Loops 2 - Nested Loops

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Question: Write a loop to print the following numbers - `1,4,7,10,13,16`

```
for i in range(1,17,3):
    if i == 16:
        print(i, end = "")
    else:
        print(i, end = ", ")
```

```
    1, 4, 7, 10, 13, 16
```

Question: Write a loop to print the following numbers - `1,3,7,13,21,31,43`

```
number = 1
i = 1
while number <= 43:
    print(number, end = " ")
    number = number + 2*i
    i += 1
```

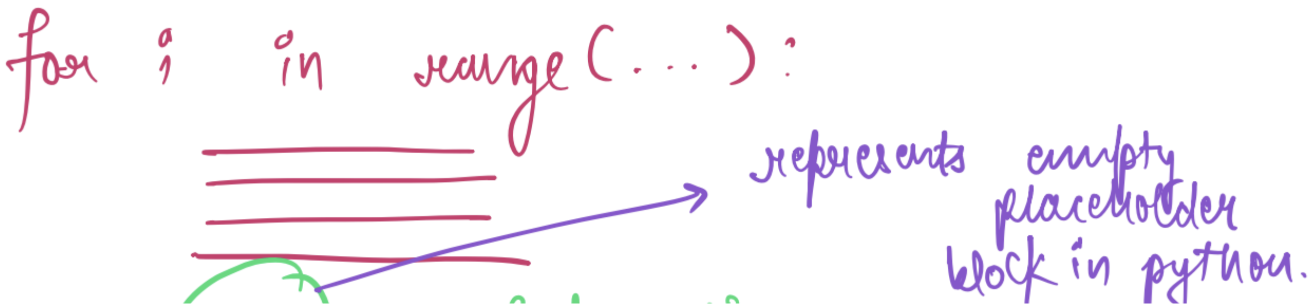
```
    1 3 7 13 21 31 43
```

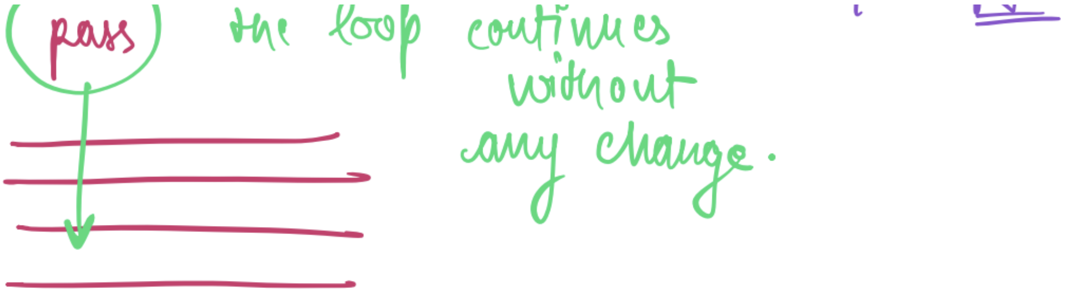
Jump Statements

`pass`

```
if True:
    pass # represents an empty block / statement in Python
```

- `pass` acts as a placeholder.
- It acts as an empty block.



