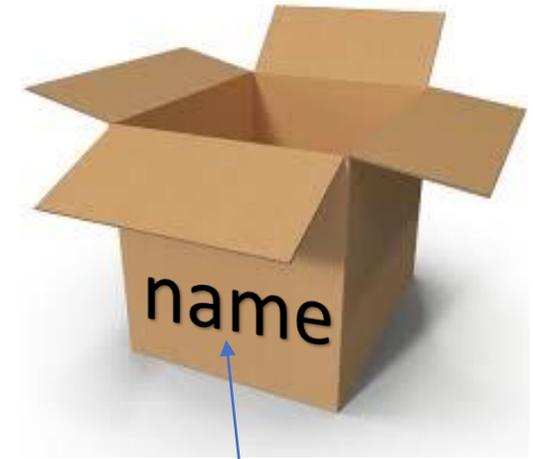


Write algorithms with variables

Phil Bagge code-it

Variables are like boxes



Box label

- Variables are like boxes. Information can be stored inside. You can look into the box to see what is inside. You can add things to a box. You can take things out of a box. You can label a box to show what is inside.
- Variables are different to boxes. Boxes can hold a mix of anything. Variables hold only one type of information, either numbers or strings.
- Numbers (whole number called integers) (decimal fractions or negative numbers called floats)
- Strings (numbers, letters and symbols)

8, **4.3,** **-25**
integers floats

I am 10. } String Example

What do variables do?

- Variables are used by algorithms to store and adapt information.

How do variables work?

- Variables can be set. This is like emptying the box and putting new information inside.
- Variables can be changed. This is where things are added to the box that change the content.
- Variables can be referred to by their name label.



If score started at 6 set score to 0 would change score to 0



Change score by 1 would change score to 7.



Change score by -2 would change score to 4.

Set and change variable example

Variables can be set. This is like emptying the box and putting new information inside.

Variables can be changed. This is where things are added to the box that change the content.



