

Python Workshop Series

Department of Computer Science – OUSL

Activity 03

The activity given is following.

-
1. Check if either $a = 4$ or $b = 10$ is smaller than 5.
 2. Apply the bitwise OR operation to 7 and 12. Convert both numbers to binary, carry out the OR operation, and determine the resulting decimal value.
 3. Apply the bitwise XOR operation to 5 and 3. Convert both numbers to binary, perform the XOR operation, and determine the resulting decimal value.
 4. Perform a right shift operation on the number 20 by 3 positions. Provide both the binary and decimal results.
-

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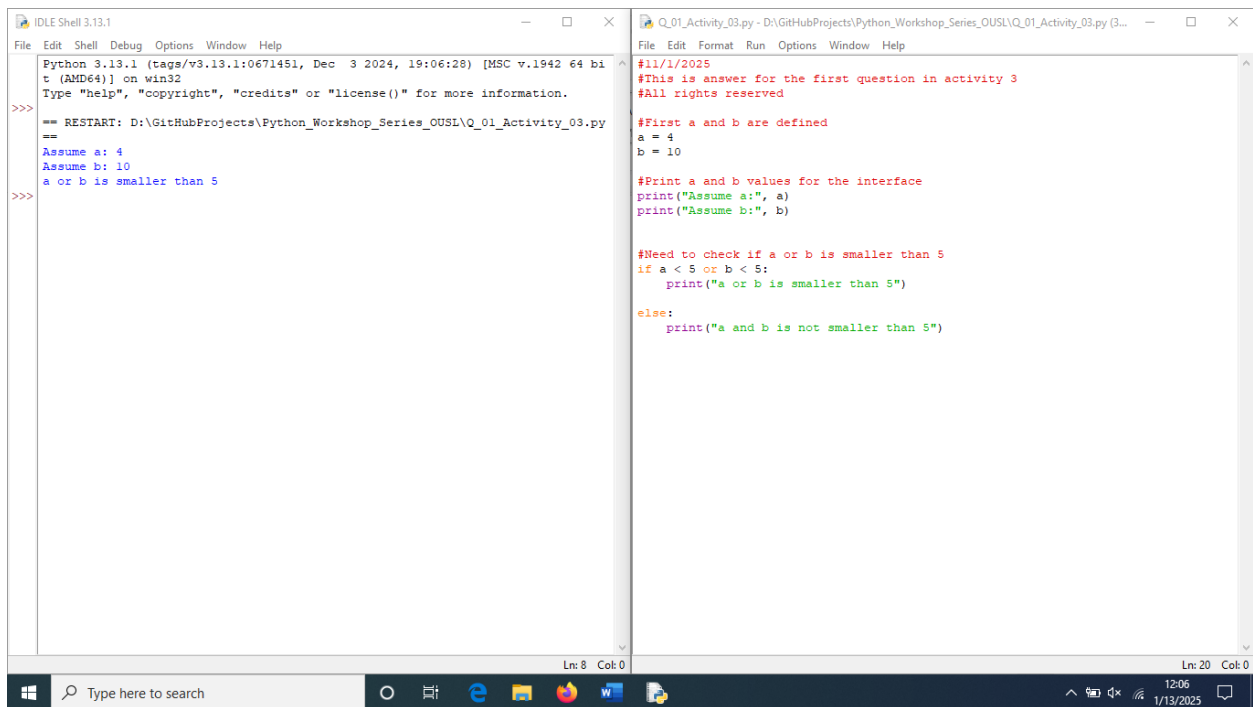
1.

```
#11/1/2025
#This is answer for the first question in activity 3
#All rights reserved

#First a and b are defined
a = 4
b = 10

#Print a and b values for the interface
print("Assume a:", a)
print("Assume b:", b)

#Need to check if a or b is smaller than 5
if a < 5 or b < 5:
    print("a or b is smaller than 5")
else:
    print("a and b is not smaller than 5")
```



```
Python 3.13.1 (tags/v3.13.1:0671451, Dec 3 2024, 19:06:28) [MSC v.1942 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
== RESTART: D:\GitHubProjects\Python_Workshop_Series_OUSL\Q_01_Activity_03.py ==
>>> Assume a: 4
Assume b: 10
a or b is smaller than 5
>>>
```

```
File Edit Format Run Options Window Help
#11/1/2025
#This is answer for the first question in activity 3
#All rights reserved

#First a and b are defined
a = 4
b = 10

#Print a and b values for the interface
print("Assume a:", a)
print("Assume b:", b)

#Need to check if a or b is smaller than 5
if a < 5 or b < 5:
    print("a or b is smaller than 5")
else:
    print("a and b is not smaller than 5")
```