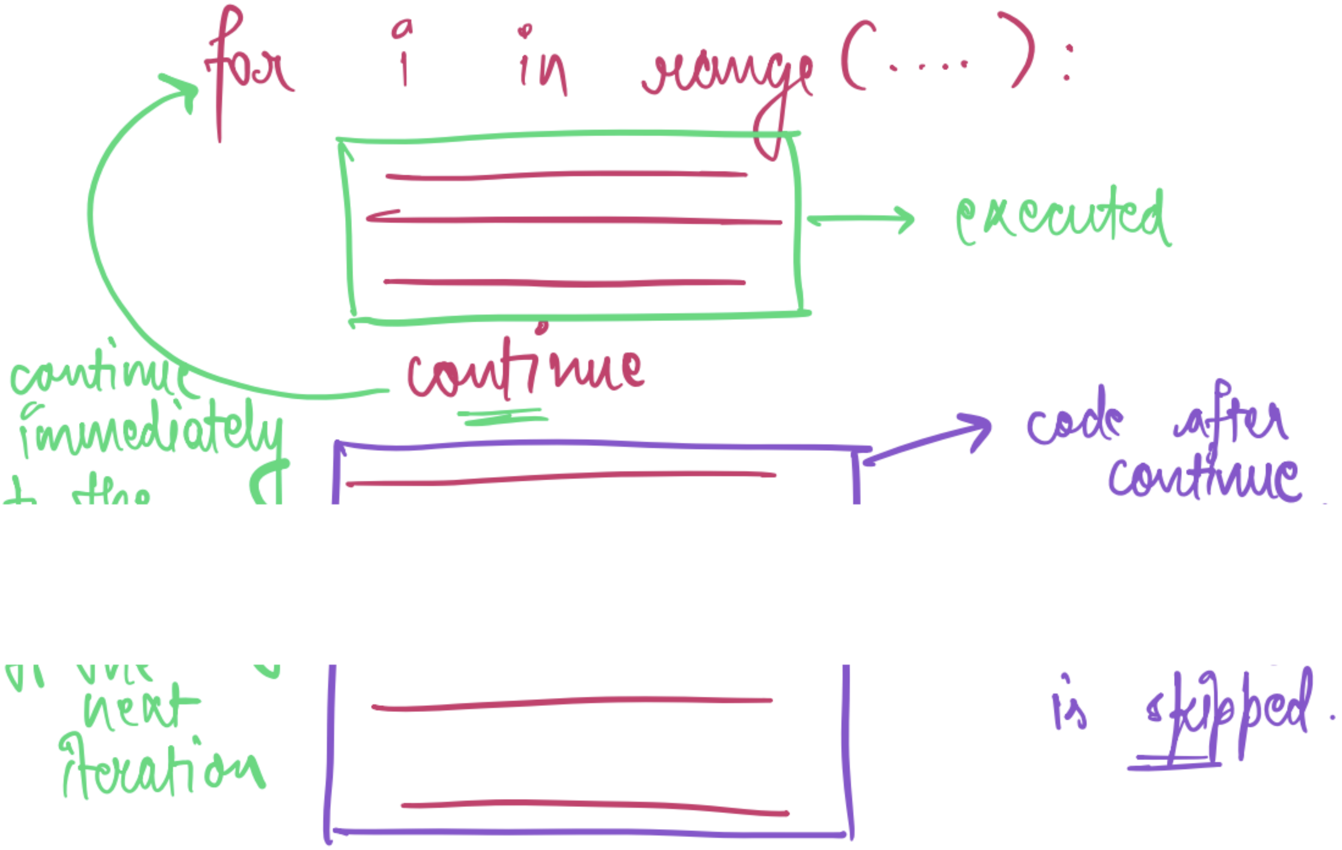


```
for i in range(5):
    if i == 3:
        pass
    print(i)
```

```
0
1
2
3
4
```

continue

- Disregards the code after the `continue` statement and goes to the next iteration.
- It is effectively used `if` to skip a specific iteration.


for i in range(....):
executed
continue
continue immediately to the next iteration
code after continue is skipped.

```
for i in range(5):
    if i == 3:
        continue
    print(i)
```

```
0
1
2
4
```

Quiz-1

Question

What will be the output of the following code snippet?

```
x = 0
while x < 5:
    x += 1
    if x == 3:
        continue
    print(x)
```

A.

```
1
2
3
4
5
```

B.

```
1
2
4
5
```

C.

```
1
2
3
4
```

D.

