

Technovation 2020

Loops

Victoria



EXPECTATION

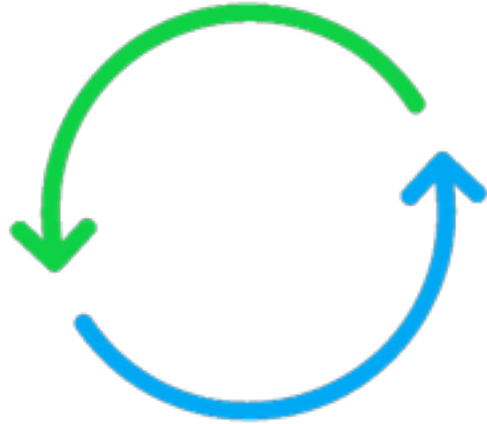


REALITY



What you will learn

- Learn about loops
- Create an app that you can bring to birthday parties



Exercise

- Open a Notepad app
- Type your name or nickname as many times as you can in 5 seconds, example “Victoria”
- Ready?
- How many did you get?
- Now let's give my computer a chance...

Loops

This was a perfect task for a computer:

- Repeat the same task
- Many times
- Really fast

You can take advantage of this by using **loops**.

Loops are a way to tell a computer to do **something many times in a row**.

A loop is a **block of code that will repeat over and over again**.

For Loops: Repeat code a set number of times

```
[Wanda:Script tutti$ ./PrintMyNameNTimes.sh 10  
1: My name is Victoria  
2: My name is Victoria  
3: My name is Victoria  
4: My name is Victoria  
5: My name is Victoria  
6: My name is Victoria  
7: My name is Victoria  
8: My name is Victoria  
9: My name is Victoria  
10: My name is Victoria  
All done!
```

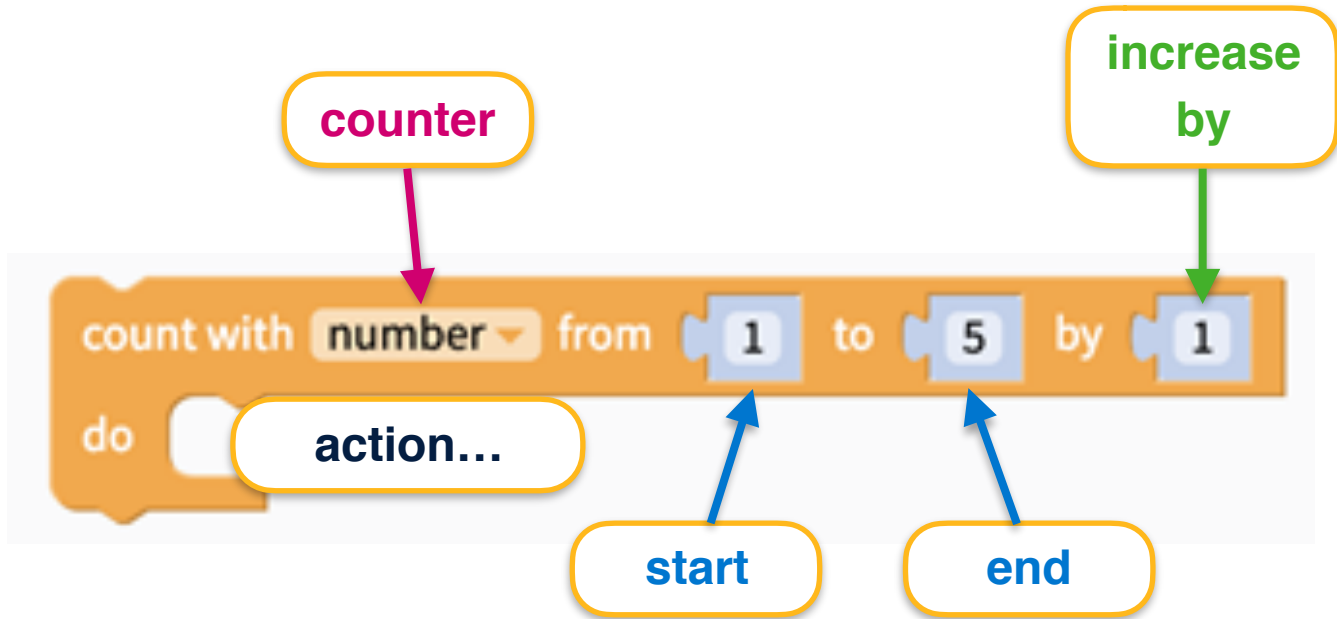
For Loops: Repeat code a set number of times

1. A **variable to count** how many times the code has been repeated, called a **counter**.
2. The number of times to repeat the loop, **where the counter starts and ends**.
3. **How much the counter goes up** by each time the code repeats.

