

# Control Flow Statements

- Conditionals
- Loops



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## Conditional Statements



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# Table of Contents



- ▶ Structure of the `if` Statements
- ▶ Comparison Operators
- ▶ `if-else` Statements
- ▶ `if-elif-else` Statements
- ▶ Nested `if-elif-else` Statements



## 1 Structure of the `if` Statements

```
if a > b :  
    print('a is greater than b')
```

## How was the pre-class content? Did you satisfied?



Students, drag the icon!



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## Structure of the if Statements

- The basic structure  of an **if** statement is :

```
if condition:  
    body
```

A 4-space indentation

A colon

Annotations include a curly brace under "condition:" labeled "A 4-space indentation", a curly brace under ":" labeled "A colon", and a yellow arrow pointing up at the start of the "if" keyword.



# Structure of the if Statements

- Here's the simple pre-class examples of the if Statements :

```
1 if True:  
2     print('it is true')  
3
```

7

# Structure of the if Statements

- Here's the simple pre-class examples of the if Statements :

```
1 if True:  
2     print('it is true')  
3
```

```
1 it is true  
2
```





# if Statements

## ► Task : Cooking a hamburger.

- ▷ We need some ingredients that are not in our kitchen.
- ▷ There is only one **grocery store** in our village and its availability is crucial.
- ▷ Ingredients (stated below) required for cooking hamburgers with **greens** (it does not matter which one. **lettuce / pepper**)
- ▷ Set a logical boolean algorithm onto **hamburger** to be able to eat.
- ▷ Set a condition **hamburger** variable with if statement that gives us a message "Bon Appetit." if we can cook hamburger, do nothing if we can not.

```
#ingredients and requirements:
minced meat (must)
hamburger bread (must)
lettuce } (must)
pepper
grocery store (must)
```



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9

# if Statements

## ► The code can be like:

```
1 minced = True
2 bread = True
3 lettuce = False
4 pepper = True
5 grocer = True
6
7 hamburger = (minced and grocer and bread) and (lettuce or pepper)
8
9 if hamburger :
10     print("Bon Appetit")
11
12
```



The values (**True/False**) are up to you

## Output

Bon Appetit

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10

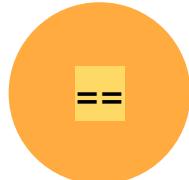
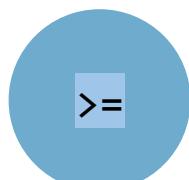


2

# Comparison Operators

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Draw lines to match the image to the answer:



equal

not equal

greater than

greater than or equal

less than

less than or equal

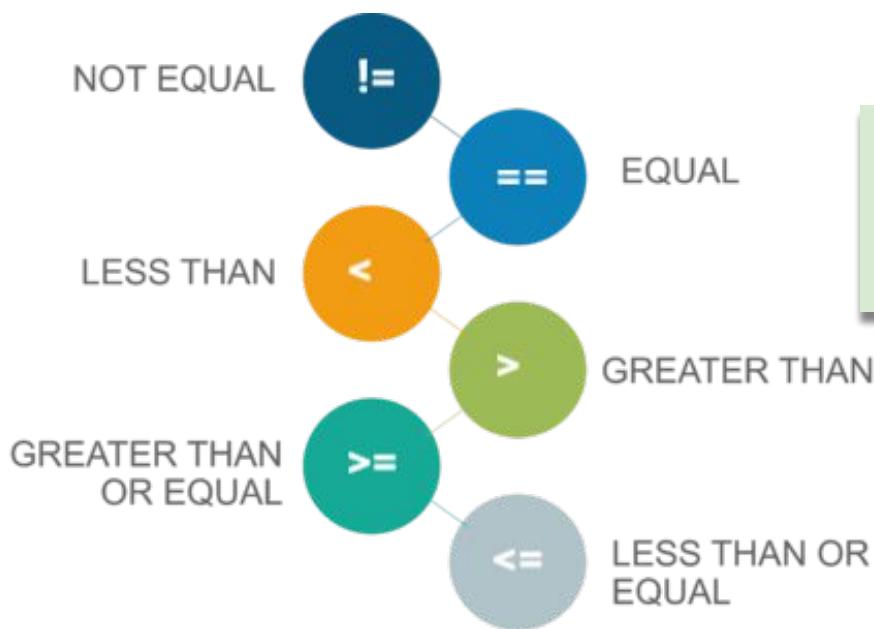


Students, draw anywhere on this slide!