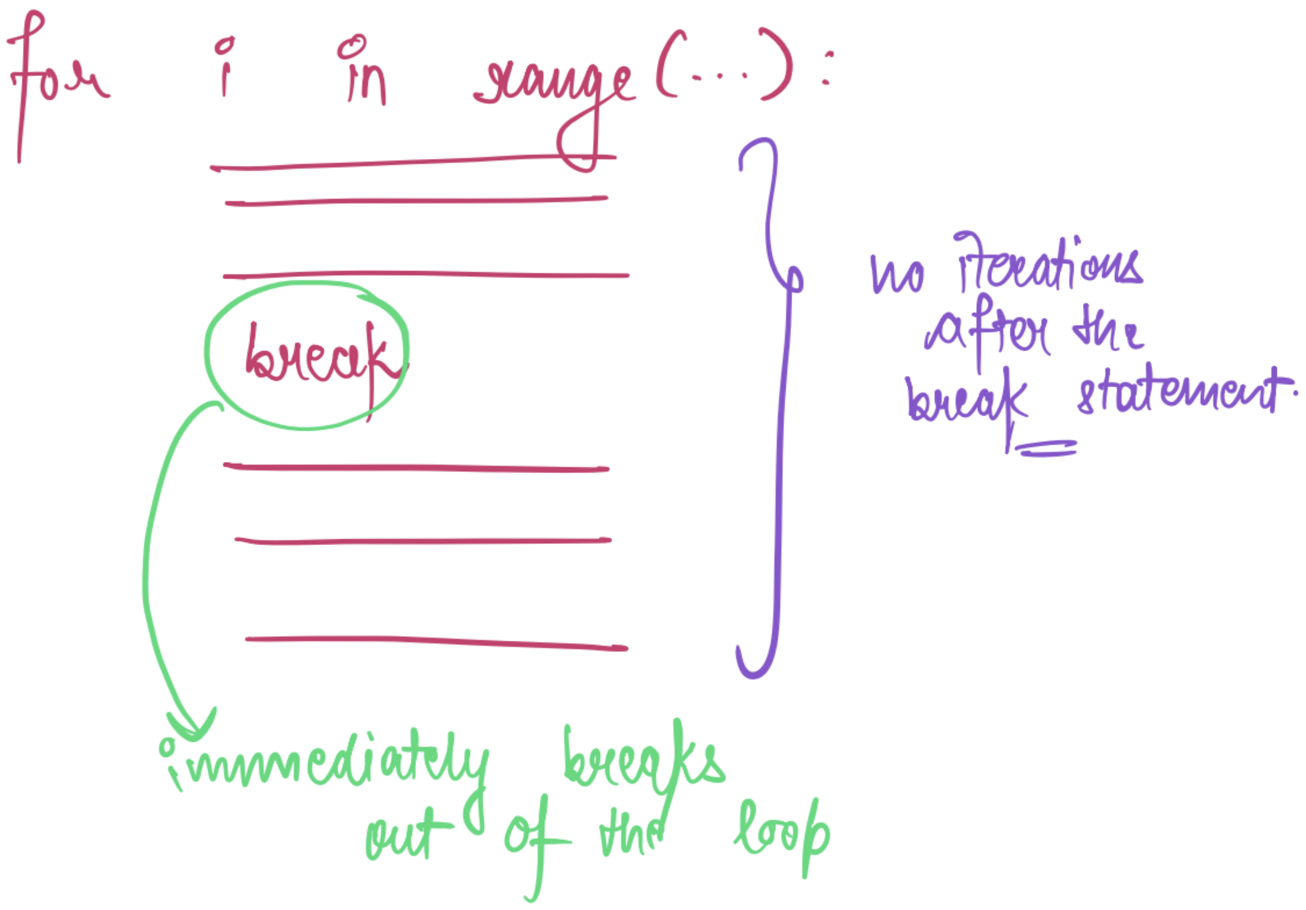
```
0
1
2
3
4
5
```

Choices

- □ A
- ☑ B
- □ C
- □ D

`break`

- When `break` is encountered, the control goes out of the loop and the loop terminates, regardless of the code that follows.


for i in range(...):
break
no iterations after the break statement.
immediately breaks out of the loop

```
for i in range(5):
    if i == 3:
        break
    print(i)

     0
     1
     2
```

Quiz-2

Question

What will be the output of the following code snippet?

```
x = 0
while x < 5:
    x += 1
    if x == 3:
        break
    print(x)
else:
    print("Loop finished")
```

A.

```
1
2
```

B.

```
1
2
Loop finished
```

C.

```
1
2
3
```

D.

```
1
2
3
Loop Finished
```

Choices

- ☑ A
- □ B
- □ C
- □ D

Quiz-3

What is the output of the following code?

```
count = 0
while True:
    if count == 5:
        break
    print(count)
    count += 1
```

a)

```
0
1
2
3
4
```

b) 5

c) an infinite loop

Answer: a.

```
0
1
2
3
4
```

Question:

- Write a program that continuously asks the user to provide an input number
- The program should stop only when the user provides 5.

- Once the user provides 5, the program should print the number of times an input was provided.
- Assume that the user always provides a number.

```
counter = 0
while True:
    number = int(input())
    counter += 1

    if number == 5:
        break
print("You provided", counter, "inputs!")
```

```
3
4
5
You provided 3 inputs!
```

Quiz-4

Question

Which statement is used to skip the current iteration of a loop and move on to the next iteration?

Choices

- □ `break`
- ☑ `continue`
- □ `pass`
- □ None of these

Nested Loops

```
for i in range(3):
    for j in range(3):
        print(i, j)
```