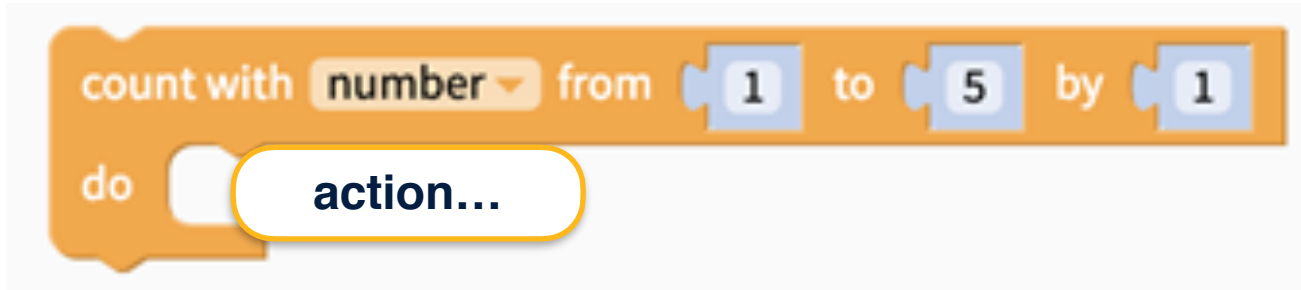
```
Wanda:Script tutti$ ./PrintMyNameNTimes.sh 10
1: My name is Victoria
2: My name is Victoria
3: My name is Victoria
4: My name is Victoria
5: My name is Victoria
6: My name is Victoria
7: My name is Victoria
8: My name is Victoria
9: My name is Victoria
10: My name is Victoria
All done!
```

Repeat this, for 10 times

For Loops in Thinkable



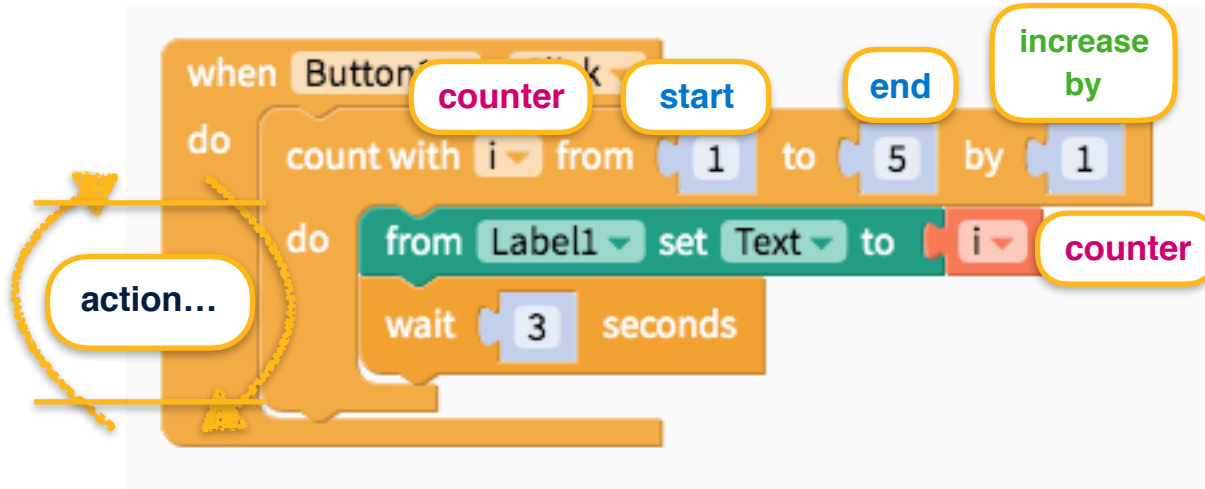
Poll



How many times does this for loop repeat the same action?

- a) 1 time
- b) 4 times
- c) 5 times

For Loop Example



In this **for loop** we are using the **counter variable 'i'** in the code.
Label gets updated to: **1, 2, 3, 4, 5**

For Each Loop: Repeats once for each item in a list

- Let's look at an example...



Example

- Send a “Good night” message to everyone on TikTok
- TikTok has **1 billion** subscribers
- How long would that take you?



Good night! 🌙



Poll

How long would it take you to send a “Good night” message to the 1 billion TikTok subscribers?

