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Python Workshop Series

Department of Computer Science – OUSL

Activity 03

The activity given is following.

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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.**

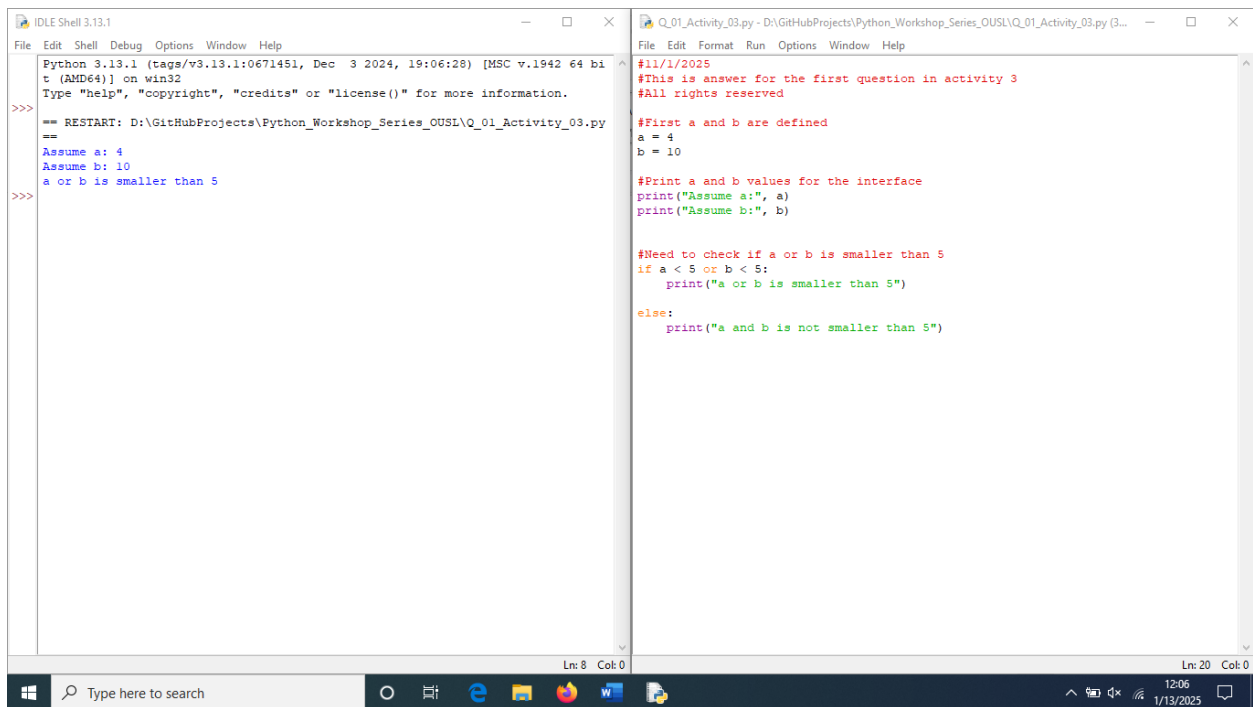*This page is intentionally left blank.*

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")
```

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 opearion of 7 and 12 is",a|b)
```
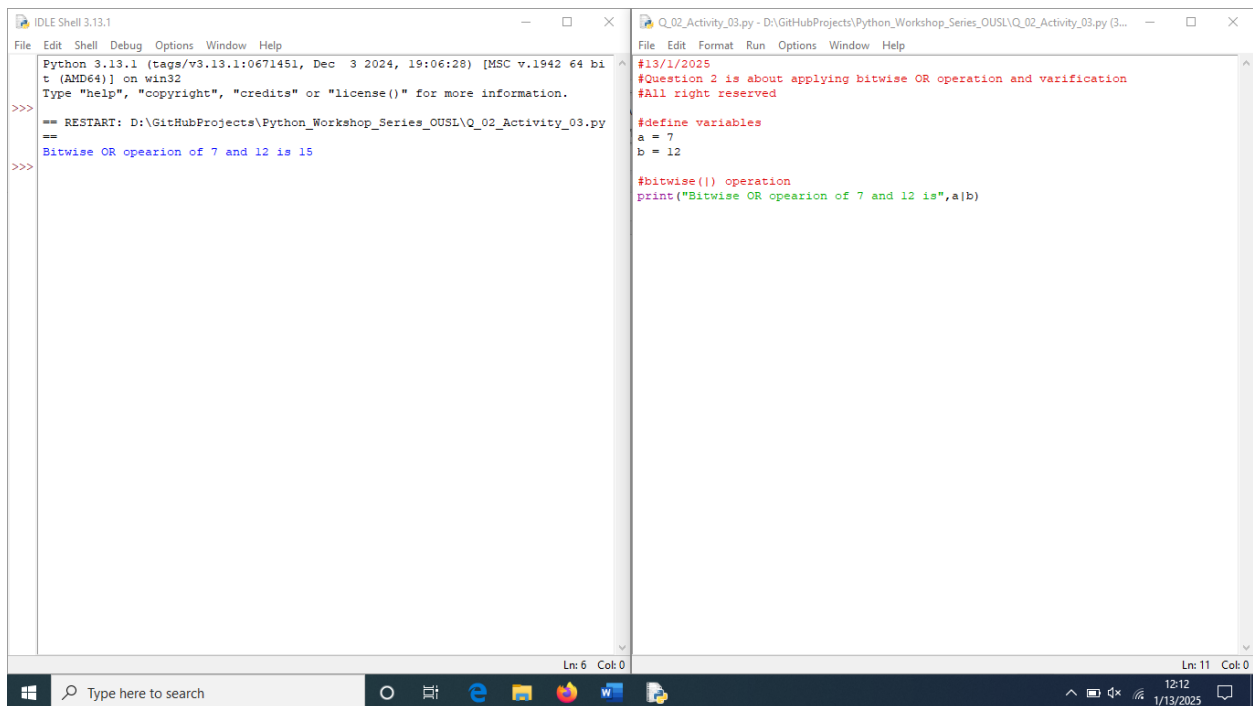
suppose that ⓠ2
$$a = 7$$
$$b = 12$$

