

Introduction to Computer Programming

Lecture 11.2:

Review : Control Flow & Loops

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Conditional Statements

Making decisions in a program

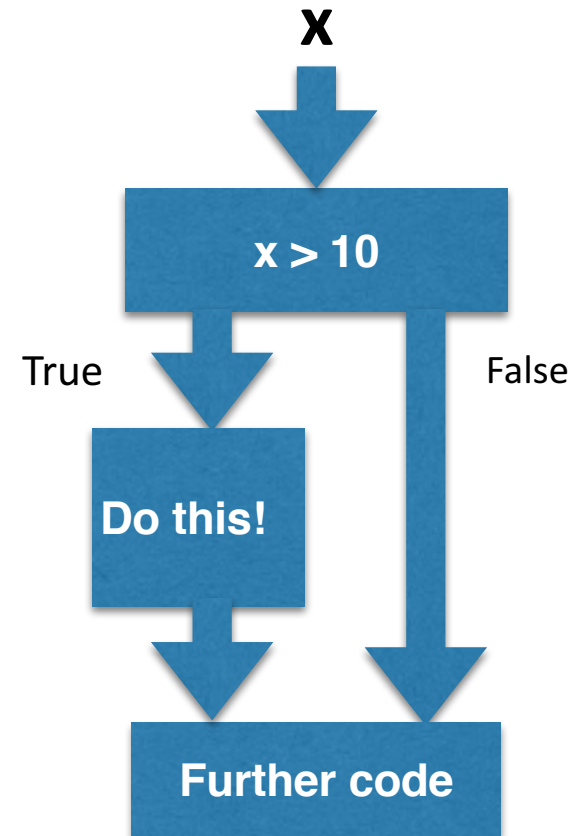
If : Runs the block of code only if the condition is true.

conditional

colon

```
if x > 10:  
    print("Do this")
```

indentation



Conditional Statements

If... else...

Runs the block of code under “if” only if the condition is true.

Runs the “else” code otherwise.

conditional

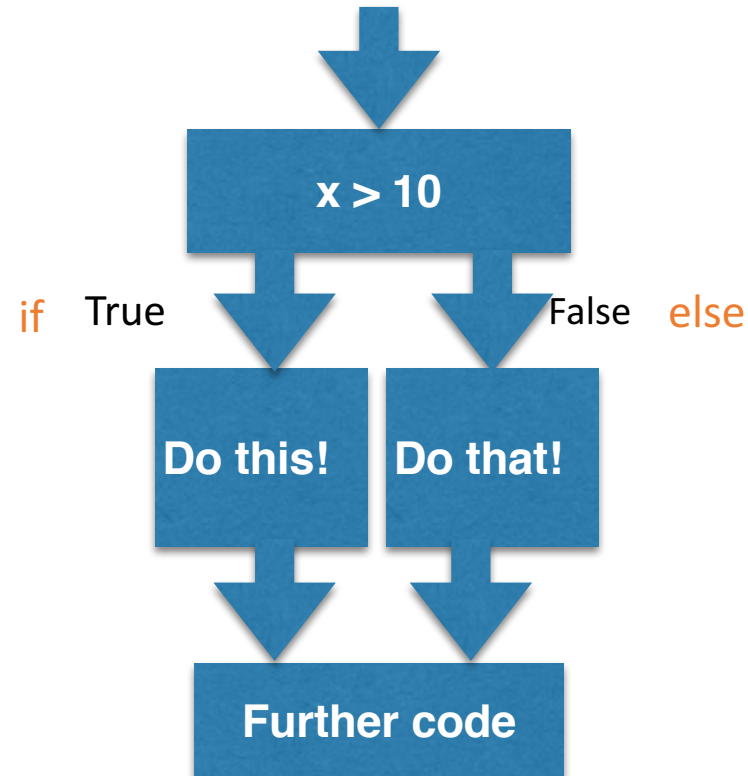
```
if x > 10:  
    print("Do this")  
else:  
    print("Do that")
```