2.

```
#13/1/2025
```

```
#Question 2 is about applying bitwise OR operation and  
verification
```

```
#All rights reserved
```

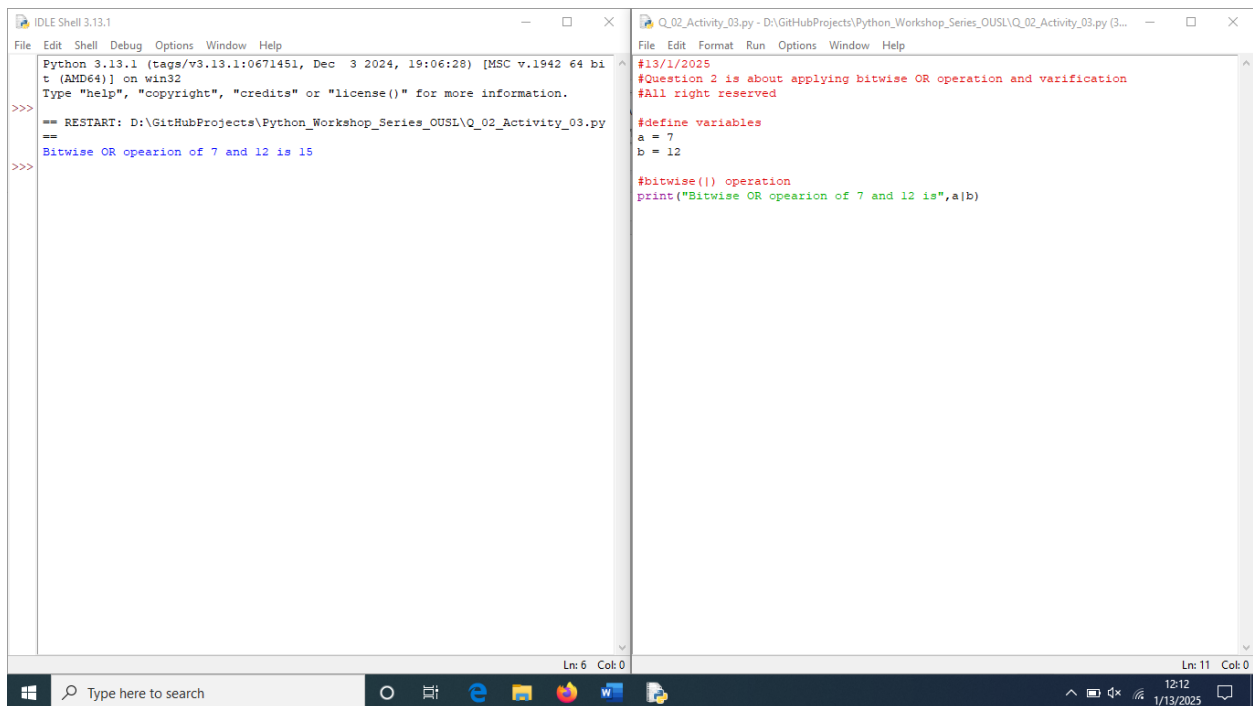
```
#define variables
```

```
a = 7
```

```
b = 12
```

```
#bitwise(|) operation
```

```
print("Bitwise OR operation of 7 and 12 is",a|b)
```



```
Python 3.13.1 (tags/v3.13.1:0671451, Dec 3 2024, 19:06:28) [MSC v.1942 64 bit  
 (AMD64)] on win32  
Type "help", "copyright", "credits" or "license()" for more information.  
>>>  
== RESTART: D:\GitHubProjects\Python_Workshop_Series_OUSL\Q_02_Activity_03.py  
==  
Bitwise OR operation of 7 and 12 is 15  
>>>
```

```
Q_02_Activity_03.py - D:\GitHubProjects\Python_Workshop_Series_OUSL\Q_02_Activity_03.py (3...  
File Edit Format Run Options Window Help  
#13/1/2025  
#Question 2 is about applying bitwise OR operation and verification  
#All right reserved  
  
#define variables  
a = 7  
b = 12  
  
#bitwise(|) operation  
print("Bitwise OR operation of 7 and 12 is",a|b)
```