Let convert a, b to binary

$$
\begin{array}{r|l}
2 & 7 \\
2 & \overline{3} - 1 \\
& \overline{1} - 1
\end{array}
\Rightarrow 0111 \quad (a)
\qquad
\begin{array}{r|l}
2 & 12 \\
2 & \overline{6} - 0 \\
2 & \overline{3} - 0 \\
& \overline{1} - 1
\end{array}
\Rightarrow 1100 \quad (b)
$$

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 → OR behaviour

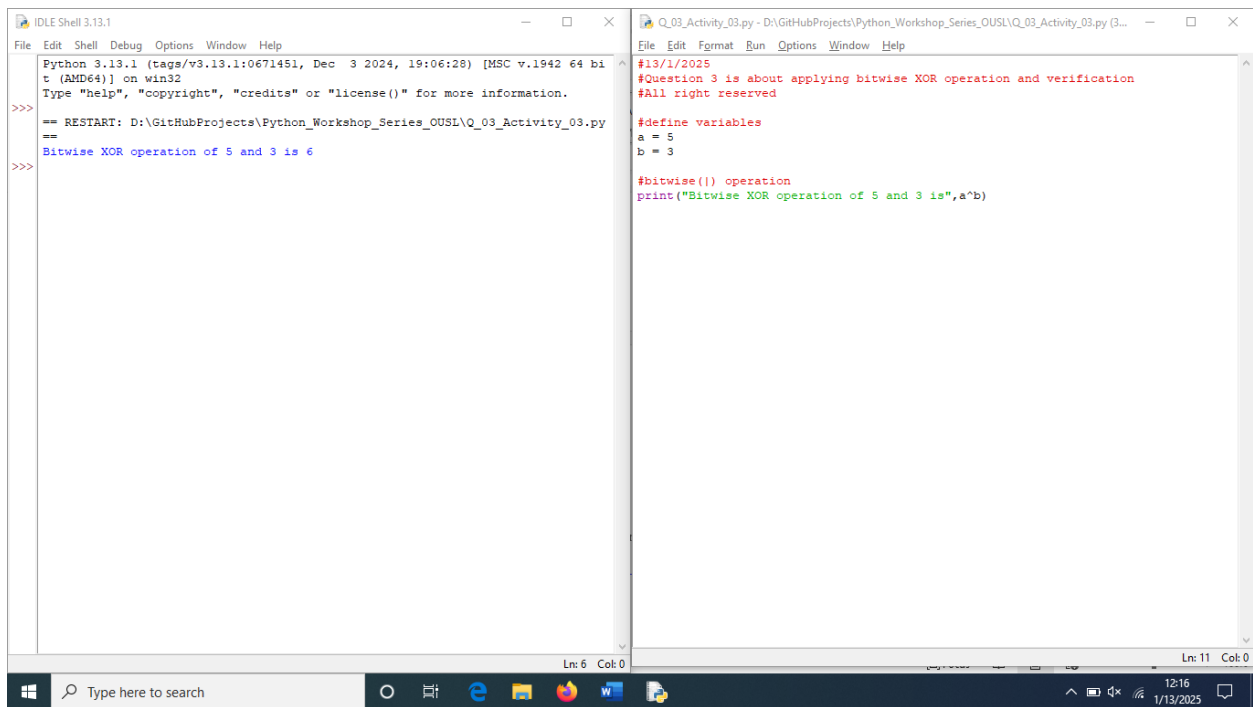| a	b	a|b
0	0	0
0	1	1
1	0	1
1	1	1

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)
```

IDLE Shell 3.13.1

File Edit Shell Debug Options Window Help

```
Python 3.13.1 (tags/v3.13.1:0671451, Dec  3 2024, 19:06:28) [MSC v.1942 64 bi
t (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
>>>
```

Ln: 6 Col: 0

Q_03_Activity_03.py - D:\GitHubProjects\Python_Workshop_Series_OUSL\Q_03_Activity_03.py (3...

File Edit Format Run Options Window Help

```
#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)
```

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12:16
1/13/2025

suppose that
$a = 5$; $b = 3$

$(Q3)$

convert into binary

$2|5$
$2|2-1$ $\Rightarrow$ 0101
$1-0$

$2|3$
$1-1$ $\Rightarrow$ 0011

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

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

thus
$a \wedge b = 0110$

convert $a \wedge b$ into decimal

0	1	1	0
2^3	2^2	2^1	2^0

0 4 2 0 $\Rightarrow$ $\underline{6}$

PS $\rightarrow$ XOR behaviour

a	b	a^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)
```

suppose

(Q4)

number = 20
digit_to_right = 3

converting to binary

binary of 20
= 10100

$$2 | 20$$
$$2 | 10 - 0$$
$$2 | 5 - 0$$
$$2 | 2 - 1$$
$$1 - 0$$

now we shift
10100 by 3 digits
        10100
        → ×3   ⇒ 00010

00010 to decimal = 2