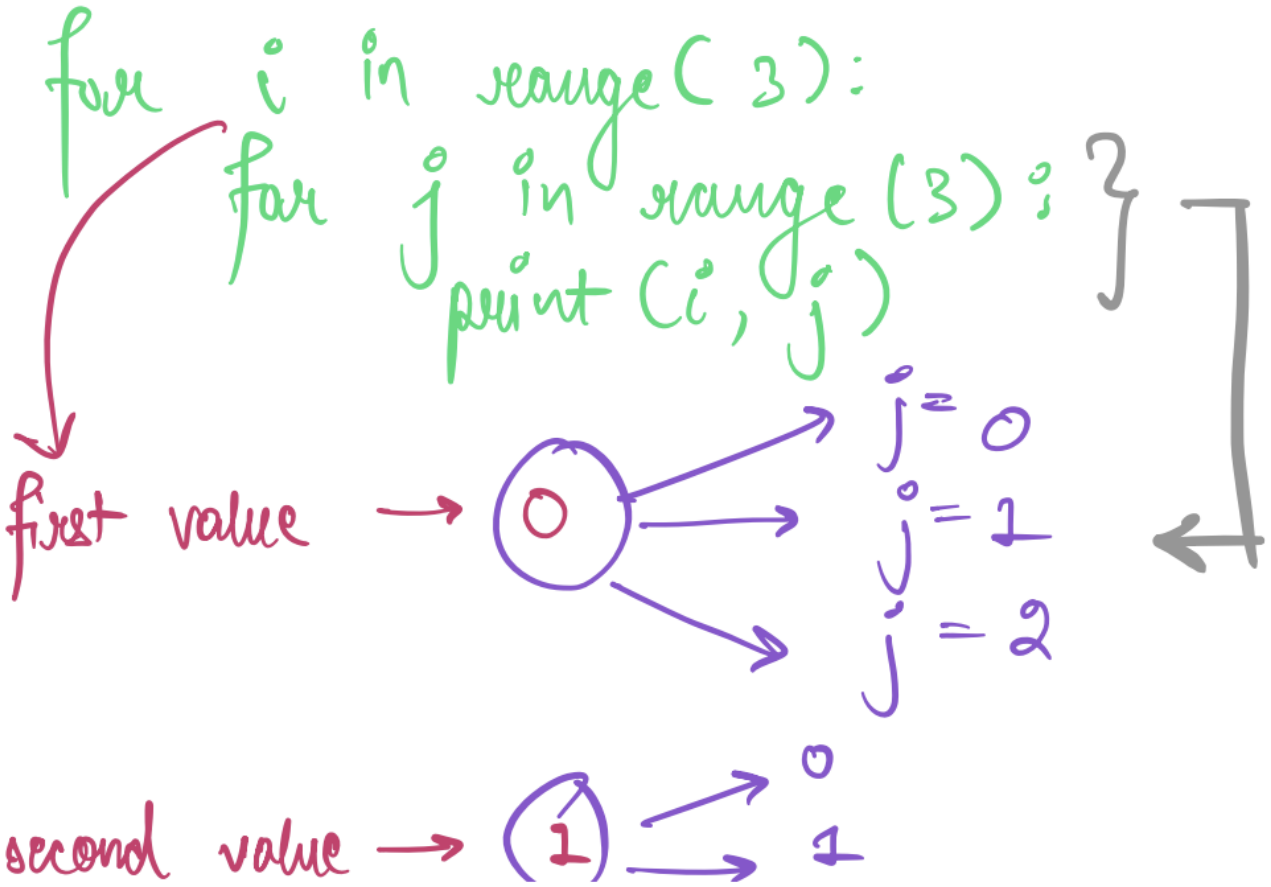
```
0 0
0 1
0 2
1 0
1 1
1 2
2 0
2 1
2 2
```

For every value of `i`, there will be corresponding `j` values.

In the above code,

- for `i = 0`, `j` runs from **0** to **2**,
- then for `i = 1`, `j` runs from **0** to **2**,
- then for `i = 2`, j runs from **0** to **2** again.

Therefore there is **6** (i, j) pairs.



Question: Write a program to print a `N x N` matrix of `*`

```
Example Input:
3

Example Output:
***
***
***
```

```
n = int(input())
for i in range(n):
    for j in range(n):
        print("*", end = " ")
    print()
```

```
 3
 * * *
 * * *
 * * *
```

Question: Write a program to print a multiplication table till the provided input.

```
Example Input:
3

Example Output:
1 2 3 4 5 6 7 8 9 10
2 4 6 8 10 12 14 16 18 20
3 6 9 12 15 18 21 24 27 30
```

```
number = int(input())
for i in range(1, number + 1):
    for j in range(1, 11):
        print(i*j, end = " ")
    print()
```

```
3
1 2 3 4 5 6 7 8 9 10
2 4 6 8 10 12 14 16 18 20
3 6 9 12 15 18 21 24 27 30
```

Quiz-5

Question

What will be the output of the following code snippet?

```
for i in range(3):
    for j in range(i, 3):
        print("*", end=" ")
    print()
```

