Learning Objectives - Elif Statement

- **Identify the differences between if statements, if else statements, and elif statements.**
- **Explain the elif syntax**

Elif Statement Syntax

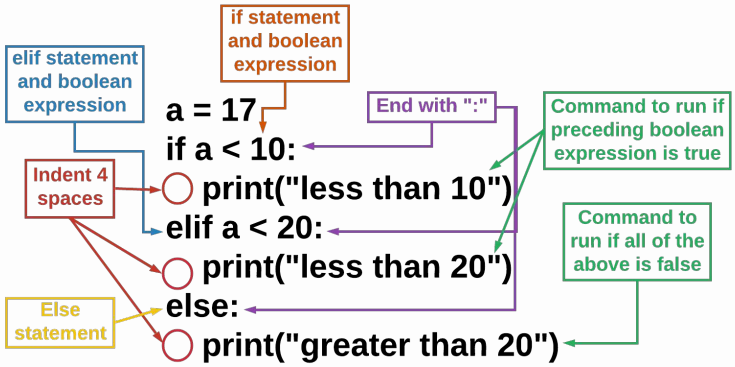
Elif Syntax

The elif statement is written similarly to the if statement. There are few differences as well. Here are the rules for writing an elif statement:

- An if statement must come before the first elif statement
- `elif` is followed by a boolean expression and a `:`
- Indent four spaces and write the commands for when the elif statement is true
- You can write as many elif statements as you want
- An else statement must come after the last elif statement

▼ **What does `elif` mean?**

`elif` is an abbreviation of `else` and `if`. Since `elif` statements are common, the command was simplified so programmers would not have to write `else if`.



elif Statement

```
a = 20

if a < 10:
    print(str(a) + " is less than 10")
elif a < 20:
    print(str(a) + " is less than 20")
elif a < 30:
    print(str(a) + " less than 30")
else:
    print(str(a) + " is greater than 30")
```

challenge

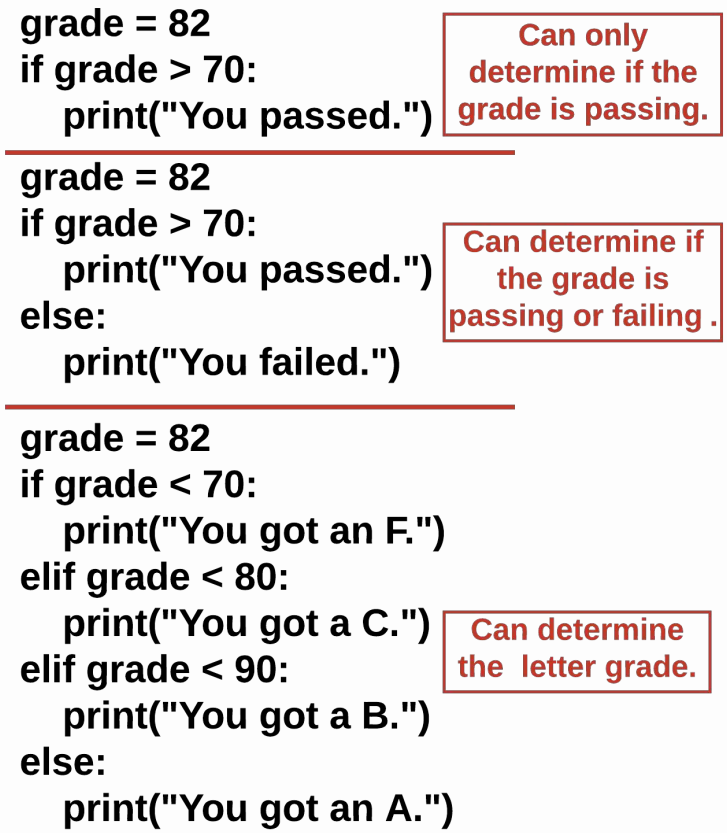
What happens if you:

- Change `a` to `0`?
- Change `a` to `100`?
- Change `a` to `30`? (How can you fix this?)

Elif Statement

Elif Statement

The if statement asks a single question, “Is this true?”. The if else statement asks two questions, “Is this true, or is this false?”. The elif statement is used after an if statement and before an else statement. Elif statements give you more precision when making decisions.



elif Statement

```
grade = 82

if grade < 70:
    print("You got an F.")
elif grade < 80:
    print("You got a C.")
elif grade < 90:
    print("You got a B.")
else:
    print("You got an A.")
```

challenge

Can you...

Add the letter grade D which is any grade from 60 to 69?

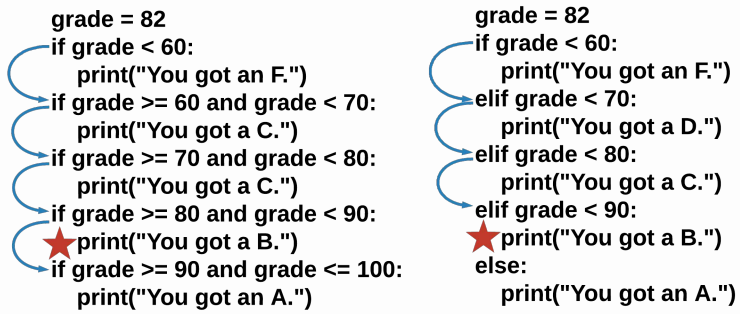
Testing Your Code
Change `grade` to `65`. You should see `You got a D.` as the output of your program.

▼ **Hint**
You need to change the if statement and add another `elif` statement.

Efficiency of Elif

Efficiency of Elif

Take a look at the image below. It shows two programs that do the same thing, calculate a letter grade based on a numeric value. The blue arrows show the flow of the program, and the red star shows what happens when the boolean expression is true.



Elif Efficiency

All of the if statements will run, even when the letter grade has been determined. The elif statements will stop once one of them is true. Use the code visualizers below to see how Python steps through the two programs below.

Series of If Statements

```
grade = 82

if grade < 60:
    print("You got an F.")
if grade >= 60 and grade < 70:
    print("You got a C.")
if grade >= 70 and grade < 80:
    print("You got a C.")
if grade >= 80 and grade < 90:
    print("You got a B.")
if grade >= 90 and grade <= 100:
    print("You got an A.")
```

Series of Elif Statements

```
grade = 82

if grade < 60:
    print("You got an F.")
elif grade < 70:
    print("You got a D.")
elif grade < 80:
    print("You got a C.")
elif grade < 90:
    print("You got a B.")
else:
    print("You got an A.")
```

challenge

What happens if you:

- Change `grade` to `0` and then run both programs through the visualizer?
- Change `grade` to `100` and then run both programs through the visualizer?

Formative Assessment 1

Formative Assessment 2