

## What the Hack: Variables | Episode 5 Challenges Solutions

*Finish testing your knowledge? Take a look at some solutions to the challenges!*

### Challenge 1: New Year's Countdown!

```
#for our New Year countdown, suppose we want to start the countdown from 10, and
when the countdown reaches 0, we will shout "Happy New Year!"

#if we want to start our countdown from 10, we can initialize a variable that
contains the integer 10
x = 10

#before the countdown reaches 0, we just want to say the number for the countdow
while x > 0:
    #so we can use the print() function to print our number out.
    print(x)
    #after counting each number, we want to count the next smaller number. So we
will decrease the value of x by 1.
    x -= 1
    #note that x -= 1 is the same as x = x - 1

#once the value of x reaches 0, the while loop will stop running, and our program
will run the code after the while loop.
#this means we are finished with our countdown, and we are ready to shout "Happy
New Year!"

#now let's shout "Happy New Year!"
print('Happy New Year!')
```

## Challenge 2: Is the number odd or even? Let the computer decide!!

```
###For Loop
#a for loop needs a range of numbers
#and since we want to only look at the numbers from 1 to 10, we can use the range
function

#notice that 11 is used in this function instead of 10

#because the range function will start at the first number that you provide, and
end right before the second number that you provide
#in this case, if we want to include the number 10, we need the loop to end
before 11
for i in range(1,11):
    #here we use the decision-making if-else statement that we learned in the 3rd
episode
    #we also utilize the operator % (modulo)

    #remember, a mathematical operation with modulo in Python will return the
remainder of that calculation

    #from hint #4, we know that when a number is divided by 2 and the remainder of
that calculation is 0, then the number is an even number

    #here we use the == (is equal to) operator to compare whether the remainder of
the calculation is the same as 0
    if i % 2 == 0:
        #if yes, the remainder is indeed 0, then we will use the print function to
display a message, to show that this number is even
        print('The number ' + str(i) + ' is even')
        #remember, because i is iterating through the range of numbers that we
provided, it is going to take on the value of the numbers, which are integers
        #if we want to concatenate, i.e. to combine multiple strings of messages
together, we will need i to be a string as well
        #and we do that by casting i to a string using the str() function
    else:
        #if no, if the remainder isn't 0, then the remainder can only be 1
```

```
#thus it is not necessary for us to check whether the calculation  
is equal to 1 using the == (is equal to) operator
```

```
print('The number ' + str(i) + ' is odd')
```

```
#same as above, we need to make sure that i is a string before we can  
concatenate it with the other two strings in the print function here.
```

```
###While Loop
```

```
#different from a for loop, we don't need to provide a range of numbers to the  
while loop for this challenge, because a while loop uses a condition
```

```
#because we want the numbers to be from 1 to 10, we need to first initialize a  
variable and give that variable the value of 1 to start with, and we need to  
increment the value of this variable inside the loop
```

```
#we can have the value of this variable increase by 1 for each iteration (i.e.  
for each time that the instructions inside the loop are executed)
```

```
#finally we want the range of our numbers to end at 10, so we can have the  
condition stating "x is less than or equal to 10"
```

```
#here we initialize a variable and give it a value of 1
```

```
x = 1
```

```
#we begin our while loop by giving the condition first
```

```
#we want the loop to stop running when the variable that we have becomes greater  
than 10, which means that the variable is not less than or equal to 10, so that  
will be our condition
```

```
#remember, a while loop stops running if the condition becomes false. In this  
case, if the value of our variable increments to more than 10, then the condition  
'x is less than or equal to 10' will no longer be true, and the loop will stop  
running.
```

```
while (x <= 10):
```

```
#same as what we did above for the for loop, we will check if the value of this  
variable divided by 2 is 0 or not.
```

#notice here we use the variable `x`, because `x` is what we declared prior to this loop, and also used in the condition statement for the while loop.

```
if x % 2 == 0:
```

#if the remainder of the calculation when our variable divided by 2 is 0, then this number is even! So let's print out the message

#same as for the for loop, we concatenate the strings together to display a message to the terminal

```
print('The number ' + str(x) + ' is even')
```

#also notice here, we use the variable `x`, because it is what we declared prior to this loop and is also used in the condition statement

```
else:
```

#if the remainder of the calculation in the if statement above isn't 0, then it has no choice but to be 1, and it means that our number is an odd number! So let's print out a message

```
print('The number ' + str(x) + ' is odd')
```

#after the checking and displaying messages are done, we need to do our last yet most critical step here

#we need to increment the value of our variable by 1

```
x = x + 1
```

#if we add 1 to our variable, and assign it right back to itself, then the value of our variable will increase by 1. And that is going to be the value that will be calculated in the next iteration of our loop (i.e., the next time that the loop runs)

#Do you remember what will happen if we forgot to include this step?