Suppose that

$$a = 7$$

$$b = 12$$

Q2

Let convert a, b to binary

$$\begin{array}{r} 2 \overline{) 7} \\ 2 \overline{) 3} - 1 \\ 1 - 1 \\ \hline \end{array} \Rightarrow \overset{a}{0111}$$

$$\begin{array}{r} 2 \overline{) 12} \\ 2 \overline{) 6} - 0 \\ 2 \overline{) 3} - 0 \\ 1 - 1 \\ \hline \end{array} \Rightarrow \overset{b}{1100}$$

Then we perform OR operator (a|b)

a	b	output
1	0	1
1	0	1
1	1	1
0	1	1

thus
 $(a|b) = 1111$

convert (a|b) to decimal

$$\begin{array}{cccc} 1 & 1 & 1 & 1 \\ 2^3 & 2^2 & 2^1 & 2^0 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ 8 & 4 & 2 & 1 \end{array} \Rightarrow \underline{\underline{15}}$$

PS \rightarrow OR behaviour

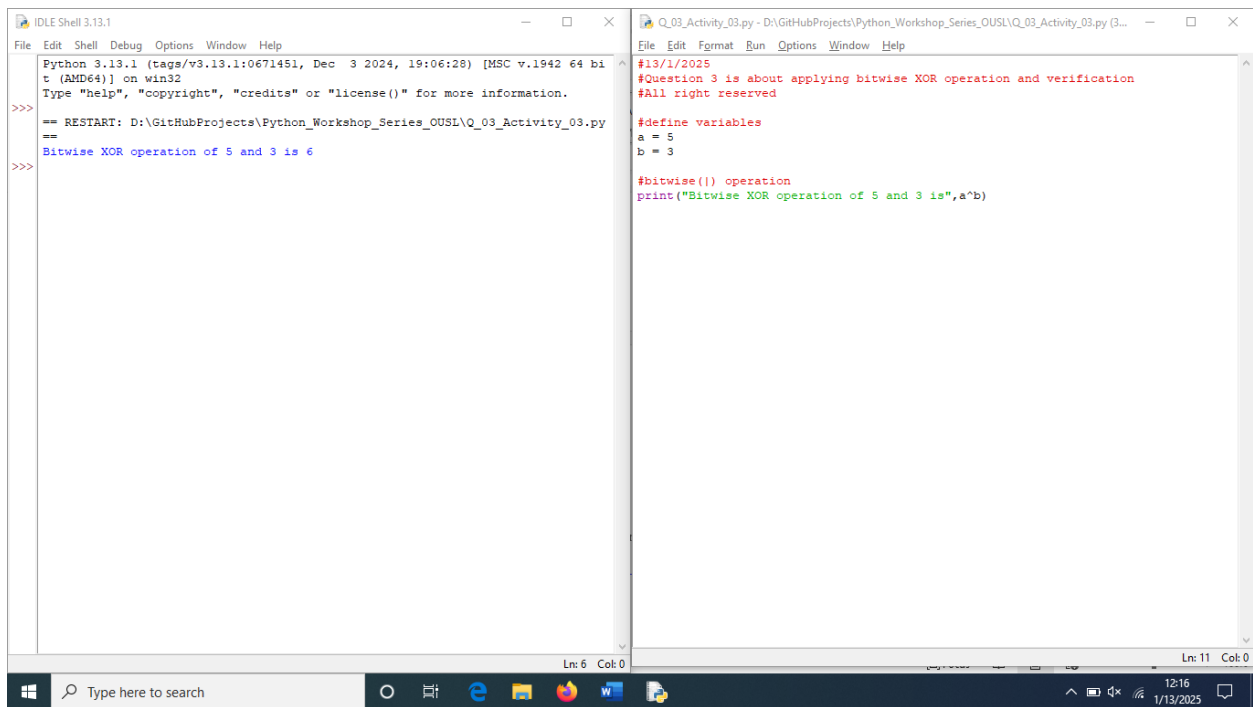
a	b	a b
0	0	0
0	1	1
1	0	1
1	1	1

3.

```
#13/1/2025
#Question 3 is about applying bitwise XOR operation and verification
#All rights reserved

#define variables
a = 5
b = 3

#bitwise(^) operation
print("Bitwise XOR operation of 5 and 3 is",a^b)
```



