

# Exercise: Convert Decimal Integer to Binary

Challenge yourself to solve the problem in this lesson!

## WE'LL COVER THE FOLLOWING ^



- Division by 2 Method
- Coding Time!

In this coding exercise, you are required to use the stack data structure to convert integer values to their binary equivalent.

## Division by 2 Method #

The slides below show how to use the **division by 2** method to compute the binary equivalent for an integer.

$$242 \div 2 = 121 \longrightarrow 0$$

 Integer Value from the division       Remainder

Divide the number by two.

Extract the non-fractional part from the answer and record the remainder from the division.

$$242 \text{ / } 2 = 121 \longrightarrow 0$$

$$121 \text{ / } 2 = 60 \longrightarrow 1$$

Keep dividing the answer from the previous calculation by two until you reach zero and keep recording the remainders.

$$242 \text{ / } 2 = 121 \longrightarrow 0$$

$$121 \text{ / } 2 = 60 \longrightarrow 1$$

$$60 \text{ / } 2 = 30 \longrightarrow 0$$

$$242 \text{ / } 2 = 121 \longrightarrow 0$$

$$121 \text{ / } 2 = 60 \longrightarrow 1$$

$$60 \text{ / } 2 = 30 \longrightarrow 0$$

$$30 \text{ / } 2 = 15 \longrightarrow 0$$

$$242 \text{ / } 2 = 121 \longrightarrow 0$$

$$121 \text{ / } 2 = 60 \longrightarrow 1$$

$$60 \text{ / } 2 = 30 \longrightarrow 0$$

$$30 \text{ / } 2 = 15 \longrightarrow 0$$

$$15 \text{ / } 2 = 7 \longrightarrow 1$$

$$\begin{array}{rcll} 242 & / & 2 & = 121 \longrightarrow 0 \\ 121 & / & 2 & = 60 \longrightarrow 1 \\ 60 & / & 2 & = 30 \longrightarrow 0 \\ 30 & / & 2 & = 15 \longrightarrow 0 \\ 15 & / & 2 & = 7 \longrightarrow 1 \\ 7 & / & 2 & = 3 \longrightarrow 1 \end{array}$$


$$\begin{array}{rcll} 242 & / & 2 & = 121 \longrightarrow 0 \\ 121 & / & 2 & = 60 \longrightarrow 1 \\ 60 & / & 2 & = 30 \longrightarrow 0 \\ 30 & / & 2 & = 15 \longrightarrow 0 \\ 15 & / & 2 & = 7 \longrightarrow 1 \\ 7 & / & 2 & = 3 \longrightarrow 1 \\ 3 & / & 2 & = 1 \longrightarrow 1 \end{array}$$

$$\begin{array}{rcll}
 242 & / & 2 & = 121 \longrightarrow 0 \\
 121 & / & 2 & = 60 \longrightarrow 1 \\
 60 & / & 2 & = 30 \longrightarrow 0 \\
 30 & / & 2 & = 15 \longrightarrow 0 \\
 15 & / & 2 & = 7 \longrightarrow 1 \\
 7 & / & 2 & = 3 \longrightarrow 1 \\
 3 & / & 2 & = 1 \longrightarrow 1 \\
 1 & / & 2 & = 0 \longrightarrow 1
 \end{array}$$

LSB (Least Significant Bit)

$$\begin{array}{rcll}
 242 & / & 2 & = 121 \longrightarrow 0 \\
 121 & / & 2 & = 60 \longrightarrow 1 \\
 60 & / & 2 & = 30 \longrightarrow 0 \\
 30 & / & 2 & = 15 \longrightarrow 0 \\
 15 & / & 2 & = 7 \longrightarrow 1 \\
 7 & / & 2 & = 3 \longrightarrow 1 \\
 3 & / & 2 & = 1 \longrightarrow 1 \\
 1 & / & 2 & = 0 \longrightarrow 1
 \end{array}$$

MSB (Most Significant Bit)



You have to read from the bottom of the remainders (MSB) to

LSB (Least Significant Bit)						
242	/	2	=	121	→	0
121	/	2	=	60	→	1
60	/	2	=	30	→	0
30	/	2	=	15	→	0
15	/	2	=	7	→	1
7	/	2	=	3	→	1
3	/	2	=	1	→	1
1	/	2	=	0	→	1
MSB (Most Significant Bit)						

Therefore the binary equivalent for 242 is:  
11110010

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## Coding Time! #

You can build your solution based on **division by 2** method. Your solution should return the correct binary equivalent of `dec_num` as a string from the `convert_int_to_bin(dec_num)` in order to pass the tests.

Make sure that you use stack while solving this challenge. The `stack.py` has been imported to the code. You can make use of the implementation while coding your solution. Remove the `pass` statement if you start implementing your solution.

Good luck!

main.py

stack.py

```
from stack import Stack

def convert_int_to_bin(dec_num):
    pass
```