colon

indentation

indentation

colon



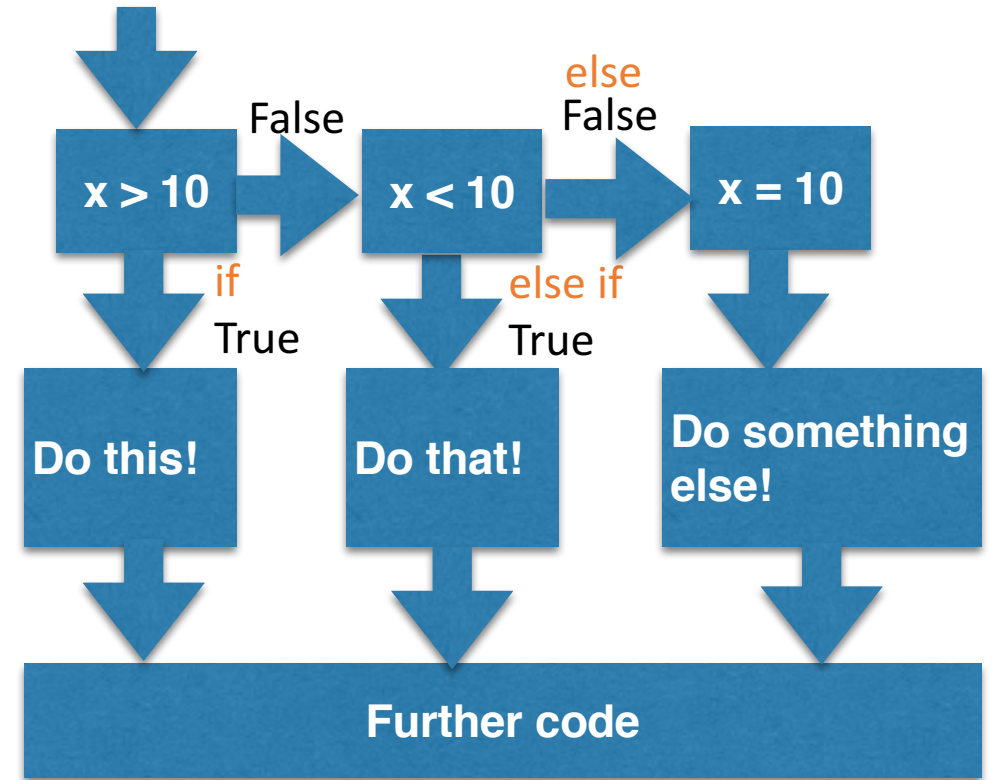
Conditional Statements

conditional

```
if x > 10:
    print("Do this!")
elif x < 10:
    print("Do that!")
else:
    print("Do something else!")
```

indentation

conditional



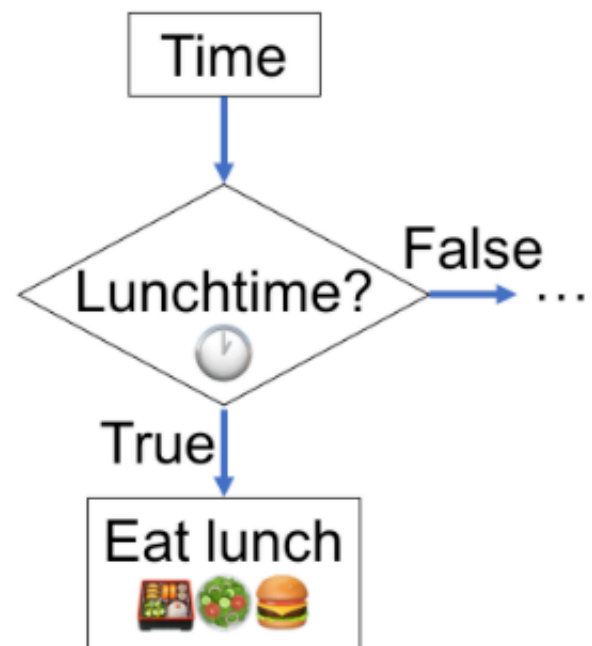
If... elif.. else...

Runs the block of code under “if” only if the condition is true.

Otherwise, runs the block of code under “elif” only if the condition is true.

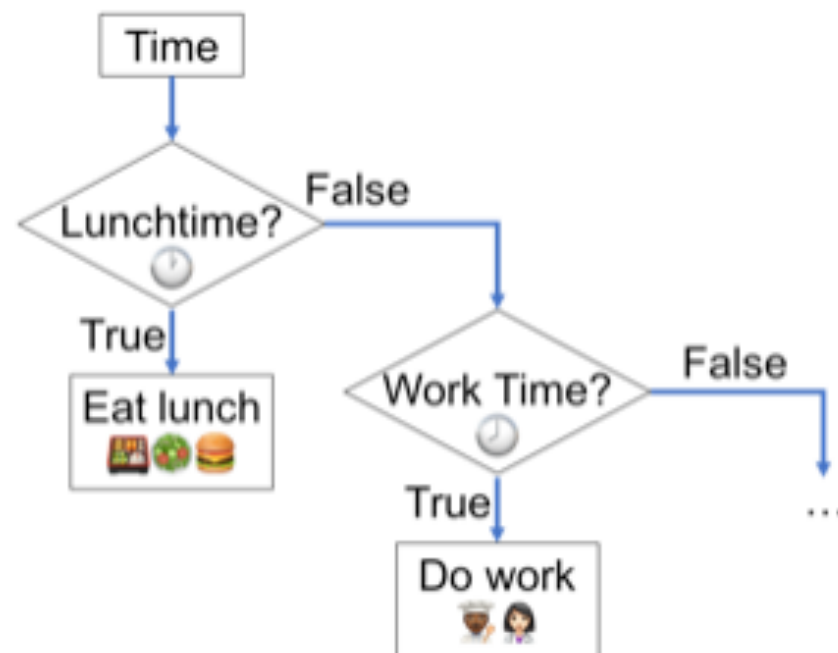
Otherwise, runs the “else” code otherwise.

```
if lunch_time is True:  
    print("eat lunch")
```