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# Comparison Operators



These Operators  
return True or False



# Comparison Operators

- Here's the simple pre-class examples of the **if** Statements :

```
1 empty_seat = 14
2
3 if empty_seat > 3: # in this case, 14>3=True, so the body will execute
4     print('there is still seat to sit')
5
```



# Comparison Operators

- Here's the simple pre-class examples of the `if` Statements :

```
1 empty_seat = 14
2
3 if empty_seat > 3: # in this case, 14>3=True, so the body will execute
4     print('there is still seat to sit')
5
```

comparison operator

```
1 there is still seat to sit
2
```

# Comparison Operators

- Take a look at the following examples :

```
1 print(1 == 1)
2 print("henry" == "Henry")
3 print(12 < 12.1)
4 print("hard" != "easy")
5
6
```

Output

```
True
False
True
True
```





# Comparison Operators (review)

Opr.	How it works ?	Sample
<code>==</code>	Returns <code>True</code> if two values are equal or <code>False</code> if different	<code>2 == 2 (True)</code> , <code>2 == 3 (False)</code>
<code>!=</code>	Returns <code>True</code> if two values are not equal or <code>False</code> if equal	<code>2 != 2 (False)</code> , <code>2 != 3 (True)</code>
<code>&gt;</code>	Returns <code>True</code> if the value on the left is greater than the value on the right otherwise returns <code>False</code>	<code>3 &gt; 2 (True)</code> , <code>2 &gt; 3 (False)</code>
<code>&lt;</code>	Returns <code>True</code> if the value on the left is less than the value on the right otherwise returns <code>False</code>	<code>2 &lt; 3 (True)</code> , <code>3 &lt; 2 (False)</code>
<code>&gt;=</code>	Returns <code>True</code> if the value on the left is greater than or equal to the value on the right otherwise returns <code>False</code>	<code>3 &gt;= 2 (True)</code> , <code>3 &gt;= 3 (True)</code> , <code>2 &gt;= 3 (False)</code>
<code>&lt;=</code>	Returns <code>True</code> if the value on the left is less than or equal to the value on the right otherwise returns <code>False</code>	<code>3 &lt;= 2 (False)</code> , <code>3 &lt;= 3 (True)</code> , <code>2 &lt;= 3 (True)</code>



# Comparison Operators

- Let's examine the following **pre-class** example carefully :

```

1 x = 6
2 y = 9
3 print ("is x equal to y?      :" , x == y)
4 print ("is x not equal to y?   :" , x != y)
5 print ("is x less than y?       :" , x < y)
6 print ("is x greater than y?    :" , x > y)
7 print ("is x less than or equal to y? :" , x <= y)
8 print ("is x greater than or equal to y? :" , x >= y)
9

```



# Comparison Operators

- ▶ Let's examine the following example carefully :

```
1 x = 6
2 y = 9
3 print ("is x equal to y?      :" , x == y)
4 print ("is x not equal to y?   :" , x != y)
5 print ("is x less than y?       :" , x < y)
6 print ("is x greater than y?     :" , x > y)
7 print ("is x less than or equal to y? :" , x <= y)
8 print ("is x greater than or equal to y? :" , x >= y)
9
```

```
1 is x equal to y?      : False
2 is x not equal to y?   : True
3 is x less than y??    : True
4 is x greater than y?   : False
5 is x less than or equal to y? : True
6 is x greater than or equal to y? : False
7
```



# Comparison Operators

- ▶ **Task :**

- ▶ Create two **sets** (using **set()** function) with the given **string** values below.
- ▶ Compare these **sets** and print out 'We are the same!' if they are equal, do nothing if they are not.

