

LESSON 4: LOOPS

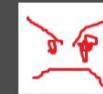
WHAT IS A LOOP?

- ▷ Some tasks in programming are tedious and repetitive to write out in long form.
- ▷ Other tasks are impossible to complete without abstracting them into a loop.
- ▷ Loops allow you to repeat a section of code over and over and over.
- ▷ Each repeat of a loop is called an “iteration.” A running loop is said to be “iterating.”

SPawning An ENEMY

```
func _ready():
    var enemyScene = load("res://Enemy.tscn")
    var enemyInstance = enemyScene.instance()
    enemyInstance.position.x = random(500)
    enemyInstance.position.y = random(500)
    add_child(enemyInstance)
```

Consider the code on the left. It spawns an enemy, and adds it as a child to the current scene with a random x and y position, producing the result on the right.



SPawning 500 ENEMIES

```
func _ready():
>    for i in range(500):
>        var enemyScene = load("res://Enemy.tscn")
>        var enemyInstance = enemyScene.instance()
>        enemyInstance.position.x = random(500)
>        enemyInstance.position.y = random(500)
>        add_child(enemyInstance)
```

Now, the code on the left is wrapped inside a loop set to run 500 times. Because the x and y position are randomized, we get a big cluster of enemies that spans the possible range.



TWO TYPES OF LOOP

While Loop

- ▷ Modified “if” statement that repeats as long as its condition is true (repeats WHILE it’s true)
- ▷ Pro: Good for repeating indefinitely until some stop condition has triggered.
- ▷ Con: Requires you create and maintain your own variables and exit conditions in the loop.

For Loop

- ▷ Designed to do something FOR each item in a collection.
- ▷ Pro: Simple to use, pairs well with predefined sets of things
- ▷ Con: More rigid than while, difficult to program abstract goal conditions.

WHILE LOOP

```
> var x = 0  
> if x < 10000:  
>     x += 1  
>     print("x is: ", x)
```

If statements trigger or fail, and then move on.



```
> var x = 0  
> while x < 10000:  
>     x += 1  
>     print("x is: ", x)
```

But, if a while loop triggers successfully, it repeats from the top again. If the while loop fails, it will be skipped, as though it were an if statement.

FOR LOOP

```
>1  for i in range(500):
>1  >1    if i < 250:
>1  >1  >1      print("Step", i, "Climbing up the hill...")
>1  >1    else:
>1  >1  >1      print("Step", i, "Climbing down the hill...")
```

For Loops do something FOR each item in a collection.

So, to write one, we have to create an iterator (i) and give it a collection to iterate over (range(500)).

Range() is a convenient function that creates a collection of numbers between 0 and the first argument.

Each iteration of the loop, our iterator is set = to the next variable in the collection. When the end of the collection is hit, the loop ends.

RANGE FUNCTION

```
range(n) # Will go from 0 to n-1.  
range(b, n) # Will go from b to n-1.  
range(b, n, s) # Will go from b to n-1, in steps of s.
```

Per the Godot specification, the range function can be used to create a simple collection of numbers. It can be called with 1-3 arguments. The arguments are...

1. Max -- The top of the created range. Exclusive.
2. Min -- The bottom of the created range. Defaults to 0. Inclusive.
3. Step -- The amount you want to increment by each step of the range. Defaults to 1.

RANGE() EXAMPLES

Range(5): $\{0, 1, 2, 3, 4\}$

Range(2, 5): $\{2, 3, 4\}$

Range(0, 5, 2): $\{0, 2, 4\}$

Range(10, 20, 2): $\{10, 12, 14, 16, 18\}$

Range(50, 10, -10): $\{50, 40, 30, 20\}$

CHALLENGE PROBLEMS:

1. Create a range function that defines a collection of numbers from 0 to 256 in steps of 2.
2. Create a for loop that prints out each element of the above collection.
3. Create a while loop that prints out each element of the above collection.
4. Create a variable 'x' and set it equal to 0.
5. Write a while loop that runs until $x > 10000$. Inside of this while loop, increment x by 5 each iteration.
6. Write a for loop inside the above while loop that runs 10 times. Each iteration of the for loop, increment x by an additional 1.

INSTRUCTIONS FOR USE

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HELLO!

I am Jayden Smith

I am here because I love to give presentations.

You can find me at @username



1. TRANSITION HEADLINE

Let's start with the first set of slides

“

Quotations are commonly
printed as a means of inspiration
and to invoke philosophical
thoughts from the reader.

THIS IS A SLIDE TITLE

- ▷ Here you have a list of items
- ▷ And some text
- ▷ But remember not to overload your slides with content

Your audience will listen to you or read the content, but won't do both.

