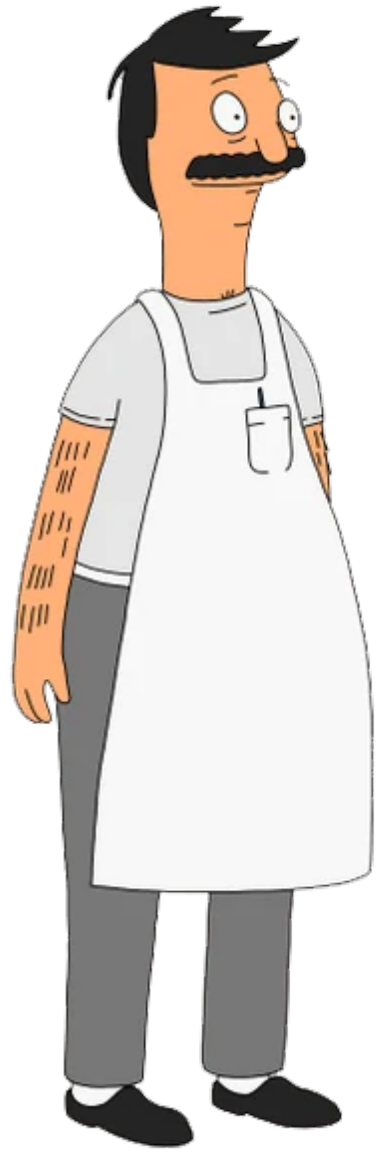
One Time Pad in Python:
A Story in Three Acts