- a) Less than 10 hours
- b) Around 10 days
- c) Around 1 year
- d) More than 10 years



Example

- Send a “Good night” message to everyone on TikTok
- TikTok has **1 billion** subscribers
- How long would that take you?
- **More than a century!**
- A computer can do that a lot faster



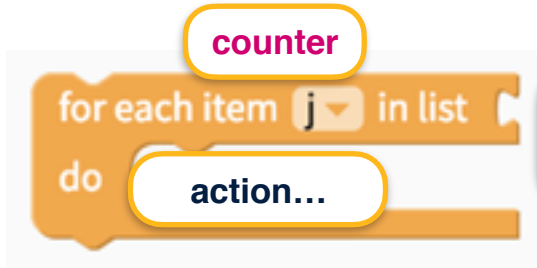
Good night! 🌙

For Each Loop: Repeats once for each item in a list

List of  subscribers:

Subscriber number	Subscriber name
1	coolName
2	evenCoolerName
...	

Good night! 🌙



repeat for the **number of items in a list**



These loops are very useful whenever you need to **do something with a list**.

For Each Loop in Thinkable

The image shows a sequence of Scratch code blocks:

- Initialize app variable sum to 0**
- Initialize app variable numberList to list** (with a list containing 44, 7, and 16)
- For each item itemvar in list app numberList do** (with a yellow callout bubble labeled "counter" pointing to the "itemvar" slot)
- Change app sum by itemvar**
- From Label1 set Text to app sum**

A yellow callout bubble on the right says "repeat for the number of items in a list" with arrows pointing to the list of numbers.

In this for **each loop** we are using a **list of numbers** and adding up every number in the list

While loop: Repeats while a condition is true

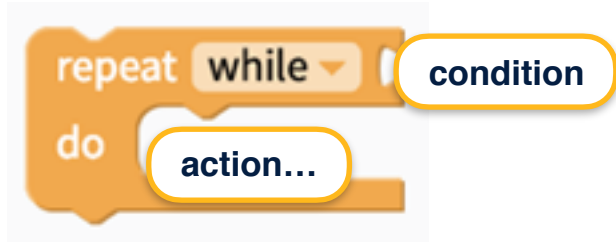
```
38224: My name is Victoria  
38225: My name is Victoria  
All done in 3 seconds!  
Wanda:Script tutti$ █
```

While Loops: Repeats while a condition is true

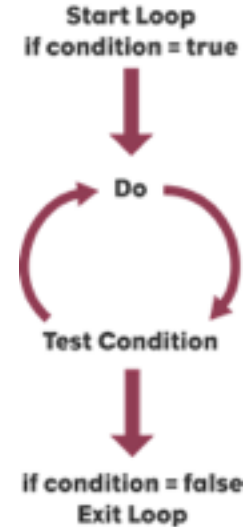
- You were typing your name or nickname **while timer was counting down to 0:**
 - while (time left > 0)
 - do: keep typing your name
- What if you get tired? You can use logic with **multiple conditions:**
 - while (time left > 0) and (not tired)
 - do: keep typing your name
- Examples?

While this happens, repeat this

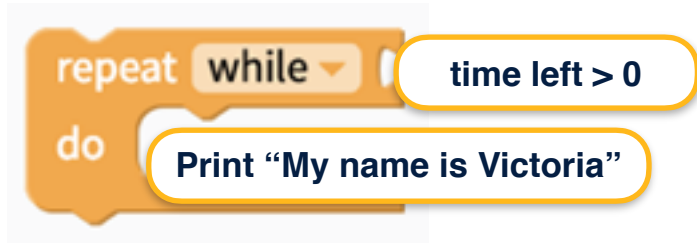
While Loop in Thinkable



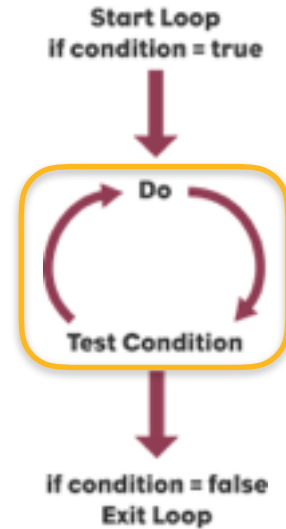
- Set up condition that is true at the beginning
- If condition is false, loop won't run
- Condition is checked before performing action to make sure the condition is still true



Infinite Loops



- What happens if I forget to set timer?
- We can run into **infinite loops!**
- Let's see what they look like...