We can check if an alternative to the `if` statement is true using an `else if` statement.

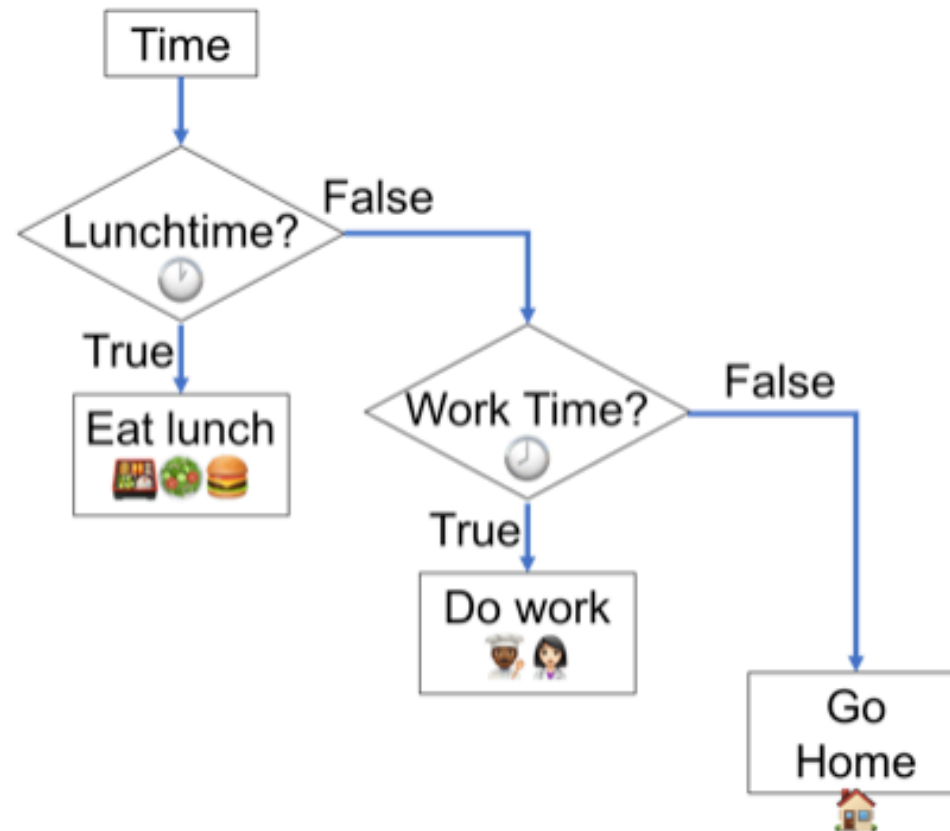
```
if lunch_time is True:
    print("eat lunch")
elif work_time is True:
    print("do work")
```



Often it is useful to include an `else` statement.

If none of the `if` and `else if` statements are satisfied, the code following the `else` statement will be executed.

```
if lunch_time is True:
    print("eat lunch")
elif work_time is True:
    print("do work")
else:
    print("go home")
```



Q11.2.A

A UK currency conversion company calculates the amount received by the customer as:

$$r = p * m * f$$

r = amount received by customer

p = amount paid by customer (GBP £)

m = market conversion rate

f = scale factor (depends on r)

m depends on the currency being bought.

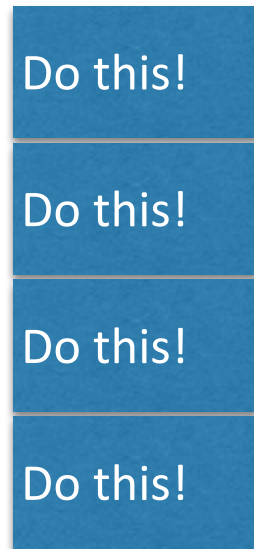
For US dollars \$, $m = 1.36$

f depends on the amount paid, p :

	f
$p \leq £100$	0.9
$£100 < p \leq £1,000$	0.925
$£1000 < p \leq £10,000$	0.95
$p > £10,000$	0.97

Write a program using conditional statements to calculate r , for an input value, p .