If score started at 6 Change score by 1 would change score to 7



If score started at 6 set score to 0 would change score to 0



If score started at 6 Change score by -2 would change score to 4

We can write this algorithm like this

set times to 6

change times by -4

repeat times

 wave

change times by 3

repeat times

 bark



Lets look at the maths

set **times** to 6

6

change **times** by -4

$6-4=2$

repeat **times**

2

wave

change **times** by 3

$2+3=5$

repeat **times**

5

bark



We can write this algorithm like this

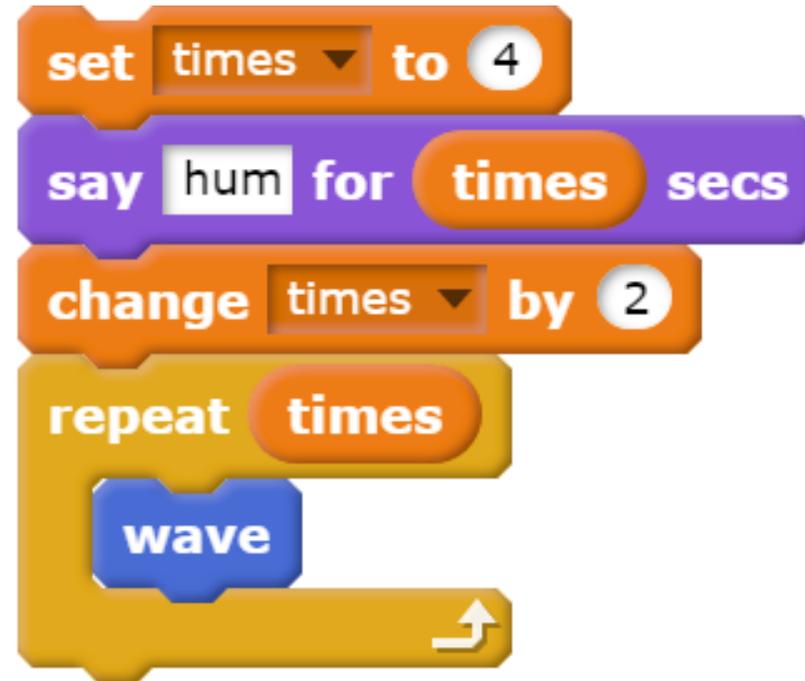
set times to 4

say hum for times seconds

change times by 3

repeat times

 wave



Lets look at the maths

set **times** to 4

4

say hum for **times** seconds

4

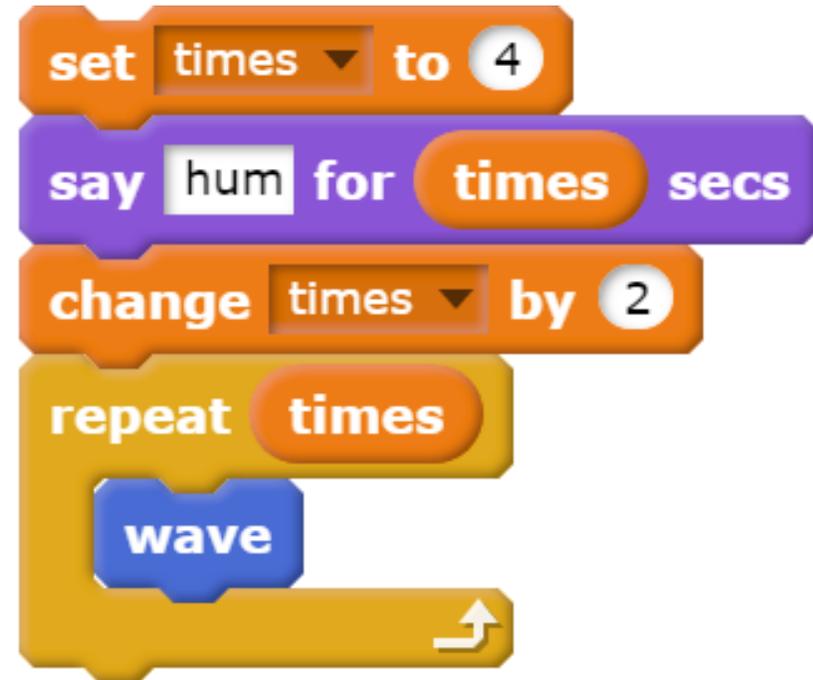
change **times** by 3

$4+2=6$

repeat **times**

6

wave



Use these examples to help you write your own everyday algorithm that uses a variable

set times to 6

change times by -4

repeat times

 wave

change times by 3

repeat times

 bark



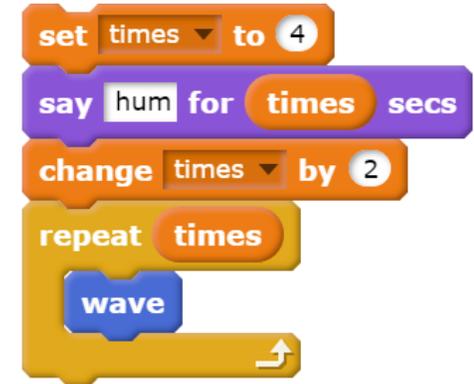
set times to 4

say hum for times seconds

change times by 3

repeat times

 wave



You don't have to name your variable times

Algorithm Challenge

Mel has programmed a game. Her sprite used the right arrow key to turn right 10 degrees.

She wants to know how many times people use the right arrow in the game.

Design an algorithm that uses a variable called `ra` to collect the information for her.

Useful commands

Set `ra` to 0

Change `ra` by 1

When green flag clicked

Forever

If right arrow pressed

turn right 10 degrees



Algorithm Challenge

Answers

Mel has programmed a game. Her sprite used the right arrow key to turn right 10 degrees.