BIG CONCEPT



Bring the attention of your audience over a key concept using icons or illustrations

YOU CAN ALSO SPLIT YOUR CONTENT

White

Is the color of milk and fresh snow, the color produced by the combination of all the colors of the visible spectrum.

Black

Is the color of ebony and of outer space. It has been the symbolic color of elegance, solemnity and authority.

IN TWO OR THREE COLUMNS

Yellow

Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

Blue

Is the colour of the clear sky and the deep sea. It is located between violet and green on the optical spectrum.

Red

Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.

A PICTURE IS WORTH A THOUSAND WORDS

A complex idea can be conveyed with just a single still image, namely making it possible to absorb large amounts of data quickly.





WANT BIG IMPACT?
USE BIG IMAGE.

USE DIAGRAMS TO EXPLAIN YOUR IDEAS

Vestibulum congue tempus

1
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.



Vestibulum congue tempus

1
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

Vestibulum congue tempus

3
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

AND TABLES TO COMPARE DATA

	A	B	C
Yellow	10	20	7
Blue	30	15	10
Orange	5	24	16

MAPS



Find more maps at slidescarnival.com/extras-free-resources-icons-and-maps

89,526,124

Whoa! That's a big number, aren't you proud?

89,526,124\$

That's a lot of money

185,244 USERS

And a lot of users

100%

Total success!

OUR PROCESS IS EASY

Lorem 1

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis sit amet odio vel purus bibendum luctus. Morbi iaculis dapibus tristique. In hac habitasse platea dictumst. Mauris convallis quam at. Morbi iaculis dapibus tristique.

Lorem 2

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis sit amet odio vel purus bibendum luctus. Morbi iaculis dapibus tristique. In hac habitasse platea dictumst. Mauris convallis quam at. Morbi iaculis dapibus tristique.

Lorem 3

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LET'S REVIEW SOME CONCEPTS

Yellow

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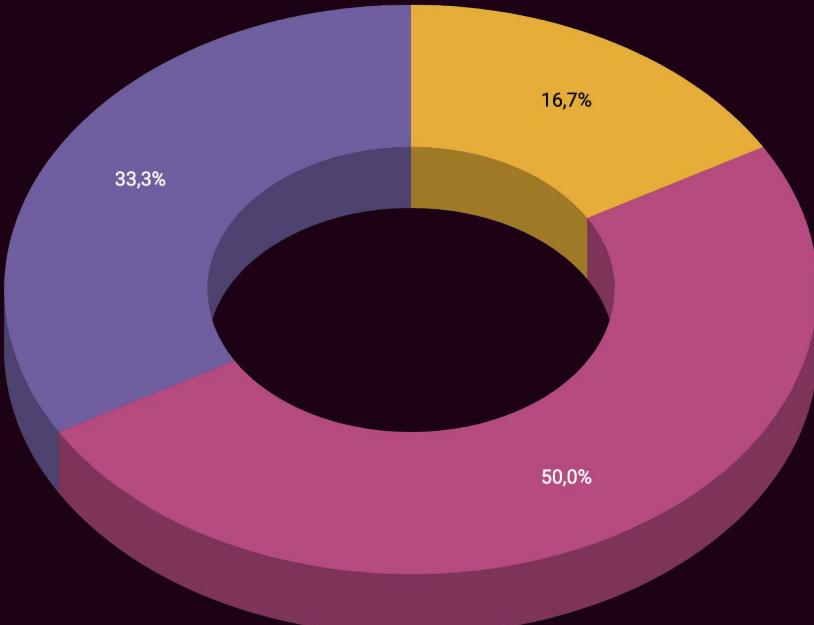
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Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.

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You can insert graphs from Excel or Google Sheets

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your web, app or
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TABLET PROJECT