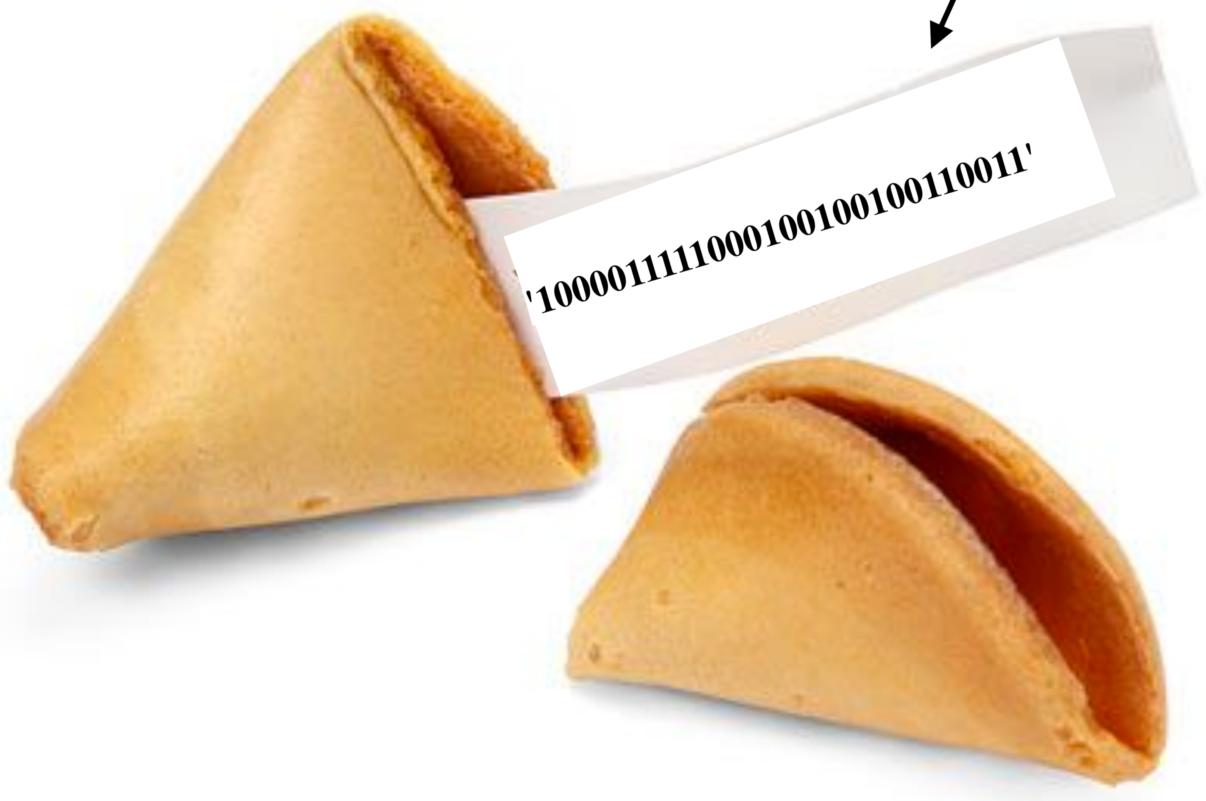


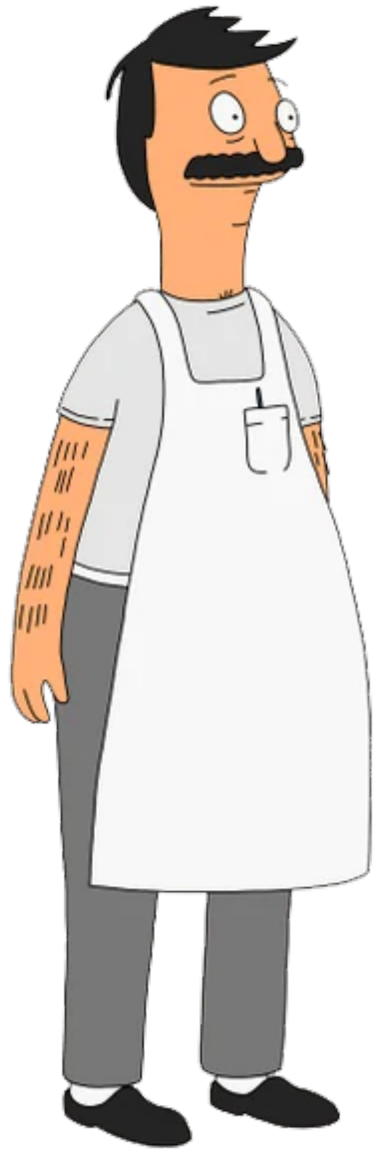
Act 1: The exchange of the key

Alice

Here's the secret key, don't lose this.

random binary digits





Sure thing Alice !

Act 2: Alice encodes her message

Message : “ Boo ”

def encode_to_decimal( ):

ASCII: [98, 111, 111]

def decimal_to_binary_string( ):

binary_message: ' 110001011011111101111'

You already have these functions!

*Notice there’s extra key? that’s ok! We can just save that for later.

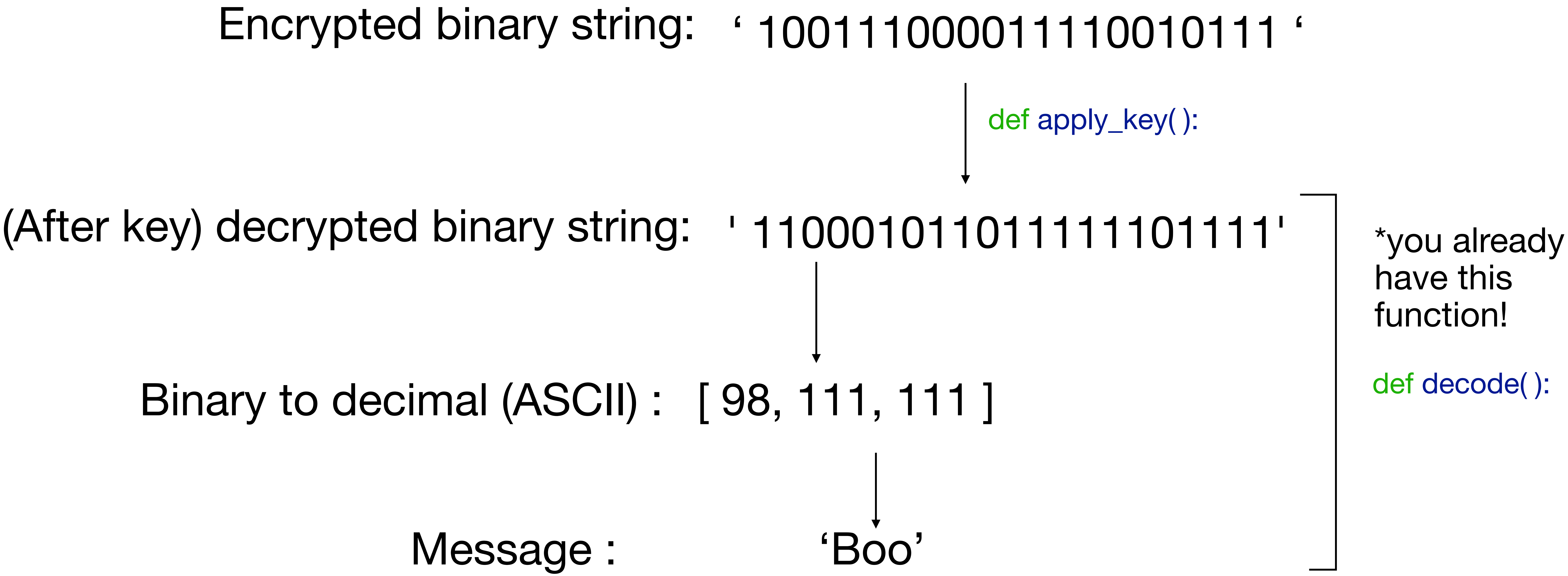
def secret_key_generator(4):