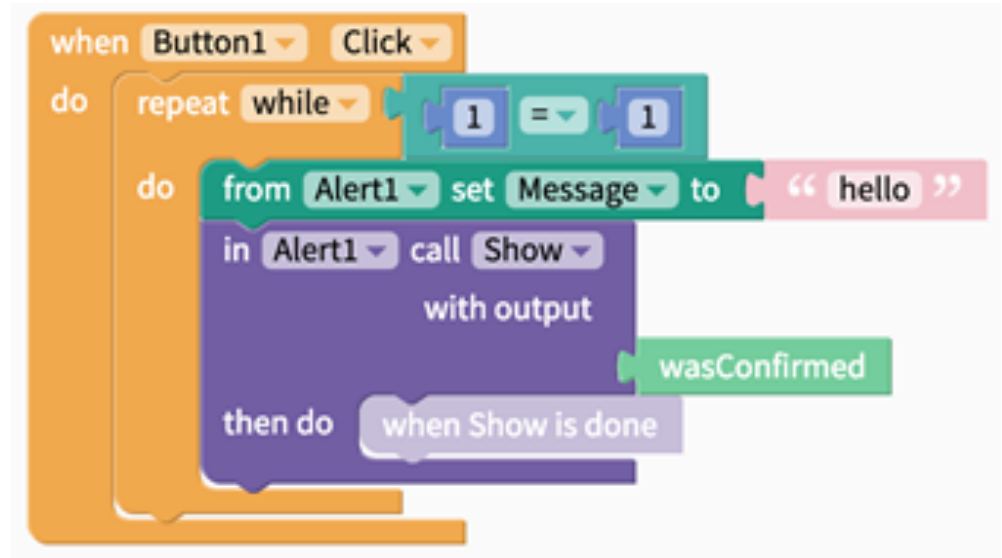




Let's look at a real example!

Infinite Loops in thunkable

- 1 will always be equal to 1
- What do you think happens?
- App froze!
- You may also get a message saying that the Thunkable app has stopped working.



Poll

Do infinite loops sound scary?

- a) Uh... YEAH
- b) Nope!

Infinite Loops? Bring it on!



Activity - How old are you?

How many times have you been at a birthday party and heard that song that goes... **are you 1, are you 2, are you 3....?** If you haven't heard it before, here's what it sounds like!

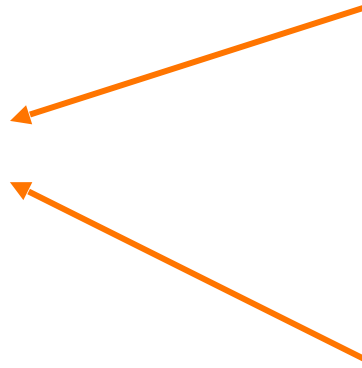
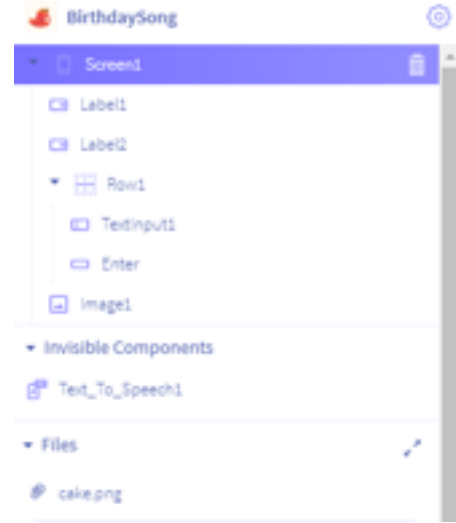
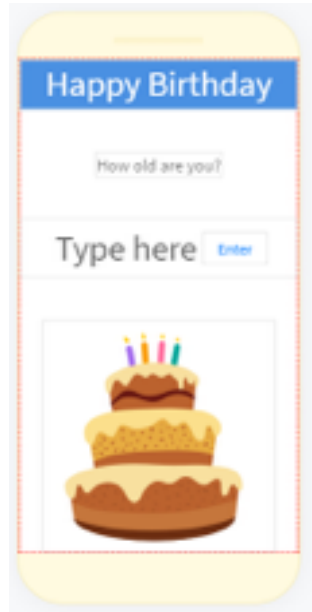
<https://www.youtube.com/watch?v=EPi9DLfIK4M>

This song takes a really **loooOOOOooong** time to sing, especially when the person is **98** like the grandma in the video.

In this activity, you are going to build an app that can do that for you!

Activity - How old are you?

