

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(50)
5 turtle.left(90)
6 turtle.forward(50)
7 turtle.right(90)
8 turtle.forward(50)
```

You can move the turtle forward or backward.

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(50)
5 turtle.left(90)
6 turtle.backward(50)
```

Try using different values to see where your turtle could go!

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(50)
5 turtle.left(65)
6 turtle.forward(50)
```

Algorithms

An algorithm is a set of step-by-step instructions to solve a problem or complete a task. We have just created an algorithm to move our turtle forward!

Algorithms are used in many areas, like finding the quickest way to get somewhere, sorting a list of names in order, or recommending a movie based on what you've watched before. They're basically the "how" behind many things computers do.

Sequencing

The order of the code lines is important for algorithms to work.

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(100)
5 turtle.left(65)
6 turtle.forward(100)
```

1. We need to import the Turtle library before we can use it. So the code line that says import turtle needs to be before the code to get the screen.
2. The code to start the screen needs to be before we can move the turtle.
3. Then the order that we tell the turtle to move will affect the order that it moves.

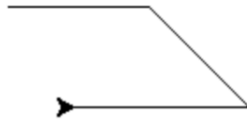
Putting code in the correct order is called [sequencing](#). Sequencing is important to make the program run the way you want it to.

Checkpoint

Moving the Turtle

Practice moving your turtle!

1. Include the necessary code to start up a python screen (import the library and generate a screen).
2. Move your turtle forward 80.
3. Rotate your turtle to the right 45 degrees.
4. Move your turtle forward 80.
5. Rotate your turtle to the left 45 degrees.
6. Move your turtle backward 100.



Requirements:

- Import the turtle library and generate a turtle screen.
- Move your turtle forward 80.
- Rotate your turtle to the right 45 degrees.
- Move your turtle forward 80.
- Rotate your turtle to the left 45 degrees.
- Move your turtle backward 100.

Questions (10)

1. What are the four directions the turtle can move?

MULTIPLE CHOICE

Choose the correct answer:

- A. Up, Down, Left, Right.
- B. Forward, Backward, Left, Right.
- C. North, South, East, West.
- D. Clockwise, Counterclockwise, Up, Down.

2. In the code `turtle.right(50)`, what does the number 50 represent?**Choose the correct answer:**

- A. Degrees
- B. Distance
- C. Direction
- D. Color code

3. What happens when you execute the following code ?

```
turtle.right(90)
```

Choose the correct answer:

- A. Turtle moves backward.
- B. Turtle turns 90 degrees to the right.
- C. Turtle turns 90 degrees to the left.
- D. Turtle changes color.

4. What is the purpose of the code line `import turtle`?**Choose the correct answer:**

- A. To change the turtle's color.
- B. To import the turtle library.
- C. To start the turtle screen.
- D. To move the turtle forward.

5. How is sequencing described in the passage?**Choose the correct answer:**

- A. Moving the turtle forward.
- B. Telling the turtle to go in different directions.
- C. Putting code in the correct order.
- D. Turning the turtle left or right.

6. Why is the order of code lines important in programming?

Choose the correct answer:

- A. It affects the turtle's color.
- B. It determines the turtle's speed.
- C. The order of the code determines the order that the turtle moves.
- D. It changes the turtle's shape.

7. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(50)
5 turtle.left(90
```

8. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.backwards(20)
```

9. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 import turtle
2 turtle.getscreen(
3
4 turtle.right(30)
5 turtle.forward(10)
```

10. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 import turtles
2 turtle.getscreen()
3
4 turtle.backward(100)
5 turtle.left(70)
```

Challenges (5)

1. Box Turtle

Instruct your turtle to draw a box! Did you know the box turtle is a popular kind of turtle for a pet? Box turtles are resilient and adaptable.

Create a program where a box turtle draws a box! A box for a box turtle.

1. Import the turtle library and generate a turtle screen
2. The box should have 4 sides with a length of `40`.
3. The box should have `90` degree angles.

Image from The Spruce / J. R. Bee



Requirements:

- Import the turtle library and generate a turtle screen
- The box should have 4 sides with a length of `40`.
- The box should have `90` degree angles.