key : '1000011111000100100100110011'

def one_time_encrypt( ):

Encrypted binary string: ‘ 100111000011110010111 ’

Act 3: Bob receives encrypted message from Alice and decodes



Encrypted binary string: ‘ 100111000011110010111 ‘

def apply_key( ):

(After key) decrypted binary string: ' 110001011011111101111'

Binary to decimal (ASCII) : [98, 111, 111]

Message : ‘Boo’

*you already have this function!

def decode( ):

So what are you supposed to do?

-Take the necessary functions from Symmetric Key encryption assignment

-Add them to new functions in one_time_pad.iynb

-Add comments to the new functions in one_time_pad.iynb describing what they do

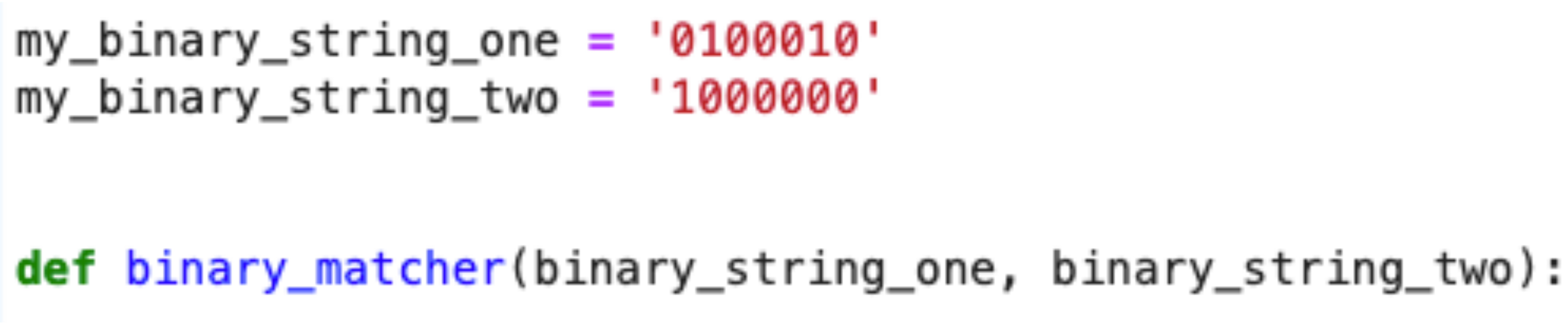
- Implement the mod 2 sum logic (see Canvas) in the one_time_encrypt( ) and apply_key( ) functions

-Create a message, and use the functions in the order given in this video to enact the one time pad protocol. Make sure that your secret key is as long or longer than the message.

-Save your notebook, making sure that all of your outputs at each step are visible