A.

```
* * *
* *
*
```

B.

```
* * *
* * *
* * *
```

B.

```
    *
  * *
* * *
```

Choices

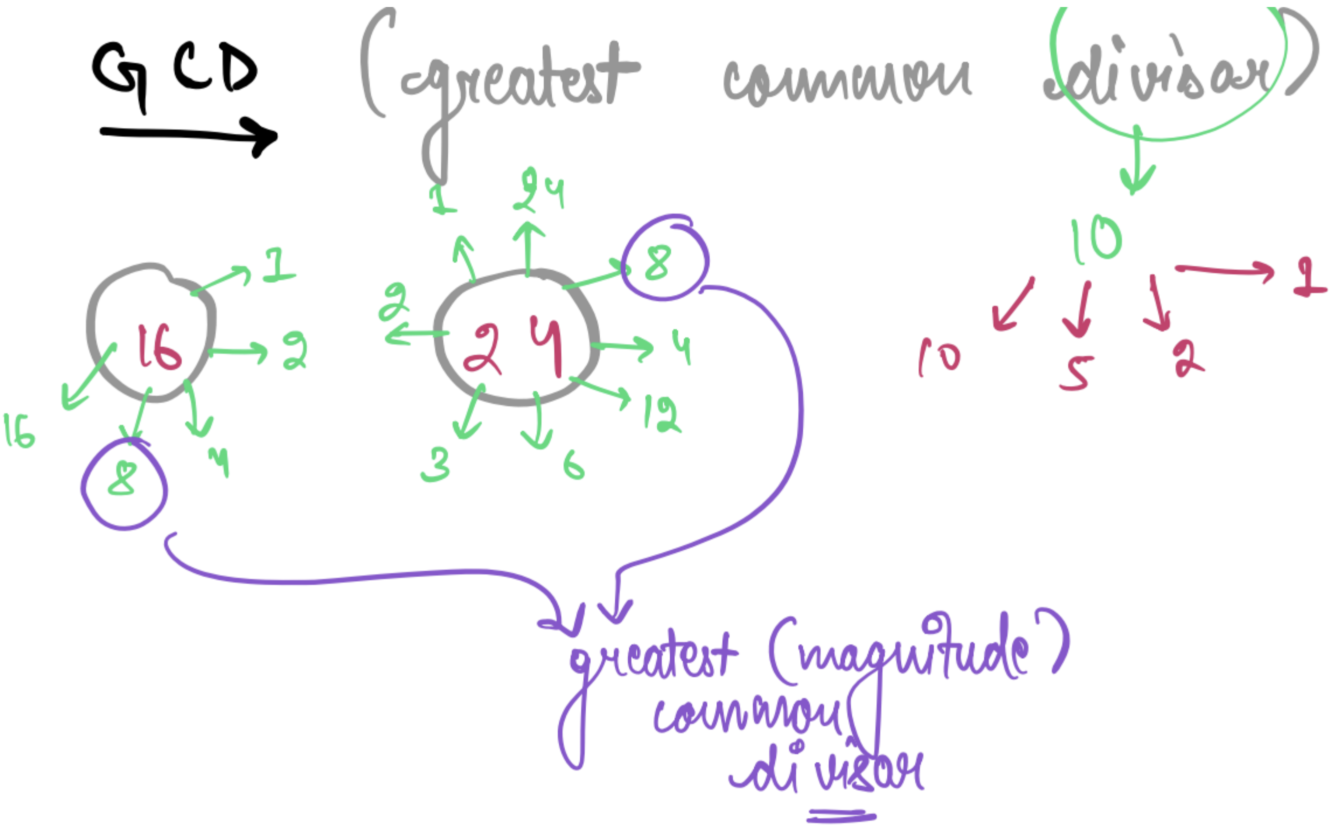
- ☑ A
- ☐ B
- ☐ C
- ☐ None of these

GCD

Question: Given two integer inputs, write a program to calculate the GCD of these two numbers.

```
Example Input:
16 24

Example Output:
8
```



$$\boxed{GCD <= min\ (A\ ,\ B\ )}$$

```
A = int(input())
B = int(input())
X = min(A, B)
for i in range(X, 0, -1):
    if A % i == 0 and B % i == 0:
        print(i)
        break
```

```
16
24
8
```

LCM

Question: Given two integer inputs, write a program to calculate the LCM of these two numbers.

```
Example Input:
6 8

Example Output:
24
```

```
A = int(input())
B = int(input())
X = max(A, B)
while True:
    if X % A == 0 and X % B == 0:
        print(X)
        break
    X += 1
```

```
6
8
24
```

Quiz-6

Question

Consider the following Python code:

```
def gcd(a, b):
    while b != 0:
        a, b = b, a % b
    return a

x = gcd(48, 180)
print(x)
```

What will be the output of this code?

Chocies

- ☑ 12