# IGS1131
# Loops

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# Two Primitive Loops

## for loop

- It is used if the number of repetition or ilterations are known in advance.
- We need to execute the code statement until the given condition is satisfied.
- It is entry controlled or pre- tested loop.

## while loop

- It should be used when the number of iteration are not known in advance
- The block of code statement is executed until the specified condition is satisfied.
- It is entry controlled or pre- tested loop.

# For Loops

```
names = ["Geralt", "Aragorn", "Legolas"]
print("---------------")
for x in names:
  print(x)
print("---------------")
for x in names[0]:
  print(x)
print("---------------")
```

```
---------------
Geralt
Aragorn
Legolas
---------------
G
e
r
a
l
t
---------------
```

# Range Function

```
for x in range(5):
  print(x)
print("---------------")
for x in range(1, 6):
  print(x)
print("---------------")
for x in range(3, 30, 3):
  print(x)
```

```
0
1
2
3
4
--------------
1
2
3
4
5
--------------
3
6
9
12
15
18
21
24
27
```

# Break and Continue

```
names = ["Geralt", "Aragorn", "Legolas"]
for x in names:
  print(x)
  if x == "Aragorn":
    break
print("---------------")

for x in names:
  if x == "Aragorn":
    break
  print(x)
print("---------------")

for x in names:
  if x == "Aragorn":
    continue
  print(x)
```

```
Geralt
Aragorn
---------------
Geralt
---------------
Geralt
Legolas
```

# Else in For Loop

```
for x in range(6):
  print(x)
else:
  print("Loop exectued
completely")
print("---------------")
for x in range(6):
  if x == 3: break
  print(x)
else:
  print("Loop exectued
completely")
```

```
0
1
2
3
4
5
Loop exectued completely
---------------
0
1
2
```

# While Loops

```
i = 1
while i < 6:
  print(i)
  i += 1
print("---------------")
i = 1
while i < 6:
  print(i)
  if i == 3:
    break
  i += 1
print("---------------")
i = 0
while i < 6:
  i += 1
  if i == 3:
    continue
  print(i)
```

```
1
2
3
4
5
--------------
1
2
3
--------------
1
2
4
5
6
```

# Nested Loops

```
for i in range(3):
    for j in range(5):
        print("* ", end="")
    print("")
```

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

```
i=0
while (i<3):
    j=0
    while (j<5):
        print("* ", end="")
        j+=1
    i+=1
    print("")
```

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

# Nested Loops

```
sum = 0
count = 0
for i in range(10):
    for j in range(i + 1):
        print(j, " ", end="")
        sum = sum + (i * j)
        count += 1
    print("")
print("sum: {}, count: {}".format(sum, count))
```

```
0
0 1
0 1 2
0 1 2 3
0 1 2 3 4
0 1 2 3 4 5
0 1 2 3 4 5 6
0 1 2 3 4 5 6 7
0 1 2 3 4 5 6 7 8
0 1 2 3 4 5 6 7 8 9
sum: 1155, count: 55
```

# Exercises

1. Print first 10 natural numbers using while loop
2. Print the multiplication table (up to 10) of a given number
3. Reverse a given integer number(You should not use string/list operations)
4. Calculate the cube of all numbers from 1 to given number
5. Print the pattern:

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

# Exercises

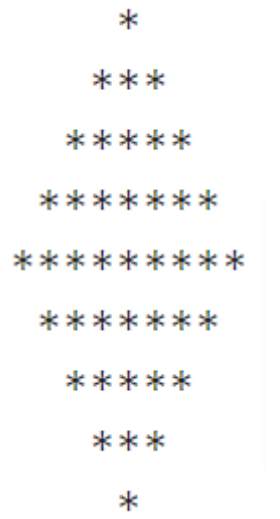
6. Print the factorial of any given number
7. Print whether a given number is a prime number or not
8. Make a pyramid pattern with numbers increased by 1 for a given length n

```
   1
  2 3
 4 5 6
7 8 9 10
```

9. Count the number of letters from any given string
10. Print all the divisors of a given number

# Exercises

11. Print a pattern like a diamond →




12. Print the first n terms of the Fibonacci series
13. Print the HCF (Highest Common Factor) of two numbers