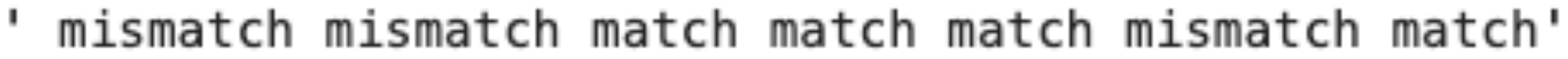
-Answer the questions in Canvas

-Turn in .ipynb



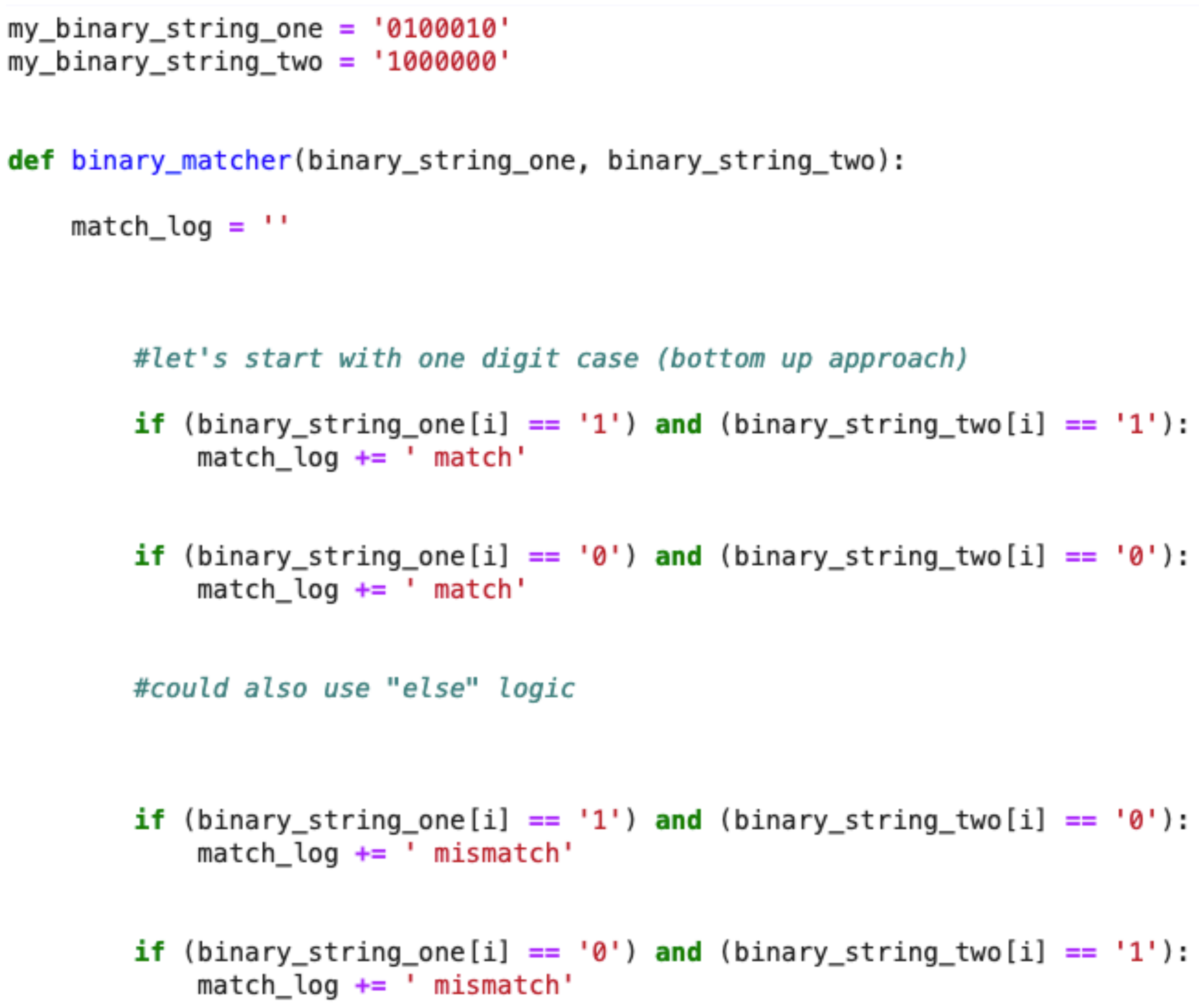
```
my_binary_string_one = '0100010'
my_binary_string_two = '1000000'


def binary_matcher(binary_string_one, binary_string_two):
```

Goal output:



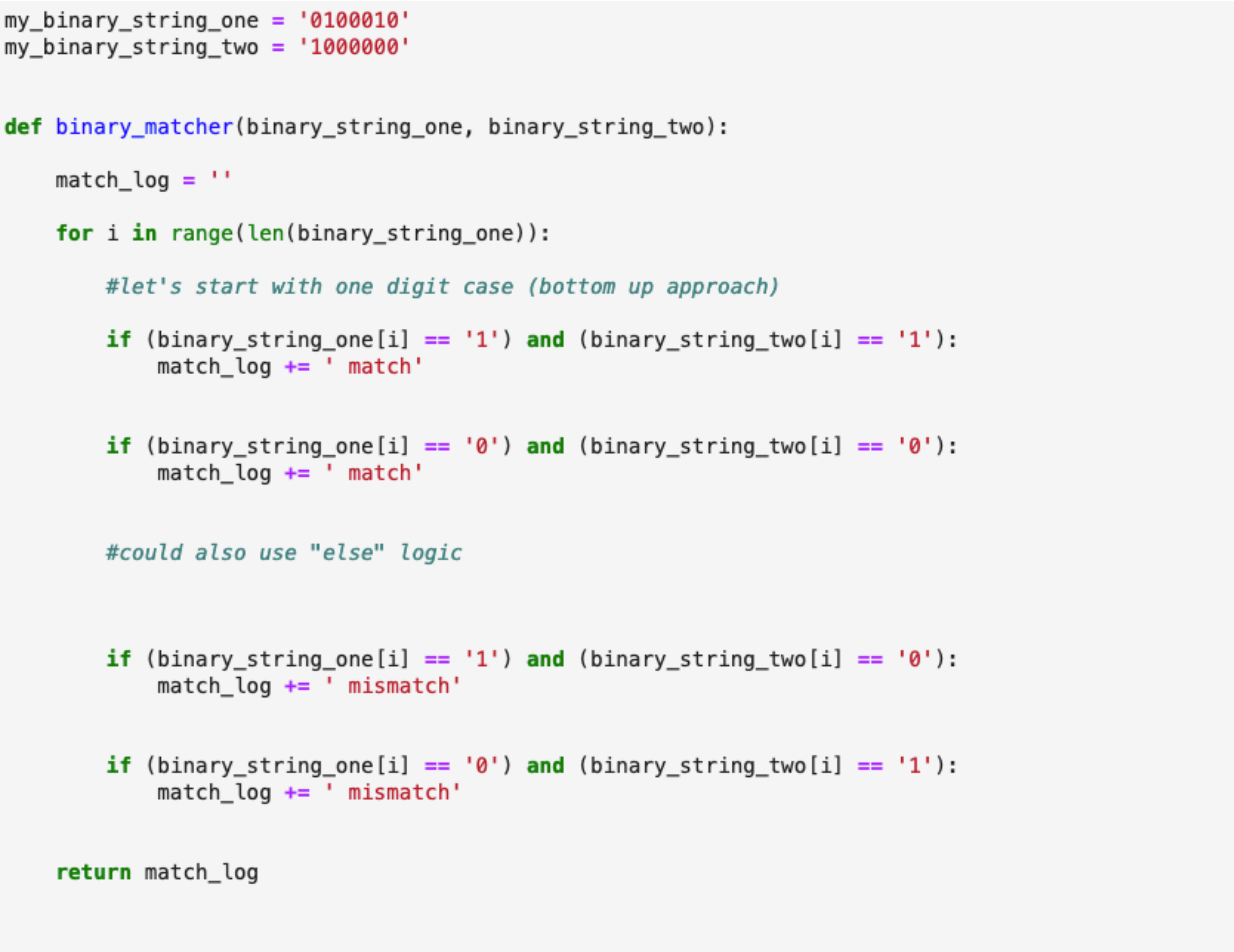
```
' mismatch mismatch match match match mismatch match'
```

Bottom up approach



```python
my_binary_string_one = '0100010'
my_binary_string_two = '1000000'


def binary_matcher(binary_string_one, binary_string_two):

    match_log = ''



        #let's start with one digit case (bottom up approach)

        if (binary_string_one[i] == '1') and (binary_string_two[i] == '1'):
            match_log += ' match'


        if (binary_string_one[i] == '0') and (binary_string_two[i] == '0'):
            match_log += ' match'


        #could also use "else" logic



        if (binary_string_one[i] == '1') and (binary_string_two[i] == '0'):
            match_log += ' mismatch'


        if (binary_string_one[i] == '0') and (binary_string_two[i] == '1'):
            match_log += ' mismatch'
```

Now iterate!



```
my_binary_string_one = '0100010'
my_binary_string_two = '1000000'


def binary_matcher(binary_string_one, binary_string_two):

    match_log = ''

    for i in range(len(binary_string_one)):

        #let's start with one digit case (bottom up approach)

        if (binary_string_one[i] == '1') and (binary_string_two[i] == '1'):
            match_log += ' match'


        if (binary_string_one[i] == '0') and (binary_string_two[i] == '0'):
            match_log += ' match'


        #could also use "else" logic



        if (binary_string_one[i] == '1') and (binary_string_two[i] == '0'):
            match_log += ' mismatch'


        if (binary_string_one[i] == '0') and (binary_string_two[i] == '1'):
            match_log += ' mismatch'


    return match_log
```

```
my_match_log = binary_matcher(my_binary_string_one, my_binary_string_two)
```

```
my_match_log
```