- "TWELVE PLUS ONE"
- "ELEVEN PLUS TWO"



# Comparison Operators

- ▶ The code might be like :

```
1 set1 = set("TWELVE PLUS ONE")
2 set2 = set("ELEVEN PLUS TWO")
3
4 if set1 == set2:
5     print("We are the same!")
6
7
```

Discuss in-class! How they can be the same.

## Output

```
We are the same!
```



# Comparison Operators

- ▶ Task : Convert string "Yes" to boolean True, convert string "No" to boolean False.
  - ▷ Write a program that ;
  - ▷ Takes the word **Yes** or **No** from the users and **converts** it into **boolean** type.
  - ▷ Yes → **True**
  - ▷ No (or other than Yes) → **False**
  - ▷ Print the result i.e.(if yes): "You entered True"
  - ▷ You may not use if-statements



# Comparison Operators

- ▶ The code might be like :

```
1 convert = input("Enter Yes or No : ").title().strip() == "Yes"
2 print("You entered", convert)
3
```



3

## if-else Statements

# ► if-else Statements(review)



- ▶ The simple structure ⤵ of an **if-else** statement is :

```
if condition1:  
    execute body1  
else:  
    execute body2
```

# ► if-else Statements(review)



- ▶ Let's take a look at this **pre-class** example of an **if-else** statement :

```
1 course = 'clarusway'  
2  
3 if course == "clarusway":  
4     print("you guaranteed the job")  
5 else:  
6     print("think about it again")  
7
```



# if-else Statements

- Let's take a look at this example of an **if-else** statement :

```
1 course = 'clarusway'  
2  
3 if course == "clarusway":  
4     print("you guaranteed the job")  
5 else:  
6     print("think about it again")  
7
```

```
1 you guaranteed the job  
2
```

# if-else Statements(review)

- Here's another **pre-class** example of an **if-else** statement :

```
1 number = 5  
2 if number <= 3:  
3     print("Number is smaller than or equal to 3")  
4 else: # Optional clause (you can only have one else)  
5     print("Number is bigger than 3")  
6
```

What is the output? Try to figure out in your mind...





# if-else Statements

- Here's another example of an **if-else** statement :

```
1 number = 5
2 if number <= 3:
3     print("Number is smaller than or equal to 3")
4 else: # Optional clause (you can only have one else)
5     print("Number is bigger than 3")
6
```

```
1 Number is bigger than 3
2
```

# if-else Statements

- Task : Python Program to Check if a Number is Odd or Even**

- Write a program to check whether a number entered by the user is even or odd.
- Print the result such as : “2 is even”



# if-else Statements

- ▶ The code might be like :

```
1 num = int(input("Enter a number: "))
2 if (num % 2) == 0:
3     print("{0} is Even".format(num))
4 else:
5     print("{0} is Odd".format(num))
6
7
```

# if-else Statements

- ▶ Task : Python Program to Check if a Number is Negative or Positive.

- ▶ Write a program to check whether a number entered by the user is *negative* or *positive*. Number zero is not acceptable.
- ▶ Print the result such as : 'Positive number'





# if-else Statements

- ▶ The code might be like :

```
1 num = float(input("Enter a number: "))
2 if num > 0:
3     print("Positive number")
4 else:
5     print("Negative number")
6
7 |
```

# if-else Statements

- ▶ Task : Python Program to Check which number is larger.
  - ▷ Write a program that prints which of the two numbers the user entered is large.
  - ▷ Print the result such as : “The large number is 4”