Loops



n iterations

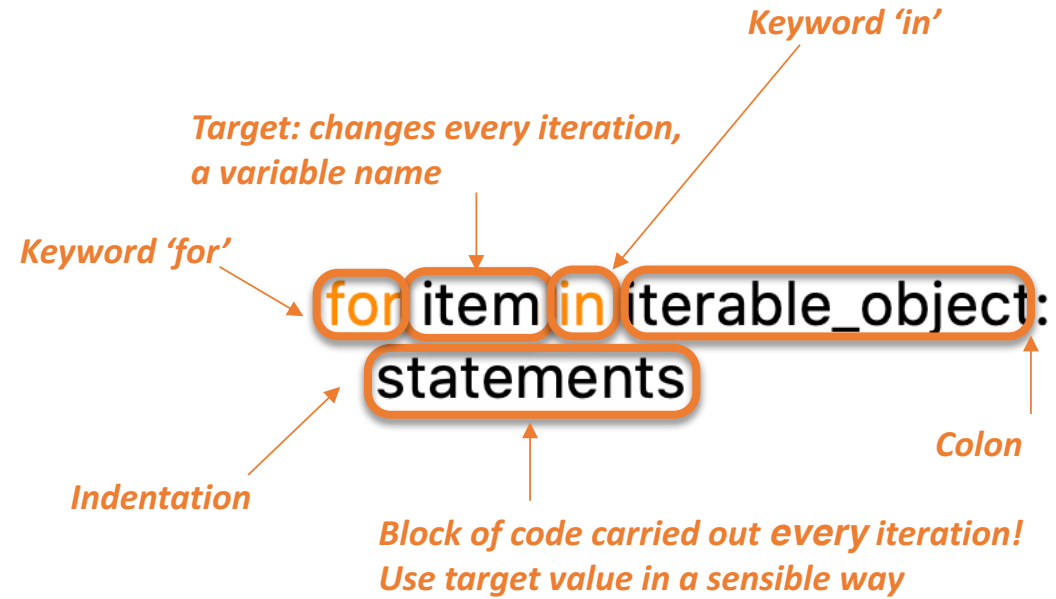
For Loop



condition

While Loop

For Loop



While Loop

The diagram illustrates a while loop with the following code and annotations:

```
Num = 0
while Num < 100:
    print(Num)
    Num = Num + 2
print("That's enough!")
```

Annotations:

- Keyword 'while'*: Points to the word `while`.
- Condition when to stop*: Points to the condition `Num < 100`.
- Needs to include changes such that condition eventually can be negated*: Points to the increment statement `Num = Num + 2`.

Q.11.2.B

Write a program that prints all the integers from 0 to 6 inclusive, using a loop.

Q.11.2.C

Write a program that prints every second element of a list, using a loop.

Q11.2.D


Write a program that requests a number from the user until the number input by the user is greater than 10.

Break & Continue

Break

Sometimes we want to exit a for or while loop prematurely
i.e skip all remaining values

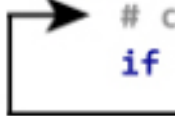
```
for var in sequence:
    # codes inside for loop
    if condition:
        break
    # codes inside for loop
# codes outside for loop
```

A diagram illustrating the 'break' statement. It shows a loop structure with an 'if' condition. When the condition is met, a horizontal arrow points from the 'break' statement to the right, then a vertical arrow points down, and finally a horizontal arrow points right to the code block following the loop, indicating that the loop is exited and execution continues with the code outside the loop.

Continue

Sometimes, instead of *skipping all remaining values*, we want to skip *just one value* in a loop.

```
for var in sequence:
    # codes inside for loop
    if condition:
        continue
    # codes inside for loop
# codes outside for loop
```

A diagram illustrating the 'continue' statement. It shows a loop structure with an 'if' condition. When the condition is met, a horizontal arrow points from the 'continue' statement to the left, then a vertical arrow points up, and finally a horizontal arrow points right to the code block following the loop, indicating that the current iteration is skipped and the loop continues with the next value.

Q.11.2.E

Write a program that prints all the integers from 0 to 6 inclusive, **except 3 and 4**, using a loop.

(Modify your answer to Q.11.2.B)

Q.11.2.F

Write a program that prints every element of a list of numbers, using a loop, **exiting the loop before printing the number if a number greater than 10 is reached.**