

## Turtles Error Messaging and Debugging

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### Textbook

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## Turtle Error Messages & Debugging



Working through bugs is a normal part of coding. When we code, we often face challenges and need to figure out solutions. It's like solving puzzles. We try things, make changes, and fix any bugs we find.

This process of problem-solving is also helpful in everyday life when we encounter difficulties.

In programming, finding bugs can be tricky. But if we learn more about the types of bugs and the error messages they give us, it becomes easier to find and fix them quickly.

### Error Types

There are different kinds of issues your program might face. If your code isn't doing what you expect, it could be because you typed the Python syntax correctly, but the logical flow of the Python commands doesn't work. When you're analyzing bugs, think about various reasons why it might not be working as you want.

There are different kinds of bugs/errors:

**Syntax error** – The characters were typed in incorrectly (for example, missing a semicolon in the right place)

**Runtime error** – When the code is correct, but can run into issues depending on how the program is run. An example of a runtime error is when we try to divide any number by zero.

**Logic error** – The code is technically written without mistakes, but the logic doesn't accomplish what it is supposed to. For example, the code is running just fine, but it's not passing the challenge. This is because the code is fine, but isn't accomplishing what the directions say. Logic errors are particularly common in Skill Struck.

When combing through code that's not working, consider each kind of problem to find the bug. It may not be a problem with the way it's typed.

## Python: Read the Error

Often, people get an error and immediately give up or get frustrated without ever reading what the error itself says. However, it can give us clues as to where the problem is.

- Check the error for any mention of a line in your code that might be the problem.
- If something is **undefined**, that often means there is a variable that hasn't been created yet.
- For Python, check for indentation inconsistencies.

Take some time to read through the error and find clues there. You can practice with a few common error messages here.

### Example 1

```
File "/home/main.py", line 3
```

```
= earningsgoal/12
```

```
IndentationError: unexpected indent
```

This error message shows that on line 3 there is an indentation problem. So check your indentation near line 3. Check the lines directly before and after line 3 to see if there's a problem.

### Example 2

```
File "/home/main.py", line 3, in <module>
```

```
months = earningsgoal/12
```

```
TypeError: unsupported operand type(s) for /: 'str' and 'int'
```

This error message means that on line 3, a variable is being used that is the wrong variable type. **str** and **int** are referring to the variable types string and integer. Check to see if you are trying to use a string to do math. If you are, remember to convert it to an integer using `int()`.

### Example 3

```
File "/home/main.py", line 3, in <module>
```

```
months = earningsgoal/12
```

```
NameError: name 'earningsgoal' is not defined
```

This error message means that a variable is being used that hasn't been defined (or created) yet. In this case, the variable **earningsgoal** needs to be created before we can do something with it.

## Where is the Error Message?

If the error message shows up in the black console on the bottom right of your Skill Struck code page, this means there's a problem with the actual functionality of your code. This indicates that your bug is more likely a **syntax error**.

If the error message shows up in the requirements of a specific challenge or checkpoint on the left of your Skill Struck code page, this means that your code doesn't meet what the challenge or checkpoint is looking for. This indicates that your bug is more likely a **logic error**.