# if-else Statements

- The code might be like :

```

1 num1 = float(input("Enter first number: "))
2 num2 = float(input("Enter second number: "))
3
4 if (num1 > num2) :
5     larger = num1
6 else:
7     larger = num2
8
9 print("The large number is", larger)
10
11

```

Option-1

# if-else Statements

- The code might be like :

```

1 num1 = float(input("Enter first number: "))
2 num2 = float(input("Enter second number: "))
3
4 if (num1 > num2) :
5     larger = num1
6 else:
7     larger = num2
8
9 print("The large number is", larger)
10
11

```

Option-1

```

1 num1 = float(input("Enter first number: "))
2 num2 = float(input("Enter second number: "))
3
4 if (num1 > num2) :
5     print("The large number is", num1)
6 else:
7     print("The large number is", num2)
8
9

```

Option-2



# if-else Statements

- ▶ **Task :** Convert boolean True to string value of "Yes", convert boolean False to string value of "No".
  - ▷ Write a program that ;
    - ▷ Converts the type of the variable `bool_value` which keeps `True / False` to **Yes** or **No**.
    - ▷ `True → "Yes"`
    - ▷ `False → "No"`

# if-else Statements

- ▶ **The code might be like :**

```
1 | bool_value = False # can be True or False
2 |
3 | if bool_value:
4 |     print("Yes")
5 | else :
6 |     print("No")
7 |
```

Output

No



4

## if-elif-else Statements

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What do you know  
about statements:

*if-elif-else*



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Students, write your response!

# if-elif-else Statements (review)

- ▶ You can define a series of conditionals.

- `if` for the **first** one,
- `elif` for the **rest**, up until the final (optional),
- `else` for **anything not caught by the other conditionals**.

# if-elif-else Statements (review)

- ▶ The simple and common structures of an `if-elif-else` statement are:

```
if condition1:  
    execute body1  
  
elif condition2:  
    execute body2  
  
else:  
    execute body3
```

```
if condition_1:  
    action_1  
  
elif condition_2:  
    action_2  
.  
.  
.  
.  
elif condition_n:  
    action_n  
  
else:  
    action_(n+1)
```

here you can  
add as many  
elifs as you need

# if-elif-else Statements (review)

- Consider this pre-class example :

```
1 audience = "baby"
2
3 if audience == "kid":
4     print("it is free to go to cinema")
5 elif audience == "teen":
6     print("discounted price!")
7 elif audience == "adult":
8     print("normal price")
9 else:
10    print("No such audience, stay at your home!")
11
```

What is the output? Try to figure out in your mind...

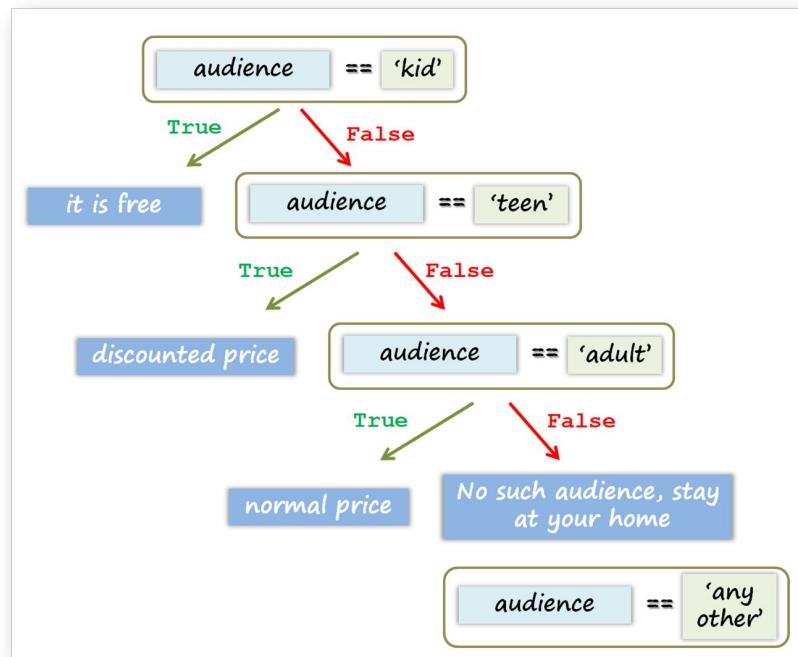


Students, write your response!

