XOR

A 5-byte key was used to encrypt but now I have lost it.Can you help me decrypt the given ciphertext.

CIPHERTEXT
0e161f01023536393a481e263854141d150e3a17321c0a16001404

NOTE
The flag format is cotd{some_text_here}

Description
The challenge gives a hex encoded string and the title of the challenge indicates that it is XOR encoded ciphertext.

It is provided that a 5-byte key is used to encode the flag and the key is lost.

Writeup
We can decode the given cipher easily if we have the key.
Since the key is 5-byte and we know the first five characters of the encoded text we can recover the key using XOR algorithm on the first five characters.

First we need to convert the first five bytes of the ciphertext to ascii string.
We can easily do it using the following function

```python
def hex2ascii(srt):
    hex_string = str(srt)
    bytes_object = bytes.fromhex(hex_string)
    ascii_string = bytes_object.decode("ASCII")
    return ascii_string


ascii_five = hex2ascii('0e161f0102')

string_five = 'cotd{'
```

Now we can recover the original key by using the following function

```python
def xordecode(pl, ke):
    input_str = str(pl)
    key = str(ke)
    no_of_itr = len(input_str)
    result = ""

    for i in range(no_of_itr):
        current = input_str[i]
        current_key = key[i%len(key)]
        result += chr(ord(current) ^ ord(current_key))

    return result
```

Calling the above function we get the key

```python
actual_key = xordecode(ascii_five, string_five)
```

Now that we have the key and the encoded string calling the xordecode function we get the flag

```python
encoded_string = hex2ascii('0e161f01023536393a481e263854141d150e3a17321c0a16001404')
```

```python
decoded = xordecode(encoded_string, actual_key)
print(decoded)
```

THE FLAG

```
cotd{XOR_1s_S1mple_n_easyy}
```