

If Else Statements

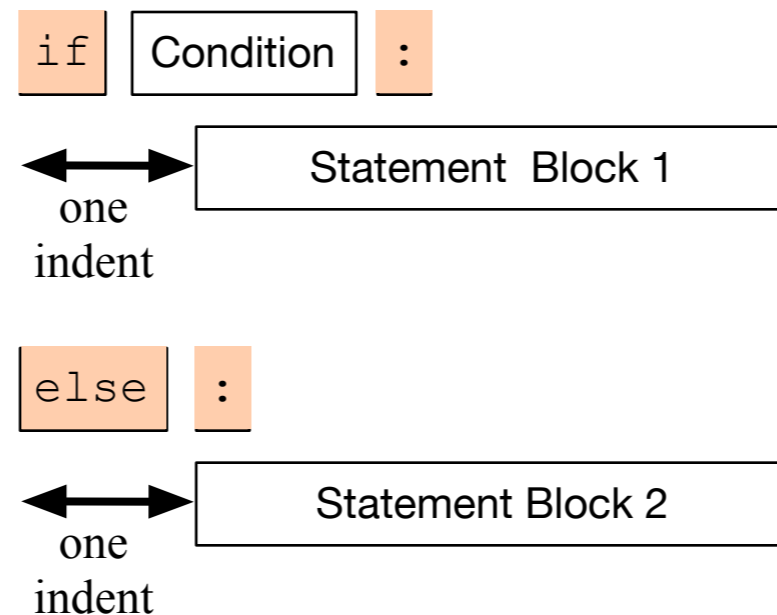
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Alternative statements

- Very often, we use a condition to decide which one of several branches of execution to pursue.
- The else-statement after the indented block of an if-statement creates an alternative route through the program.

Alternative Statements

- The if-else statement has the following form:



- We add the keyword else, followed by a colon
- Then add a second set of statements, indented once
- If the condition is true, then Block 1 is executed, otherwise, Block 2.

Examples

- I can test equality by using the double = sign.
- To check whether a number n is even, I take the remainder modulo 2 and then compare with 0.

```
p2.2.py - /Users/thomasschwarz/Google Drive/AATeaching/Ahmedabad/Solutions/...
number = int(input("Enter a number: "))
if number%2 ==0:
    print("The number is even.")
    print("Its square is", number**2)
else:
    print("The number is odd.")
    print("Its square-root is", number**0.5)
|
```

Alternative Statements

- Often, we have more than two alternative streams of execution.
- Instead of nesting if expressions, we can just use the keyword “elif”, a contraction of else if.

Alternative Statements

`if` `Condition 1` `:`

↔ `Statement Block 1`
one indent

`elif` `Condition 2` `:`

↔ `Statement Block 2`
one indent

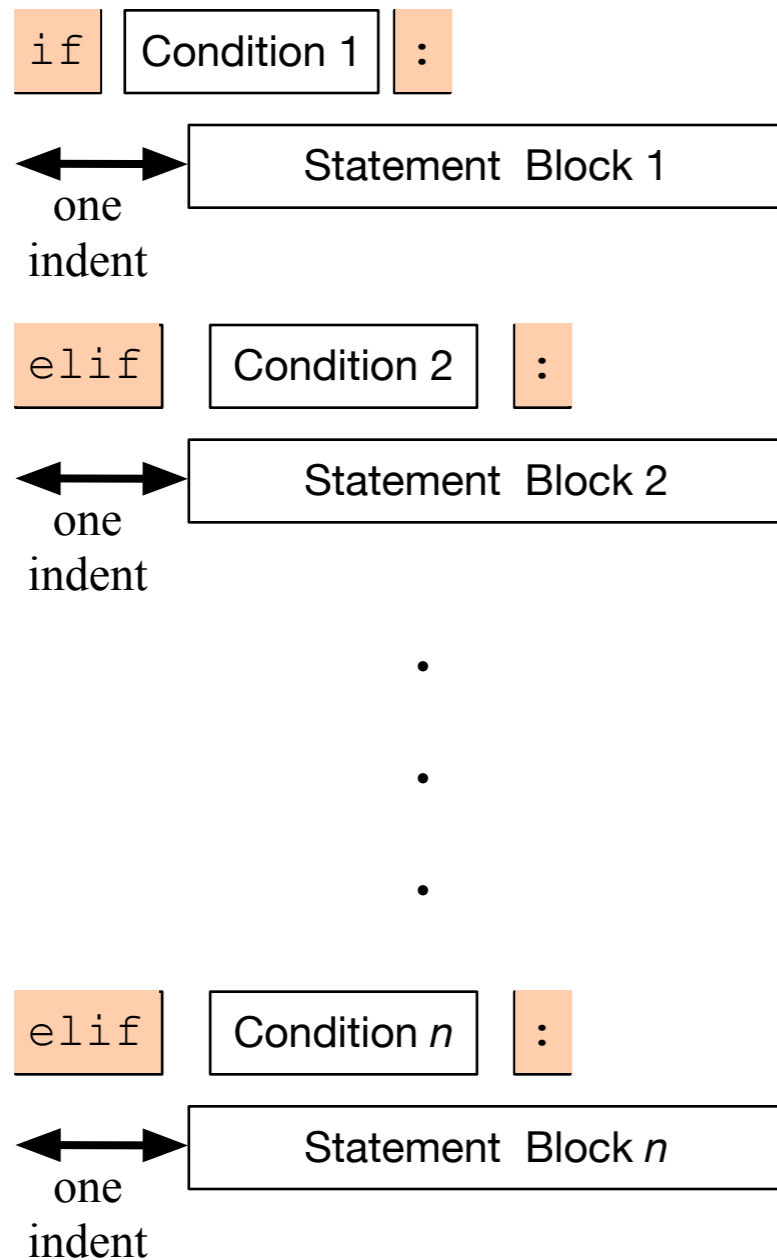
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`else` `:`

↔ `Statement Block n`
one indent

- One of the statement blocks is going to be executed
- The else block contains the default action, if none of the conditions are true

Alternative Statements



- Here, there is no else statement, so it is possible that none of the blocks is executed.

