CS 114 Tutorial 2

Sept 19 2025

Goals for this Week:

- ❏ Start Assignment 01 (due next Friday)
- ❏ Understand how to use booleans in python (<, >=, ==, !=, True)
- ❏ Understand how to write conditions (if, elif, else)
- ❏ Become familiar with using and/or

Try the following in python as a warmup.

Write a function that calculates the term of a pattern given it's term #.

def pattern(n):

Term 1 = (1*2)^2   Term 2 = -(2*2)^2

Term 3 = (3*2)^2   Term 4 = -(4*2)^2

Create a function that returns true if a given number is between 5 and 10 inclusive or if it is higher than 15.

def bools(x):

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Annotations

- Gives information about the function parameters

- Tells you what type of variables are needed and returned

Which would you choose to use to describe the follow:

def   area_garden(l, w):

A.   area_garden(l: int, w: int) → int:

B.   area_garden(l: float, w: float) → int:

C.   area_garden(l: str, w: str) → str:

D.   area_garden(l: float, w: float) → float:

Assert

```python
def fun_A(n):
    assert n > 0, "n must be > 0"
    return n


def fun_B(n):
    assert("n > 0", "n must be > 0")
    return n


def fun_C(n):
    assert n > 0 and "n must be > 0"
    return n


def fun_D(n):
    assert n > 0 "n must be > 0"
    return n
```

Which function correctly uses assert?

A.   B.   C.   D.

Conditionals

```python
score = 85
passed = score >= 50

if passed:
    print("Pass")
elif score >= 80:
    print("High pass")
else:
    print("Fail")
```

What does this program print?

A.   Pass   B.   High Pass   C.   Fail   D.   Pass

High Pass

Fail

And

```
x = 5
y = 10

print ("A", (x <= 4) and (y > 8))
print ("B", (x != 3) and (y > 10))
print ("C", ((x + y) == 15) and (x != 7))
print ("D", (y >= 20) and ((x + y) % 2 == 0))
```

Which will print True?

A.   B.   C.   D.

Or

```
x = 5
y = 10

print ("A", (x <= 4) or (y > 8))
print ("B", (x != 3) or (y > 10))
print ("C", ((x + y) == 15) or (x != 7))
print ("D", (y >= 20) or ((x + y) % 2 == 0))
```

Which will print False?

A.   B.   C.   D.

a) Write a function *num_roots()* that takes the coefficients of a quadratic as parameters and returns the **number of roots**.

b) Write a function *quadratic()* that takes the coefficients of a quadratic as parameters and **if there are real roots**, it returns the root **using addition** in the quadratic formula. Otherwise it **returns 0**.
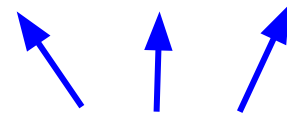
Discriminant

MATH MONKS

Quadratic Equation

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- If $b^2 - 4ac > 0$ 2 real solutions
- If $b^2 - 4ac = 0$ 1 real solution
- If $b^2 - 4ac < 0$ no real solutions

Quadratic Function

$$f(x) = ax^2 + bx + c$$

Coefficients