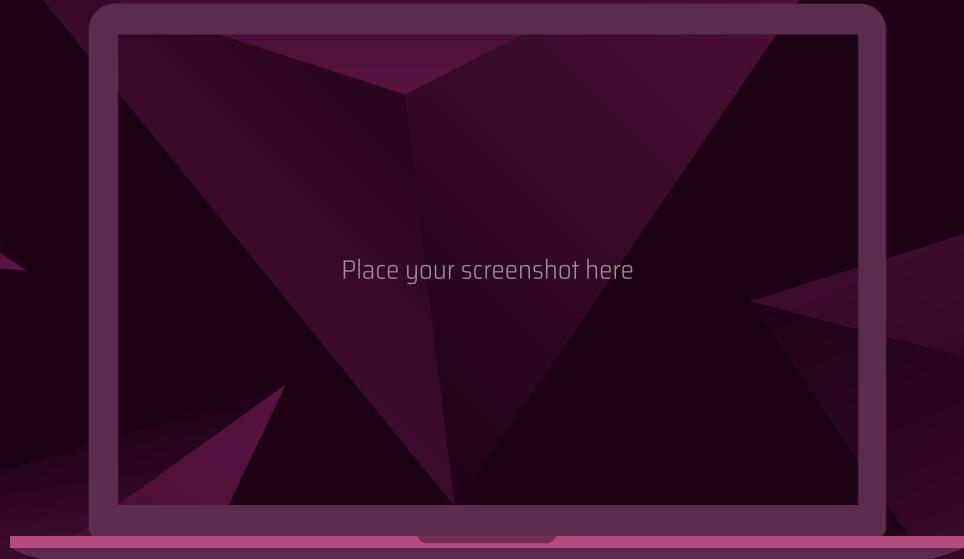
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software projects
using these gadget
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THANKS!

Any questions?

@username
user@mail.me

CREDITS

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- Presentation template by [SlidesCarnival](#)
- Photographs by [Unsplash](#)

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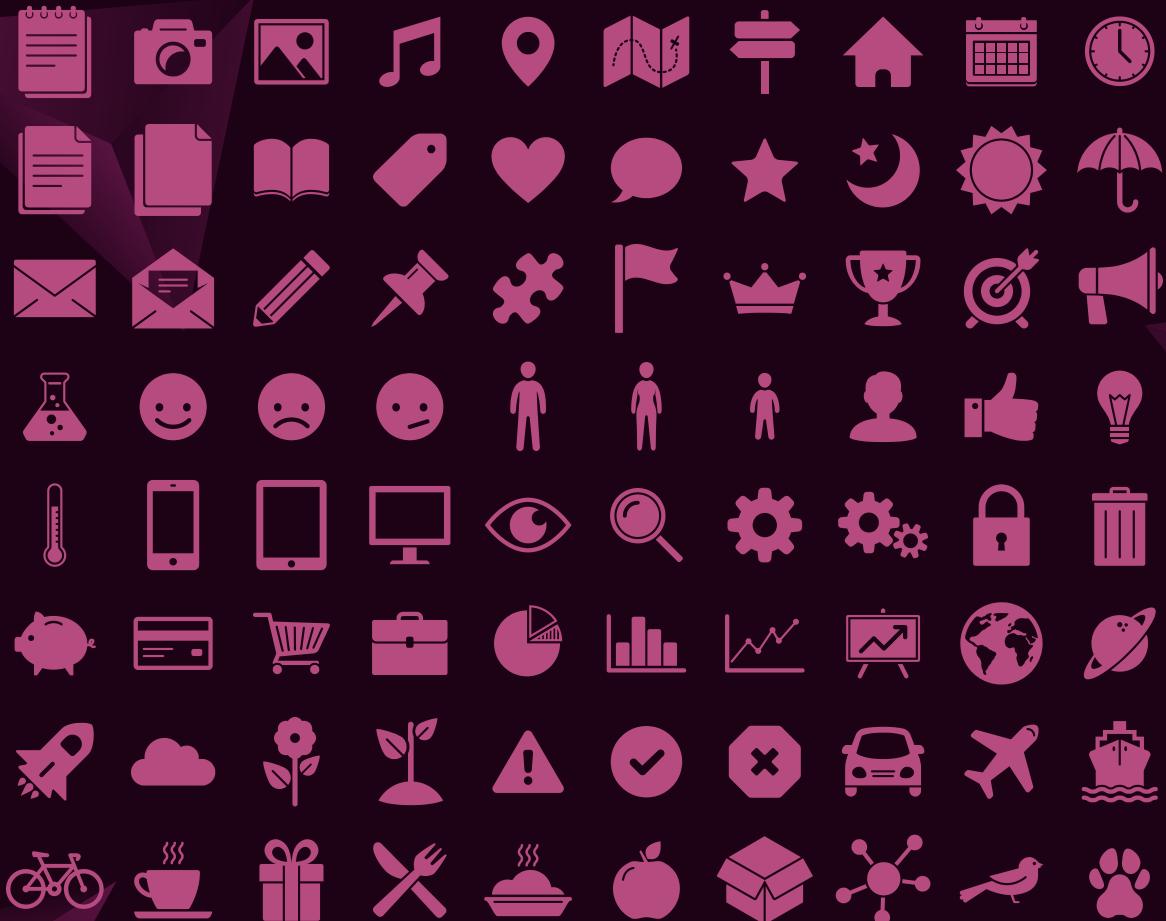
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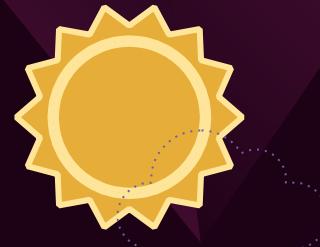
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- ▷ Resize them without losing quality.
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- ▷ Change line color, width and style.