2. Checkmark

Use your turtle to draw a checkmark!

1. Include the necessary code to start up a python screen (import the library and generate a screen)
2. Rotate your turtle to the right 60 degrees.
3. Move your turtle forward 50.
4. Rotate your turtle to the left 125 degrees.
5. Move your turtle forward 100.



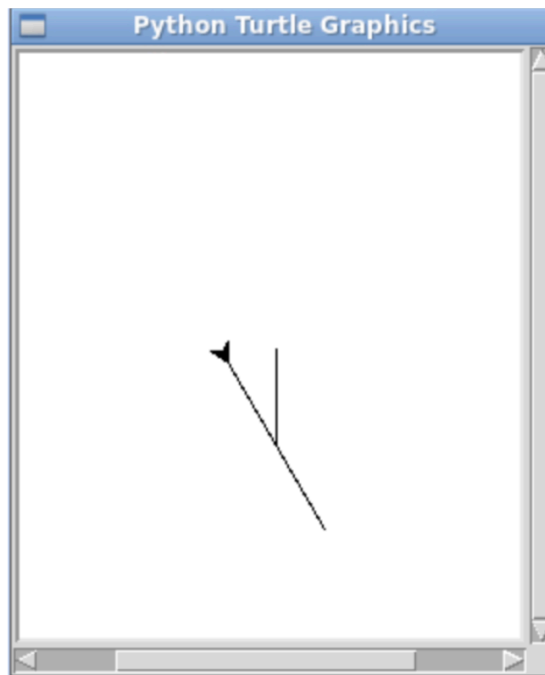
Requirements:

- Import the turtle library and generate a turtle screen
- Rotate your turtle to the right 60 degrees.
- Move your turtle forward 50.
- Rotate your turtle to the left 125 degrees.
- Move your turtle forward 100.

3. Forward and Backward

Practice moving your turtle.

1. Include the necessary code to start up a python screen (import the library and generate a screen.
2. Rotate your turtle 90 degrees to the right.
3. Move your turtle 50 forward.
4. Rotate your turtle 30 degrees to the left.
5. Move your turtle 50 forward.
6. Move your turtle 100 backward.



Requirements:

- Include the necessary code to start up a python screen (import the library and generate a screen.)
- Rotate your turtle 90 degrees to the right.
- Move your turtle 50 forward.
- Rotate your turtle 30 degrees to the left.
- Move your turtle 50 forward.
- Move your turtle 100 backward.

4. Snowboarding Turtle

Let's say your turtle is really good at snowboarding! In snowboarding, 3 flips in a row is called a 1080 because you rotate 360 degrees three times.

Your turtle wants to do a trick where it flips three times, moves forward and flips twice back but lands facing the other way.

1. Include the necessary code to start up a python screen (import the library and generate a screen)
2. Rotate your turtle to the left 1080 degrees.
3. Move the turtle forward 100
4. Rotate your turtle to the right 900 degrees



Requirements:

- Import the turtle library and generate a turtle screen
- Rotate your turtle to the left 1080 degrees.
- Move the turtle forward 100.
- Rotate your turtle to the right 900 degrees.

5. Mountain Range

Draw a mountain range!

1. Include the necessary code to start up a python screen (import the library and generate a screen)
2. Rotate your turtle to the left 70 degrees.
3. Move your turtle forward 50.
4. Rotate your turtle to the right 125 degrees.
5. Move your turtle forward 30.
6. Rotate your turtle to the left 120 degrees.
7. Move your turtle forward 100.
8. Rotate your turtle to the right 125 degrees.
9. Move your turtle forward 140.



Requirements:

- Import the turtle library and generate a turtle screen.
- Rotate your turtle to the left 70 degrees.
- Move your turtle forward 50.
- Rotate your turtle to the right 125 degrees.
- Move your turtle forward 30.
- Rotate your turtle to the left 120 degrees.
- Move your turtle forward 100.
- Rotate your turtle to the right 125 degrees.

- Move your turtle forward 140.