Examples

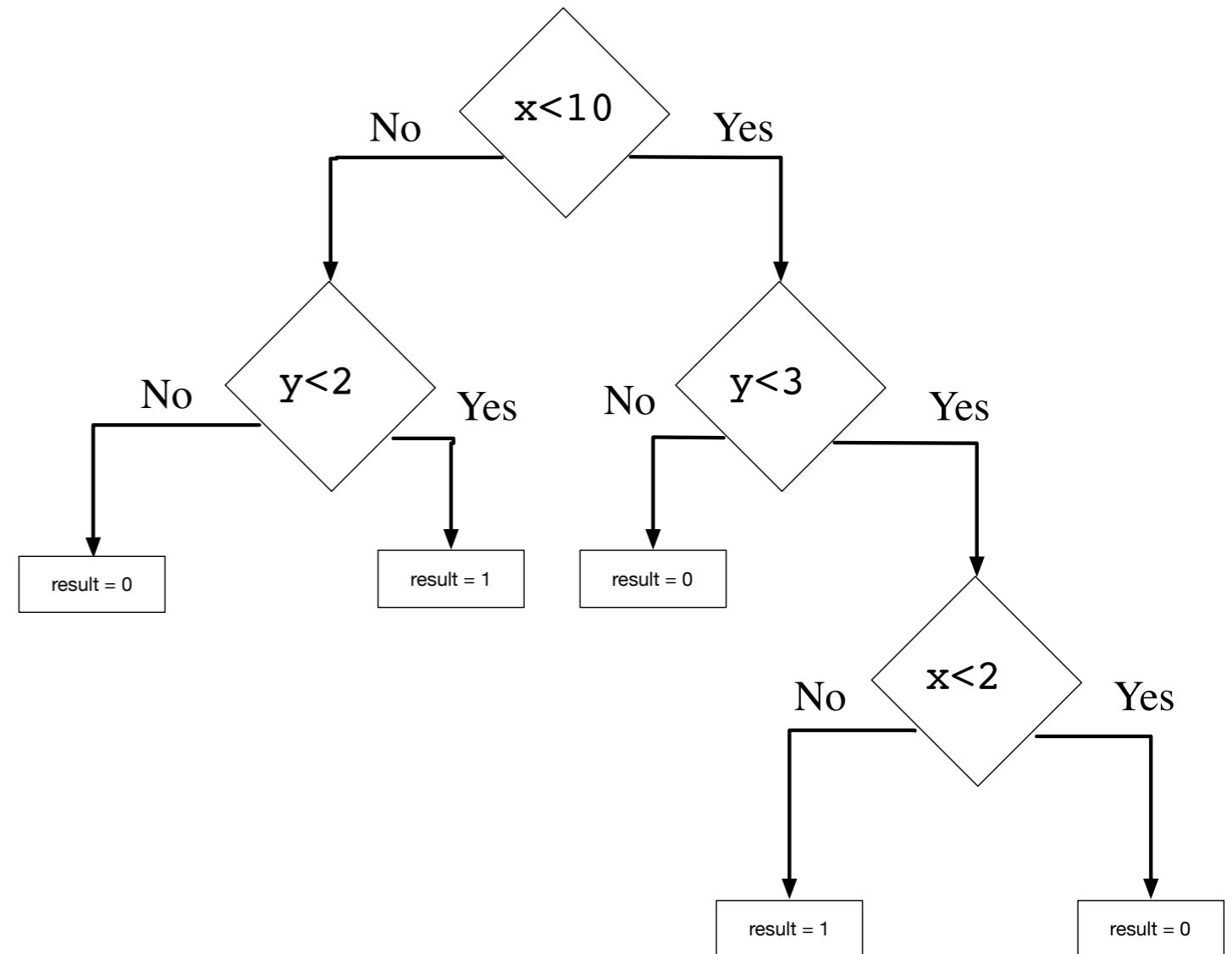
- Categorization of temperatures

```
if temperature < -25.0:  
    feeling = "arctic"  
elif temperature < -10.0:  
    feeling = "Wisconsin in winter"  
elif temperature < 0.0:  
    feeling = "freezing"  
elif temperature < 15.0:  
    feeling = "cold"  
elif temperature < 25.0:  
    feeling = "comfortable"  
elif temperature < 35.0:  
    feeling = "hot"  
elif temperature < 45.0:  
    feeling = "Ahmedabad in the summer"  
else:  
    feeling = "hot as in hell"
```


Boolean Expressions

- Nested loops to implement decision tree:

```
if x<10:  
    if y<3:  
        if x<2:  
            result=0  
        else:  
            result=1  
    else:  
        result=0  
else:  
    if y<2:  
        result=1  
    else result=0
```



Example

- Ask a user for an integer
- Tell the user if the integer is an even number

```
number = int(input('Enter an integer '))  
if number%2 == 0:  
    print('The number is even')
```

Example

- Write a program that calculates and prints $\frac{x^2 + 3x + 2}{x^2 - 5x + 6}$
 - But prints infinity if the denominator is zero
 - **Nota bene:** This is inherently dangerous because checking a floating point number for zero is difficult because of lack of precision

Example

```
x = float(input('Enter a number: '))
if x**2-5*x+6 == 0:
    print('Infinity')
else:
    print((x**2+3*x+2)/(x**2-5*x+6))
```