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# if-elif-else Statements (review)

- Let's examine this diagram of previous example :



# if-elif-else Statements (review)

- ▶ The output :

```
1 audience = "baby"
2
3 if audience == "kid":
4     print("it is free to go to cinema")
5 elif audience == "teen":
6     print("discounted price!")
7 elif audience == "adult":
8     print("normal price")
9 else:
10    print("No such audience, stay at your home!")
11
```

```
1 No such audience, stay at your home!
2
```

# if-elif-else Statements

- ▶ **Task : Write Python Program to Find the Largest Among Three Numbers**

- ▶ Write a program that prints which of the three numbers the user entered is the largest.
- ▶ Print the result such as : “The largest number is 4”



# if-elif-else Statements

- The code might be like :

```
1 num1 = float(input("Enter first number: "))
2 num2 = float(input("Enter second number: "))
3 num3 = float(input("Enter third number: "))
4
5 if (num1 >= num2) and (num1 >= num3):
6     largest = num1
7 elif (num2 >= num1) and (num2 >= num3):
8     largest = num2
9 else:
10    largest = num3
11
12 print("The largest number is", largest)
13
```

# if-elif-else Statements

- Task : Write Python Program to Check if a Number is Negative, Positive or Zero.

- Write a program to check whether a number entered by the user is negative, positive or zero.
- Print the result such as : “Negative number” or “Zero”.





# if-elif-else Statements

- ▶ The code might be like :

```
1 num = float(input("Enter a number: "))
2 if num > 0:
3     print("Positive number")
4 elif num == 0:
5     print("Zero")
6 else:
7     print("Negative number")
8
```



5

## Nested if-elif-else Statements

# Nested if-elif-else Statements

- Nested structure of **pre-class** examples.

```
1 audience_group = 'kid', 'teen', 'adult'
2
3 audience = "teen"
4
5 if audience in audience_group:
6     if audience == "kid":
7         print("it is free to go to cinema")
8     elif audience == "teen":
9         print("discounted price!")
10    else: # audience == "adult":
11        print("normal price")
12 else:
13     print("No such audience, stay at your home!")
```

# Nested if-elif-else Statements

- In this case, the output is :

```
1 audience_group = 'kid', 'teen', 'adult'
2
3 audience = "teen"
4
5 if audience in audience_group:
6     if audience == "kid":
7         print("it is free to go to cinema")
8     elif audience == "teen":
9         print("discounted price!")
10    else: # audience == "adult":
11        print("normal price")
12 else:
13     print("No such audience, stay at your home!")
```

```
1 discounted price!
2
```

# Nested if-elif-else Statements

- Let's write a program that asks you to enter your exam score and calculates the range in which your degree is based on your exam score. The output would be: e.g, "**Your degree is B+**"
  - 95 and above ►► "A+"
  - 90-94 ►► "A"
  - 85-89 ►► "B+"
  - 80-84 ►► "B"
  - 79 and below ►► "below B" or "B-"



⚠ Use nested if-statement.

# Nested if-elif-else Statements

- The one of the solution code may be like :

```
1 score = int (input("Enter your score :"))
2
3 if score >= 90:
4     if score >= 95:
5         Score_letter="A+"
6     else:
7         Score_letter="A"
8 elif score >= 80:
9     if score >= 85:
10        Score_letter="B+"
11    else:
12        Score_letter="B"
13 else:
14     Score_letter="below B"
15
16 print ("Your degree: %s" % Score_letter)
17
```

# THANKS!

**End of the Lesson**

(Conditional Statements)

**next Lesson**

**Loops**

**click above**