Answer Keys & Solutions

Checkpoint Solutions

Moving the Turtle

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(80)
5 turtle.right(45)
6 turtle.forward(80)
7 turtle.left(45)
8 turtle.backward(100)
```

Questions

1. What are the four directions the turtle can move?

MULTIPLE CHOICE

Correct Answer:

- A. Up, Down, Left, Right. ✗ Incorrect
- B. Forward, Backward, Left, Right. ✓ Correct
- C. North, South, East, West. ✗ Incorrect
- D. Clockwise, Counterclockwise, Up, Down. ✗ Incorrect

Explanation:

You can just tell the turtle to move forward or backward or to turn.

2. In the code `turtle.right(50)`, what does the number 50 represent?

MULTIPLE CHOICE

Correct Answer:

- A. Degrees ✓ Correct
- B. Distance ✗ Incorrect
- C. Direction ✗ Incorrect

D. Color code

✗ Incorrect

Explanation:

The turtle rotates in degrees

3. What happens when you execute the following code ?

MULTIPLE CHOICE

Correct Answer:

A. Turtle moves backward.

✗ Incorrect

B. Turtle turns 90 degrees to the right.

✓ Correct

C. Turtle turns 90 degrees to the left.

✗ Incorrect

D. Turtle changes color.

✗ Incorrect

Explanation:

The number inside the parentheses indicates degrees.

4. What is the purpose of the code line import turtle?

MULTIPLE CHOICE

Correct Answer:

A. To change the turtle's color.

✗ Incorrect

B. To import the turtle library.

✓ Correct

C. To start the turtle screen.

✗ Incorrect

D. To move the turtle forward.

✗ Incorrect

Explanation:

Import means to bring a library in.

5. How is sequencing described in the passage?

MULTIPLE CHOICE

Correct Answer:

A. Moving the turtle forward.

✗ Incorrect

B. Telling the turtle to go in different directions.

✗ Incorrect

C. Putting code in the correct order.

✓ Correct

D. Turning the turtle left or right.

✗ Incorrect

Explanation:

Sequencing is the order that commands appear in the code

6. Why is the order of code lines important in programming?

MULTIPLE CHOICE

Correct Answer:

A. It affects the turtle's color.

✗ Incorrect

B. It determines the turtle's speed.

✗ Incorrect

C. The order of the code determines the order that the turtle moves.

✓ Correct

D. It changes the turtle's shape.

✗ Incorrect

Explanation:

The order of the code affects the turtle's movement

7. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(50)
5 turtle.left(90
```

Correct Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(50)
5 turtle.left(90)
```

Explanation:

This code is missing a parenthesis

8. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.backwards(20)
```

Correct Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.backward(20)
```

Explanation:

The word backwards is wrong.

9. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 import turtle
2 turtle.getscreen(
3
4 turtle.right(30)
5 turtle.forward(10)
```

Correct Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.right(30)
5 turtle.forward(10)
```

Explanation:

This code is missing parentheses

10. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 import turtles
2 turtle.getscreen()
3
4 turtle.backward(100)
5 turtle.left(70)
```


Correct Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.backward(100)
5 turtle.left(70)
```

Explanation:

turtles is not the right word

Challenges

1. Box Turtle

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.forward(40)
5 turtle.right(90)
6 turtle.forward(40)
7 turtle.right(90)
8 turtle.forward(40)
9 turtle.right(90)
10 turtle.forward(40)
```

2. Checkmark

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.right(60)
5 turtle.forward(50)
6 turtle.left(125)
7 turtle.forward(100)
```

3. Forward and Backward

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.right(90)
5 turtle.forward(50)
```

```
6 turtle.left(30)
7 turtle.forward(50)
8 turtle.backward(100)
```

4. Snowboarding Turtle

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.left(1080)
5 turtle.forward(100)
6 turtle.right(900)
```

5. Mountain Range

Solution:

```
1 import turtle
2 turtle.getscreen()
3
4 turtle.left(70)
5 turtle.forward(50)
6 turtle.right(125)
7 turtle.forward(30)
8 turtle.left(120)
9 turtle.forward(100)
10 turtle.right(125)
11 turtle.forward(140)
```