The app would look like this:



Activity - How old are you?

- Build an app in Thunkable that says “are you 1, are you 2, are you 3...” until it reaches the number (age) entered by user
- It needs:
 - 1 text input
 - 1 button
 - Cool styling
- Behaviour:
 - When user presses button, start a for loop (count block)
 - Define “from”, “to” and “by” fields of loop
 - Add action for “Text_To_Speech1” with text “Are you” + the value of counter

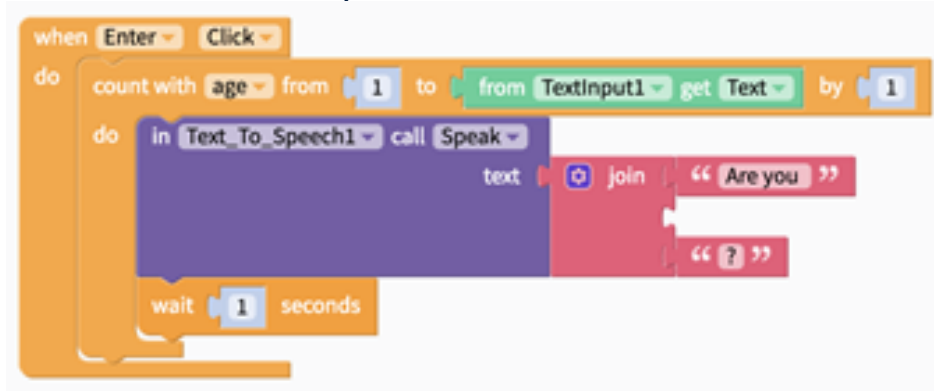
Loops

In this lesson, you learned about for loops, while loops, and for each loops.

- How do you think you can use loops in your final app?
- Does this give you any ideas for how you might build some of your features?

Activity - how old are you?

For this app, you'll need to use a for loop:



This for loop counts from 1 until the number the user put in the text box. Each time the loop runs, the counter increases by 1. This code is almost complete, but it doesn't say the age each time it counts. You need to figure out how to make this block say the age each time it counts.

Thunkable code: <https://x.thunkable.com/copy/bae72338be9d10c1ddaf18d77626cb98>

Activity - how old are you?

Stuck or need a hint?

Age is a variable, and you can get it from the variables drawer.



Types of Loops

1. Printing your name during 3 seconds:

While loops will repeat until a condition is no longer true.

```
38224: My name is Victoria
38225: My name is Victoria
All done in 3 seconds!
Wanda:Script tutti$ █
```

2. Printing your name 100 times:

For loops will repeat a certain number of times.

```
100: My name is Victoria
All done!
Wanda:Script tutti$ █
```

3. Sending a message to each  subscriber:

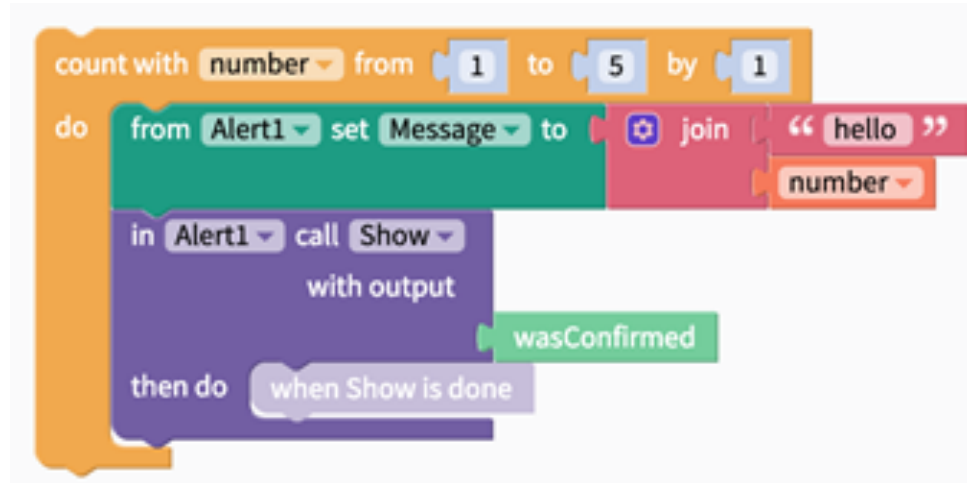
For Each loops repeats once for each item in a list.

Good night! 🌙

Let's go through each of them in more detail.

Thinkable Exercise

- 10 minutes to implement a for loop



Thinkable Exercise

- 10 minutes to implement for each loop