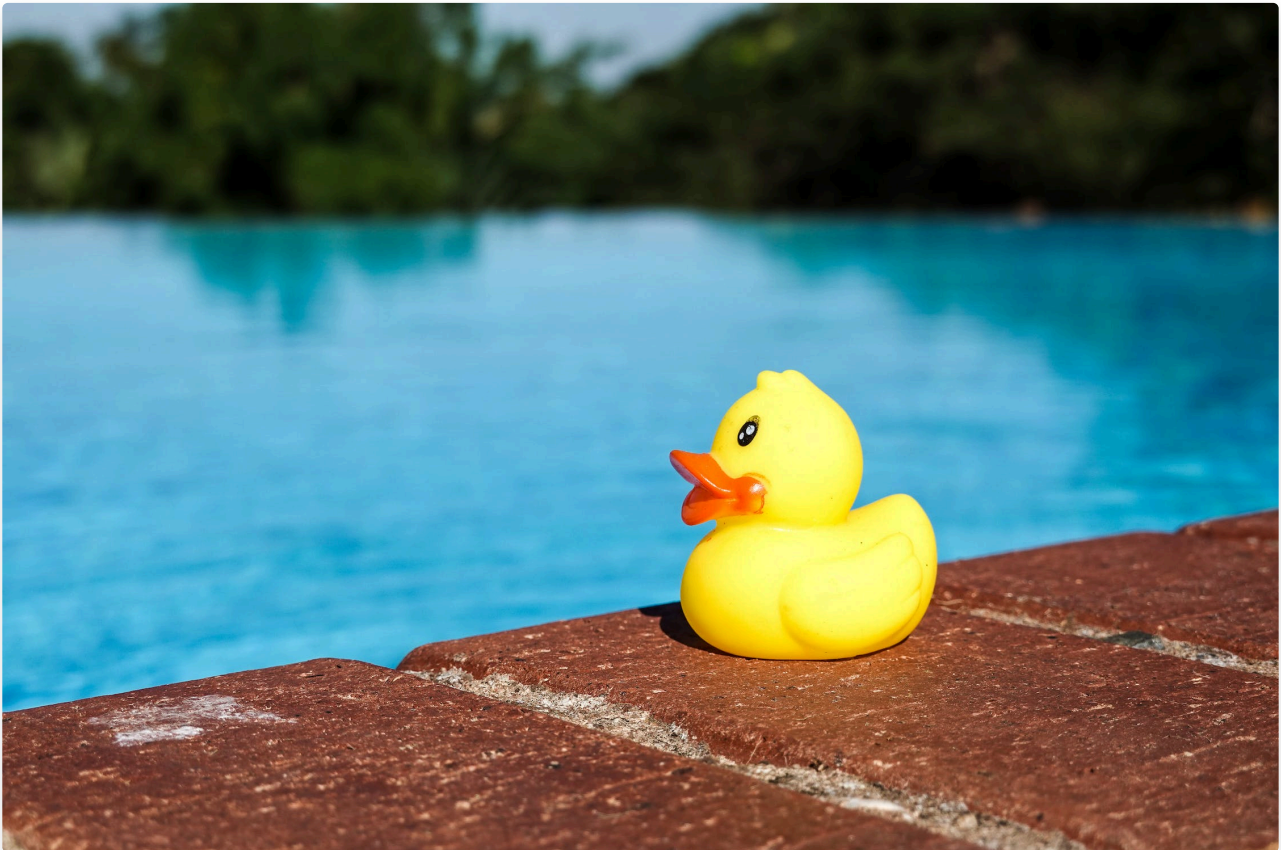
Sometimes, identifying what kind of problem you are having with your code can help you find the bug.

## Retype the Code

Sometimes, some strange spacing causes code to not run correctly. Try retyping the code out from scratch and see if it eliminates unusual hiccups in code.

Retyping out code is a good approach, because it forces you to look at each character individually. This often helps identify bugs that your eye just passes over when you're just looking for it.

## Rubber Duck Method



A great method that is common in computer science is referred to as the "rubber duck method." The idea is that you talk through the problem out loud -- some people find it easier to talk "to something" like a rubber duck on their desk. Often, through the process of vocalizing your problem you're able to think through the answer before you've even finished explaining the problem.

## Backtrack to a Working Code

When code breaks, it's helpful to instruct students to backtrack what they've done back to a code that still works. From there, you can step by step retrace the code you tried until you can identify what they added that stopped it from working. Then you can identify where the bug is.

## Editing All Instances of a Word At Once

Sometime you'll want to edit all instances of a word in a chunk of code at once. This is done by highlighting the code you want, then press **command + shift + L**. (Or **ctrl + shift + L**). This will highlight all of the places in your code where that word appears and allows you to edit them all at once. You can create more code faster with this keyboard shortcut.

## Summary

Debugging is just a part of coding. It's all part of the puzzle solving of putting working code together. Sometimes it can be difficult to identify the problem.



In this lesson we talked about different strategies that help with debugging. We examined the different types of errors. We explored different strategies such as noticing the color scheme, retyping the code, the rubber duck method, reading the error message, and backtracking to a working code. These tips will help everyone debug quicker and easier.

## Questions (9)

**1. What are the three main types of errors? Select 3.**

SELECT MULTIPLE

Select all that apply:

- A. syntax
- B. logic
- C. runtime
- D. language

**2. True or False: Working through bugs is just a part of the coding process.**

MULTIPLE CHOICE

Choose the correct answer:

- A. True
- B. False

**3. Which of the following are strategies you can use to find the bug? Select all that apply.**

SELECT MULTIPLE

Select all that apply:

- A. Keep coding and often it will fix itself.
- B. Rubber duck method.
- C. Read the error message.
- D. Check the color of the code in the editor.
- E. Backtrack to a working code.
- F. Retype the code.

