

# Lecture 06 - Control Flow / If Statements

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1. We are working on the grading.
2. Assignment 2 - too hard.

## Using GIT and Github.com

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We are basically following most of the steps in <https://product.hubspot.com/blog/git-and-github-tutorial-for-beginners>.

<https://www.freecodecamp.org/news/how-to-undo-a-git-add/>

## 1st Test Question

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```
1:
2: def feet_to_inches ( feet ):
3:     conv = 12
4:     inches = feet * conv
5:     return ( feet )
6:
7: # Automated Test
8: if __name__ == "__main__":
9:     n_err = 0
10:    x = feet_to_inches ( 1 )
11:    if x != 12:
12:        n_err = n_err + 1
13:        print ( "Error: Test 1: conversion not working, expected {} got {}".format ( 12, x ) )
14:    x = feet_to_inches ( 0 )
15:    if x != 0:
16:        n_err = n_err + 1
17:        print ( "Error: Test 2: conversion not working, expected {} got {}".format ( 0, x ) )
18:
19:    if n_err == 0 :
20:        print ( "PASS" )
21:    else:
22:        print ( "FAILED" )
23:
```

1. (10pts) The above code has something wrong with it. When the test is run it says "FAILED". Correct the code.

## Where we are so far...

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1. Installs - usually hard and unpleasant.
2. Using some files - where - paths - directories/folders.
3. Fixing some code - changes break things - then you have to fix it.
4. Testing. Thomas Piketty, "Capital in the Twenty-First Century". <https://www.reuters.com/article/idUS268051827620140527>  
"The Financial Times has launched a critique of the data behind the French economist's bestseller "Capital in the Twenty-First Century." ... he has also fallen prey to sloppy spreadsheets."
5. Functions

```
def fucntion_name ( input1, input2 ):
    # do_someting... with input1, input2
    # produce some output
    return ( output )
```

6. Input a number - differences between strings and numbers and integers and floats

## "if" / True / False

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```
if n_err == 0 :
    print ( "PASS" )
else:
    print ( "FAILED" )
```

```
if expression-evaluates-to-true:
    Do the true side
elif expression-2-evaluates-to-true:
    More stuff if expression-2 is true
else:
    if non of the above are true, do this.
```

Operators that commonly go into expressions in if:

==	compare for equality
!=	not equal
<	less than
>	greater than
<=	less than or equal
>=	greater than or equal

An Example:

The ski area sells tickets and gives a discount based on age. Adult tickets age 18-69 are \$59, Youth 5-12 are \$40, Teen are \$52, Children 4 and under are free, seniors 70 and older are free.

```
1:
2: print ( "Input Age\n=> ", end="" )
3: age_str = input()
4: age = int(age_str)
5:
6: ticket_price = 0
7: if age <= 4:
8:     ticket_price = 0
9: elif age >= 5 and age <= 12:
10:     ticket_price = 40
11: elif age >= 13 and age <= 17:
12:     ticket_price = 52
13: elif age >= 18 and age <= 70:
14:     ticket_price = 59
15: else:
16:     ticket_price = 0
17:
```

```
18: print ( "Ticket Price ${}.00 dollars".format(ticket_price) )
```

## Order of Evaluation

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```
1:
2: print ( "Input Age\n=> ", end="" )
3: age_str = input()
4: age = int(age_str)
5:
6: ticket_price = 0
7: if age <= 4:
8:     ticket_price = 0
9: elif age <= 12:
10:    ticket_price = 40
11: elif age <= 17:
12:    ticket_price = 52
13: elif age <= 70:
14:    ticket_price = 59
15: else:
16:    ticket_price = 0
17:
18: print ( "Ticket Price ${}.00 dollars".format(ticket_price) )
```

## Common Errors - leaving out cases in the logic.

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```
1:
2:
3: print ( "Input Age\n=> ", end="" )
4: age_str = input()
5: age = int(age_str)
6:
7: ticket_price = 59
8: if age <= 4:
9:     ticket_price = 0
10: elif age <= 12:
11:    ticket_price = 40
12: elif age <= 17:
13:    ticket_price = 52
14:
15: print ( "Ticket Price ${}.00 dollars".format(ticket_price) )
```

## "and" and "or"

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When we have "if" the expression is true or false as values.

There are operators that work on Boolean values. These are *or*, *and*, *not* and an exclusive or operator,  $\wedge$ .

```
a = 2
b = 3

r = ( a == 2 ) and ( b == 3 )
```

## Truth Tables

And:

A	B	A and B
False	False	False
False	True	False
True	False	False
True	True	True

Or:

A	B	A or B
False	False	False
False	True	True
True	False	True
True	True	True

Exclusive Or:

A	B	$A \wedge B$
False	False	False
False	True	True
True	False	True
True	True	False

Not:

A	not A
True	False
False	True

## calling functions

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You can also make a function (def) that returns a True/False value and use that in an if.

```
def isRed ( r ):  
    if r == "Red":  
        return True  
    if r == "red":
```

```
        return True  
    return False
```

```
if isRed("green"):  
    print ( "Its Is Red" )  
else;  
    print ( "Its Is *NOT* Red" )
```

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