

Print this assignment off and complete the written portions on each page. You will scan or take images and convert this to a pdf to be included in your upload to Github. Questions 3 and 4 will have code sections as well in the repository. Do not forget to adjust the README to indicate you have completed the assignment before your final commit!

Get Assignment link: <https://classroom.github.com/a/oRL9IOa0>

1. The Python interpreter is particular about what sorts of variable names are allowed. For each of the listed names below, determine if that variable name would be considered legal by the interpreter. If it is not, state the reason why.

(a) var *yes var works*

(b) and *no its a key word*

(c) 1var *no because it can't start with number*

(d) _if *yes*

(e) my-name *no hyphens have key uses*

(f) CATS *yes*

(g) your_name *yes*

(h) friends4ever *yes*

2. Arnold loves sandwiches but is picky about what type of bread they are made with and wants the maximum amount of meat possible. He loves ciabatta bread and will cheerfully take a ciabatta sandwich with a meat-level above 50. He is happy with sourdough bread and will take a sourdough sandwich if the meat-level is above 70. Interestingly, Arnold likes white bread only for peanut butter and jelly sandwiches, and will thus only eat white bread if the meat-level is 0. Any other type of sandwich bread, if the meat-level is above 100, Arnold will accept.

The below code shows Arnold's basic strategy for whether or not to accept and eat a sandwich.

```

1 bread_type = -----
2 meat_level = -----
3
4 if bread_type == 'ciabatta':
5     if meat_level > 50:
6         print("Yum! I'll take it!")
7 elif bread_type == 'sourdough' and meat_level > 70:
8     print("I'll accept this!")
9 elif bread_type == 'white':
10    if meat_level > 0:
11        print("I refuse!")
12    else:
13        print("I'll take it.")
14 elif meat_level > 100:
15    print("Bring on the meat!")
16 else:
17    print("I can not bring myself to eat this.")

```

For each of the given sandwich offers, write down what Arnold's reply would be. While you could copy the above code and check each option, I'd greatly encourage you not to. Being able to understand what a piece of code does without running it is an important skill.

- (a) Ciabatta with meat level 80: "Yum! I'll take it!"
- (b) Sourdough with meat level 65: "I can not bring myself to eat this"
- (c) White with meat level 110: "I refuse!"
- (d) Rye with meat level 85: "I cannot bring myself to eat this"
- (e) Wheat with meat level 120: "Bring on the meat!"
- (f) Sourdough with meat level 130: "I'll accept this"

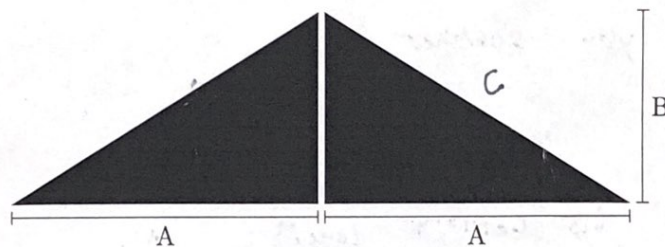
3. Write a program that prompts the user to enter in values for 3 different variables: x , y , and z . The program then prints out the largest odd number among x , y and z . If none of the numbers are odd, the program prints out a message saying "No odd numbers found."

Two examples of an interaction with your program are shown below. The blue lines are lines the program would print to the screen, while the black numbers indicate user input.

```
Enter the value for x: 2
Enter the value for y: 5
Enter the value for z: -3
5
```

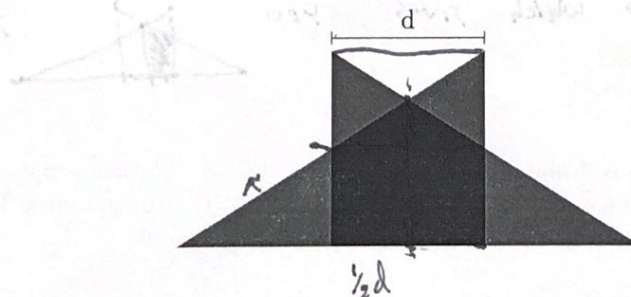
```
Enter the value for x: 2
Enter the value for y: -4
Enter the value for z: 8
No odd numbers found.
```

4. Consider the situation in which you have two identical right triangles, each with a base length A and a side height B , positioned as shown below.



Initially, there is no overlap and the total shaded area encompassed by both triangles would be equal to $A \times B$.

Now suppose that the triangles are moved towards one another such that they overlap a distance d , where d varies from 0 at a minimum to A at a maximum. (See *animated gif* in the *HW Images* folder if you are having trouble picturing this over the full range.)



$$\frac{1}{2}bh = A \quad \frac{1}{2}d$$






Your objective in this problem will be to write a Python script capable of outputting the total area covered by the triangles for given values of A , B , and d .

- (a) In the space below (or attach another page if you need), write out using words and pictures your approach for how you can construct an algorithm to find the total shaded area. No coding needs to be happening here, you just need to determine a method by which you can find the total covered area.

Hints:

- I'd greatly suggest trying to break the problem (and area) up into smaller pieces, where you can calculate the area of each.
- The area for a triangle is base times height divided by two.
- It may be useful to remember that for similar triangles, the ratio of their side lengths are equal.

1. First you know that the bottom little triangle
 2 is $A = d/2$, and the height is the reverse of
 $1/2 B = \text{bottom} / A \cdot B$. This makes it so
 you subtract

 Then big bottom length

 Then for the height use $A = (d/2)/2$ same ratio since it's
 a similar triangle, which is the bottom $1/A \cdot B$
 Thus giving area of larger triangle the you subtract
 little $\rightarrow B$ which gives you
 * 2

- (b) Once you have a working algorithm, implement it in a Python script. I have provided you with a simple template to get you started, but you'll need to fill in the necessary portions from whatever algorithm you arrived at.