#### 4. True or False: The rubber duck method is only used by beginners who are learning code

MULTIPLE CHOICE

Choose the correct answer:

- A. True
- B. False

#### 5. In the following error, what line of code has a problem?

MULTIPLE CHOICE

File `"/home/main.py"`, line 5 `days = weeks / 7` IndentationError: unexpected indent

Choose the correct answer:

- A. Line 5
- B. Line 7
- C. Line 1
- D. Line 10

#### 6. What is the problem with the code that threw this error?

MULTIPLE CHOICE

File `"/home/main.py"`, line 4, in `weeks = months / 4` NameError: name 'months' is not defined

Choose the correct answer:

- A. There's an indentation problem.
- B. The variable named "months" hasn't been created yet.
- C. The wrong variable type is being used.
- D. The tag isn't showing up.

#### 7. Which type of error is where the characters were typed in incorrectly?

MULTIPLE CHOICE

Choose the correct answer:

- A. syntax error
- B. logic error
- C. runtime error

**8. True or False: All code editors have the same color scheme.**

**Choose the correct answer:**

- A. True
- B. False

**9. What is likely the problem with a chunk of code that threw this error?**

File "/home/main.py", line 3 = earningsgoal/12 IndentationError: unexpected indent

**Choose the correct answer:**

- A. An indentation problem.
- B. A missing closing tag.
- C. Use of a variable that hasn't been created yet.
- D. A runtime error.

## Answer Keys & Solutions

### Questions

1. What are the three main types of errors? Select 3.

SELECT MULTIPLE

Correct Answers:

A. syntax ✓ Correct

B. logic ✓ Correct

C. runtime ✓ Correct

D. language ✗ Incorrect

#### Explanation:

language is not an error type

2. True or False: Working through bugs is just a part of the coding process.

MULTIPLE CHOICE

Correct Answer:

A. True ✓ Correct

B. False ✗ Incorrect

#### Explanation:

Professional programmers work through bugs every day

3. Which of the following are strategies you can use to find the bug? Select all that apply.

SELECT MULTIPLE

Correct Answers:

A. Keep coding and often it will fix itself. ✗ Incorrect

B. Rubber duck method. ✓ Correct

C. Read the error message.

✓ Correct

D. Check the color of the code in the editor.

✓ Correct

E. Backtrack to a working code.

✓ Correct

F. Retype the code.

✓ Correct

#### Explanation:

There are 5 correct answers

### 4. True or False: The rubber duck method is only used by beginners who are learning code

MULTIPLE CHOICE

Correct Answer:

A. True

✗ Incorrect

B. False

✓ Correct

#### Explanation:

Professional programmers frequently use the rubber duck method

### 5. In the following error, what line of code has a problem?

MULTIPLE CHOICE

Correct Answer:

A. Line 5

✓ Correct

B. Line 7

✗ Incorrect

C. Line 1

✗ Incorrect

D. Line 10

✗ Incorrect

#### Explanation:

Check where it says "line"



## 6. What is the problem with the code that threw this error?

MULTIPLE CHOICE

Correct Answer:

- A. There's an indentation problem. ✗ Incorrect
- B. The variable named "months" hasn't been created yet. ✓ Correct
- C. The wrong variable type is being used. ✗ Incorrect
- D. The tag isn't showing up. ✗ Incorrect

### Explanation:

"not defined" is the same as "hasn't been created yet."

## 7. Which type of error is where the characters were typed in incorrectly?

MULTIPLE CHOICE

Correct Answer:

- A. syntax error ✓ Correct
- B. logic error ✗ Incorrect
- C. runtime error ✗ Incorrect

### Explanation:

Syntax refers to the characters used in the code.

## 8. True or False: All code editors have the same color scheme.

MULTIPLE CHOICE

Correct Answer:

- A. True ✗ Incorrect
- B. False ✓ Correct

### Explanation:

Code editors have their own color scheme that you will need to get used to.

## 9. What is likely the problem with a chunk of code that threw this error?

MULTIPLE CHOICE

### Correct Answer:

- A. An indentation problem. ✓ Correct
- B. A missing closing tag. ✗ Incorrect
- C. Use of a variable that hasn't been created yet. ✗ Incorrect
- D. A runtime error. ✗ Incorrect

### Explanation:

Read the error carefully