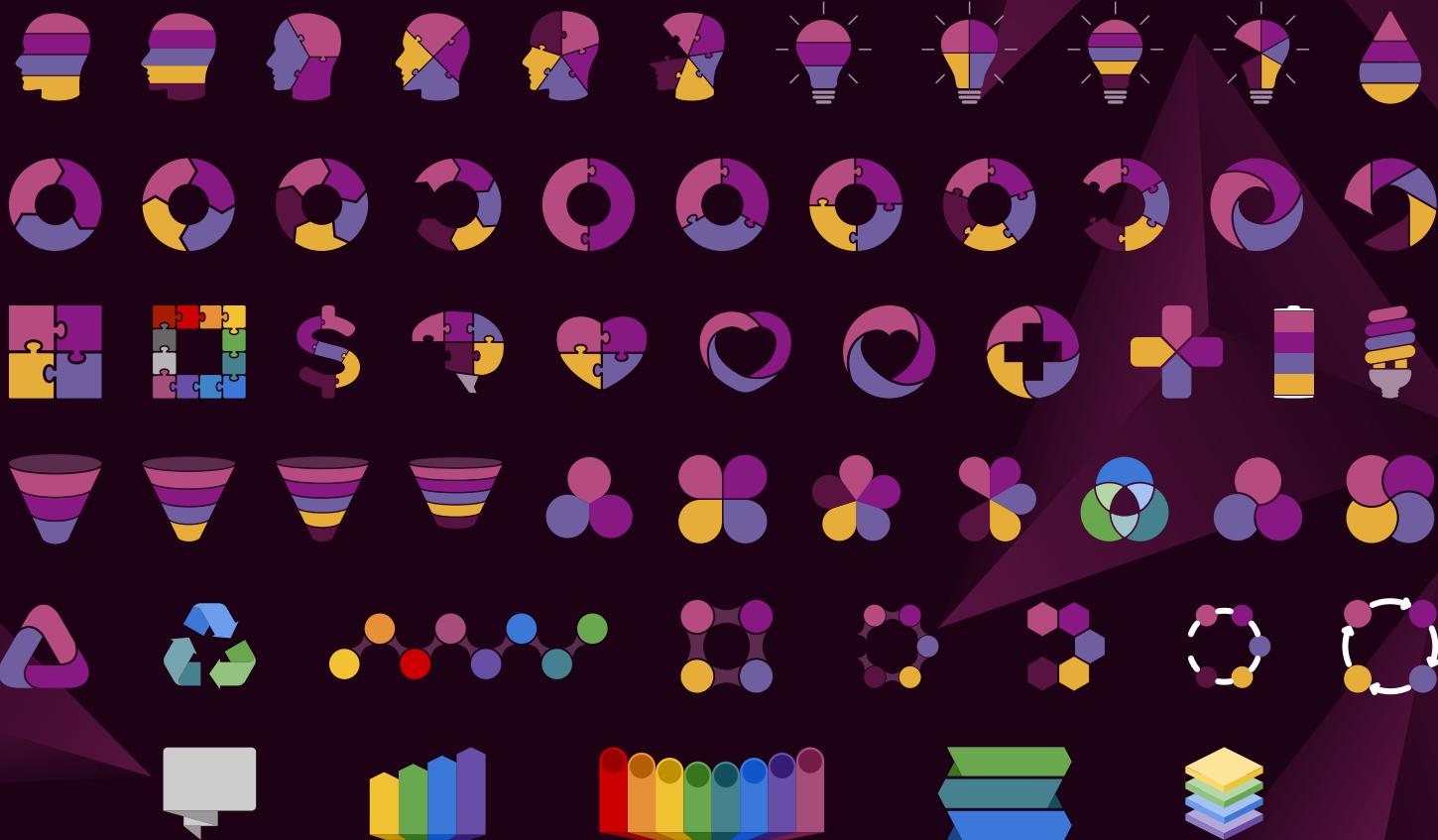
Isn't that nice? :)

Examples:



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DIAGRAMS AND INFOGRAPHICS





You can also use any emoji as an icon!
And of course it resizes without losing quality.

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<https://twitter.com/googledocs/status/730087240156643328>



and many more...



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professional and
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Blow your audience
away with attractive
visuals