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Useful commands

Set `ra` to 0

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When green flag clicked

Set `ra` to 0

Forever

If right arrow pressed

turn right 10 degrees

change `ra` by 1



Algorithm Challenge

Bart has programmed a dice. His sprite used the space key to roll the dice.

He want to know how many times people use the dice in the game.

Design an algorithm that uses a variable called dice to collect the information for him.

When green flag clicked

Forever

If space pressed

say pick random 1 to 6



Algorithm Challenge Answers

Bart has programmed a dice. His sprite used the space key to roll the dice.

He want to know how many times people use the dice in the game.

Design an algorithm that uses a variable called dice to collect the information for him.

When green flag clicked

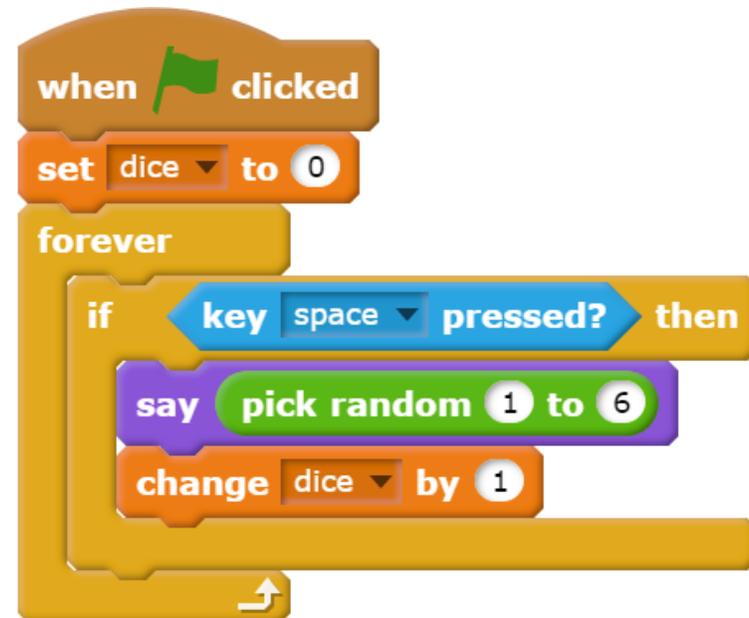
Set dice to 0

Forever

If space pressed

say pick random 1 to 6

change dice by 1



Algorithm Challenge

Carly has created a program to randomly choose odd or even. She has set it to run 100 times.

She would like to know how many times even is chosen.

Adapt her algorithm to use a variable called even to find that out.

