Solution Review: Convert Decimal Integer to Binary

This lesson contains the solution review for the challenge of converting integer values to their binary equivalents.

WE'LL COVER THE FOLLOWING

Let's analyze the solution to the exercise in the previous lesson.

Implementation

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
        bin_num += str(s.pop())

    return bin_num

print(convert_int_to_bin(56))
print(convert_int_to_bin(2))
print(convert_int_to_bin(32))
print(convert_int_to_bin(10))

print(int(convert_int_to_bin(56),2)==56)
```

Explanation

On **line 2**, we declare a stack and proceed to a `while` loop on **line 4** which executes if `dec_num` is greater than 0.

As stated in the **division by 2** method, we calculate the remainder of the division of `dec_num` by 2 and push it onto the stack (**lines 5-6**). Then we divide `dec_num` by 2 using the `//` operator to `dec_num` which floors the answer of the division, and we update `dec_num` with the answer (**line** 7). We keep executing the code on **lines 5-7** as long as `dec-num` is greater than 0. As soon as `dec_num` becomes equal to or less than 0, the `while` loop terminates.

On **line 9**, `bin_num` is declared as an empty string. The `while` loop on the very next line executes if the stack `s` is *not* empty. If `s` is not empty, we pop a value from `s` and append it to the `bin_num` string on **line 11**. We keep popping elements from `s` until it becomes empty and the `while` loop is terminated.

The `bin_num` is returned from the function on **line 13**.

The following code helps us to evaluate whether our implementation is correct or not:

```
print(int(convert_int_to_bin(56),2)==56)
```

The above statement will print `True` if `convert_int_to_bin(56)` returns the correct binary equivalent for `56`. We convert the returned value from `convert_int_to_bin(56)` to an integer value by specifying base `2` of the returned value. It will convert to `56` if it's equal to `56` in binary format. Otherwise, the statement will print `False` if we get some number other than `56`.

In this problem, the *First-In, Last-Out* property of the stack has enabled us to store the binary bits from the *MSB* (Most Significant Bit) to the *LSB* (Least Significant Bit), although we get the values in reverse order by the *division by 2* method.

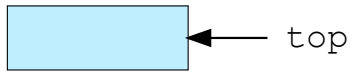
Below are some slides that will help you understand the code even better:

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
        bin_num += str(s.pop())

    return bin_num
```



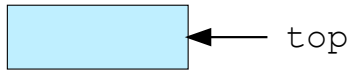
dec_num = 10


```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
        bin_num += str(s.pop())

    return bin_num
```



dec_num = 10

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
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    bin_num = ""
    while not s.is_empty():
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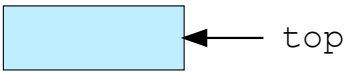
    return bin_num
```



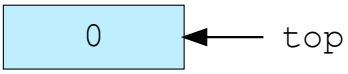
dec_num = 10
remainder = 0


```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
        bin_num += str(s.pop())

    return bin_num
```



dec_num = 10
remainder = 0

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
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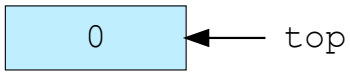
    bin_num = ""
    while not s.is_empty():
        bin_num += str(s.pop())

    return bin_num
```



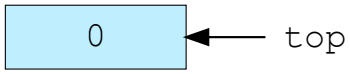
dec_num = 5
remainder = 0


```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
        bin_num += str(s.pop())

    return bin_num
```



dec_num = 5
remainder = 0

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
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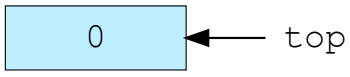
    return bin_num
```



dec_num = 5
remainder = 1


```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
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    bin_num = ""
    while not s.is_empty():
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    return bin_num
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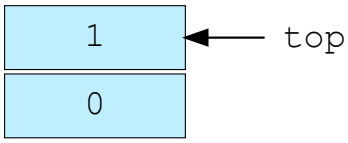

dec_num = 5
remainder = 1

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
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    bin_num = ""
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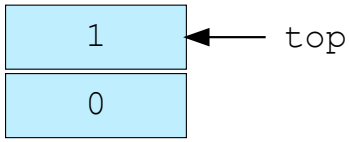

dec_num = 2
remainder = 1


```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
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    bin_num = ""
    while not s.is_empty():
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    return bin_num
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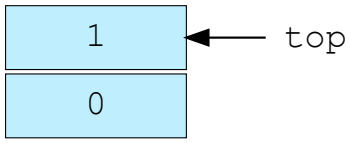

dec_num = 2
remainder = 1

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    while dec_num > 0:
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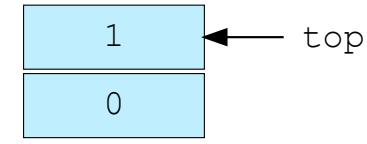

dec_num = 2
remainder = 0


```
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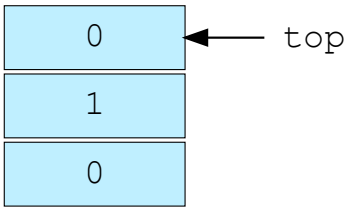

dec_num = 2
remainder = 0

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def convert_int_to_bin(dec_num):
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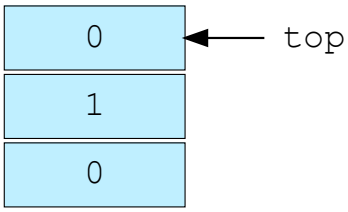


```
dec_num = 1
remainder = 0
```