The screenshot shows a Python IDE with two windows. The left window, titled 'IDLE Shell 3.13.1', displays the output of a script execution: a restart message, the file path, and the result 'Bitwise XOR operation of 5 and 3 is 6'. The right window, titled 'Q_03_Activity_03.py', shows the source code of the script, which includes comments and code for defining variables, performing a bitwise XOR operation, and printing the result. The Windows taskbar at the bottom shows the system clock as 12:16 on 1/13/2025.

```
Python 3.13.1 (tags/v3.13.1:0671451, Dec 3 2024, 19:06:28) [MSC v.1942 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
== RESTART: D:\GitHubProjects\Python_Workshop_Series_OUSL\Q_03_Activity_03.py ==
>>> Bitwise XOR operation of 5 and 3 is 6
>>>
```

```
#13/1/2025
#Question 3 is about applying bitwise XOR operation and verification
#All right reserved

#define variables
a = 5
b = 3

#bitwise(^) operation
print("Bitwise XOR operation of 5 and 3 is",a^b)
```

suppose that

No

Date

$a = 5$; $b = 3$

Q3

convert into binary

$$\begin{array}{r} 2 \overline{) 5} \\ \underline{2 2} - 1 \\ 1 - 0 \end{array} \Rightarrow 0101 \quad \begin{array}{r} 2 \overline{) 3} \\ \underline{2 1} - 1 \\ 1 - 0 \end{array} \Rightarrow 0011$$

Then we perform XOR operator ($a \oplus b$)

a	b	$a \oplus b$
1	1	0
0	1	1
1	0	1
0	0	0

thus

$$a \oplus b = 0110$$

convert $a \oplus b$ into decimal

$$\begin{array}{cccc} 0 & 1 & 1 & 0 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ 2^3 & 2^2 & 2^1 & 2^0 \\ 0 & 4 & 2 & 0 \Rightarrow \underline{6} \end{array}$$

ps \rightarrow XOR behaviour

a	b	$a \oplus b$
0	0	0
0	1	1
1	0	1
1	1	0

4.

```
#13/1/2025
```

```
#Question 4 is about performing right shift operation and verification
```

```
#All rights reserved
```

```
#define variables
```

```
number = 20
```

```
digits_to_right = 3
```

```
#bitwise(>>) operation
```

```
print("Bitwise Right shift(>>) operation on number 20 by 3 positions is:",  
      number>>digits_to_right)
```

```
Python 3.13.1 (tags/v3.13.1:0671451, Dec 3 2024, 19:06:28) [MSC v.1942 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
== RESTART: D:\GitHubProjects\Python_Workshop_Series_OUSL\Q_04_Activity_03.py ==
>>> Bitwise Right shift(>>) operation on number 20 by 3 positions is: 2
>>>
```

```
#13/1/2025
#Question 4 is about performing right shift operation and verification
#All rights reserved

#define variables
number = 20
digits_to_right = 3

#bitwise(>>) operation
print("Bitwise Right shift(>>) operation on number 20 by 3 positions is:",
      number>>digits_to_right)
```

suppose

number = 20

digit-to-right = 3

Q4

converting to binary

binary of 20
= 10100

$$\begin{array}{r|l} 2 & 20 \\ \hline 2 & 10 - 0 \\ \hline 2 & 5 - 0 \\ \hline 2 & 2 - 1 \\ \hline & 1 - 0 \end{array}$$

now we shift
10100 by 3 digits

10100 \Rightarrow 00010
 $\rightarrow \times 3$

00010 to decimal = 2

Dear sir/madam, please visit repositories for more information:

https://github.com/loachana/Python_Workshop_Series_OUSL.git