When green flag clicked

Repeat 100

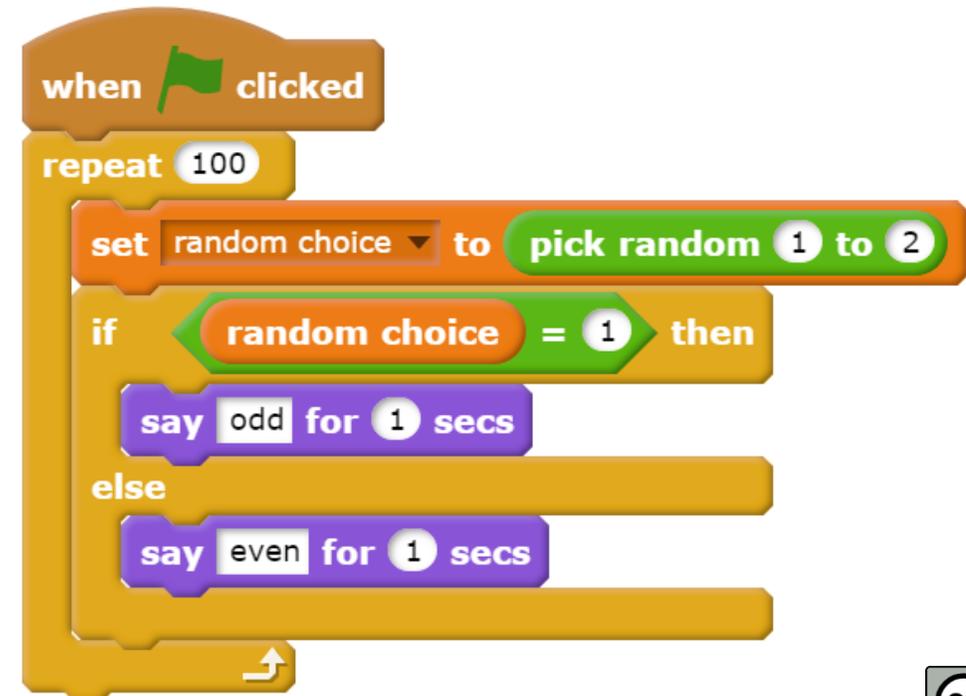
set random choice to pick random 1 to 6

if random choice = 1

say odd for 1 second

Else

say even for 1 second



Algorithm Challenge

Answers

Carly has created a program to randomly choose odd or even. She has set it to run 100 times.

She would like to know how many times even is chosen.

Adapt her algorithm to use a variable called even to find that out.

When green flag clicked

Set even to 0

Repeat 100

 set random choice to pick random 1 to 6

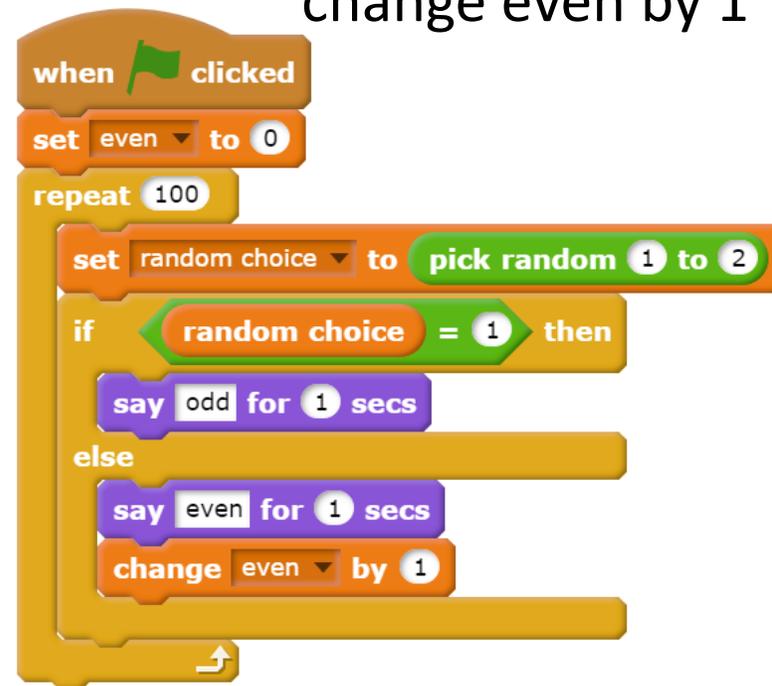
 if random choice = 1

 say odd for 1 second

 Else

 say even for 1 second

 change even by 1



School Turnstile

A school has installed a turnstile that every pupil has to enter through. Students can only use it to enter the school. Write an algorithm to record how many students are in the school.

Commands you can use

- School opens
- Repeat until school closes
- Set variable counter to 0
- Change variable counter by 1
- If turnstyle arm moves 120°



School Turnstile

A school has installed a turnstile that every pupil has to enter through. Students can only use it to enter the school. Write an algorithm to record how many students are in the school.

Turnstile arm



School opens

Set variable counter to 0

Repeat until school closes

If turnstyle arm moves 120°

Change variable counter by 1

Mel wants to know how many times people use the right arrow in her game.

Design an algorithm that uses a variable called ra to collect the information for her.

Useful commands

Set ra to 0

Change ra by 1

When green flag clicked

Forever

If right arrow pressed

turn right 10 degrees