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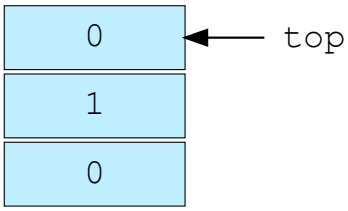


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dec_num = 1
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```

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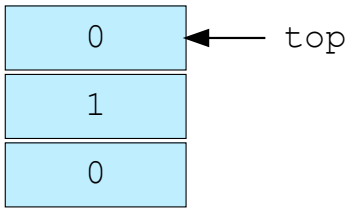

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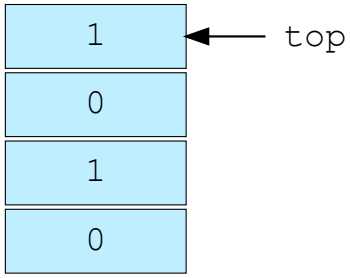

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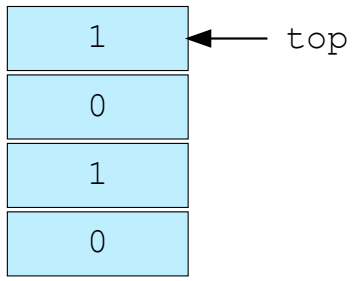


```
dec_num = 0
remainder = 1
```



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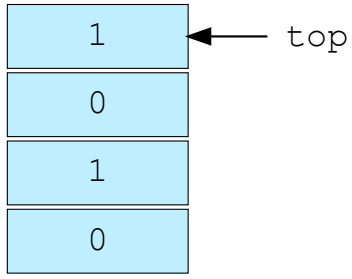


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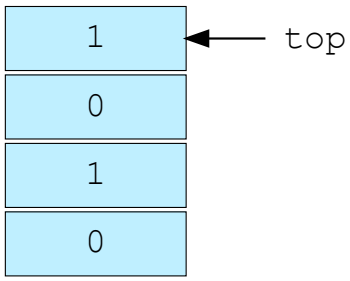


```
dec_num = 0
remainder = 1
bin_num = ""
```



```
def convert_int_to_bin(dec_num):
    s = Stack()

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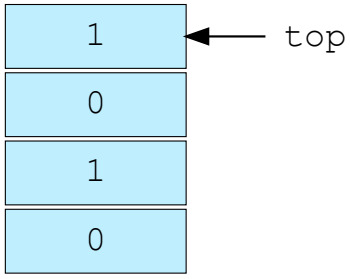


```
dec_num = 0
remainder = 1
bin_num = ""
```

```
def convert_int_to_bin(dec_num):
    s = Stack()

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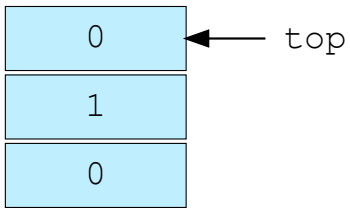


```
dec_num = 0
remainder = 1
bin_num = "1"
```



```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
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    return bin_num
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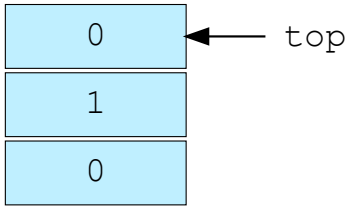


```
dec_num = 0
remainder = 1
bin_num = "1"
```

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
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    return bin_num
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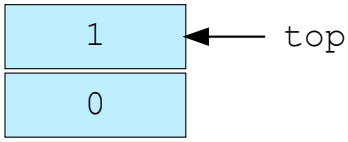



```
dec_num = 0
remainder = 1
bin_num = "10"
```

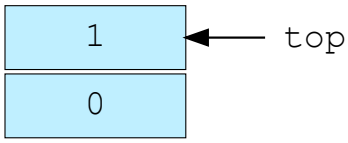


```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
        bin_num += str(s.pop())

    return bin_num
```




```
dec_num = 0
remainder = 1
bin_num = "10"
```

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
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    bin_num = ""
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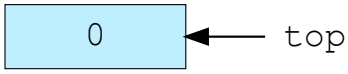



```
dec_num = 0
remainder = 1
bin_num = "101"
```

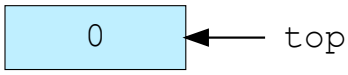


```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
        bin_num += str(s.pop())

    return bin_num
```




```
dec_num = 0
remainder = 1
bin_num = "101"
```

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
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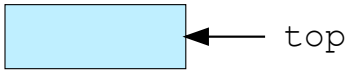


```
dec_num = 0
remainder = 1
bin_num = "1010"
```



```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
        dec_num = dec_num // 2

    bin_num = ""
    while not s.is_empty():
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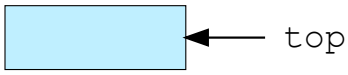
    return bin_num
```




```
dec_num = 0
remainder = 1
bin_num = "1010"
```

```
def convert_int_to_bin(dec_num):
    s = Stack()

    while dec_num > 0:
        remainder = dec_num % 2
        s.push(remainder)
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    bin_num = ""
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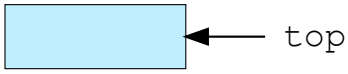
    return bin_num
```




```
dec_num = 0
remainder = 1
bin_num = "1010"
```

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Hope everything's clear up until now! We'll now move on to the next chapter which is all about Singly Linked Lists.