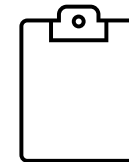


# Programming Concepts Simplified

## Variables

You will need pen and paper or pen and whiteboard



Terms of use are on the last slide

# Prior Knowledge

## Sequence

A **simple sequence** is one instructions following another

An **input** is how we put information into a program (keyboard, mouse, trackpad inputs) or digital device

**digital devices** run programs (oven, kettle, fridge, computer etc)

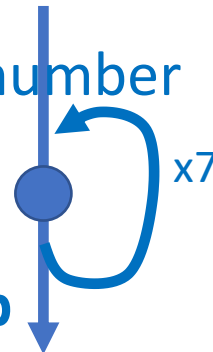


## Repetition

A loop is a set of instructions that are repeated

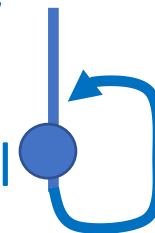
### A count-controlled-loop

- Is controlled by the number
- Ends after the number of repeats are complete



### An indefinite loop

- we do not know how many times it will repeat or when it will end



## Selection

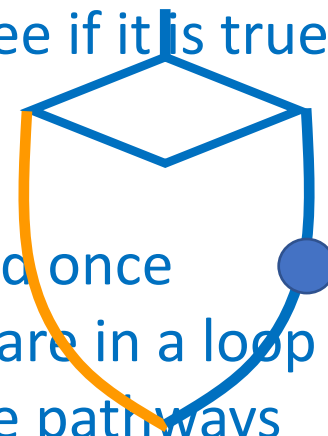
A condition is a state we can check to see if it is true or false

### Conditions

- Only checked once unless they are in a loop
- Two possible pathways

### True and False

- Are only checked when reached in flow of control
- Can be used to stop a loop



# Variables Defined

Information stored by a digital device



**Named unit of data that holds a value**



Unique name



Text or Number

# Variables are like whiteboards

Buy  
flowers  
for Gran 

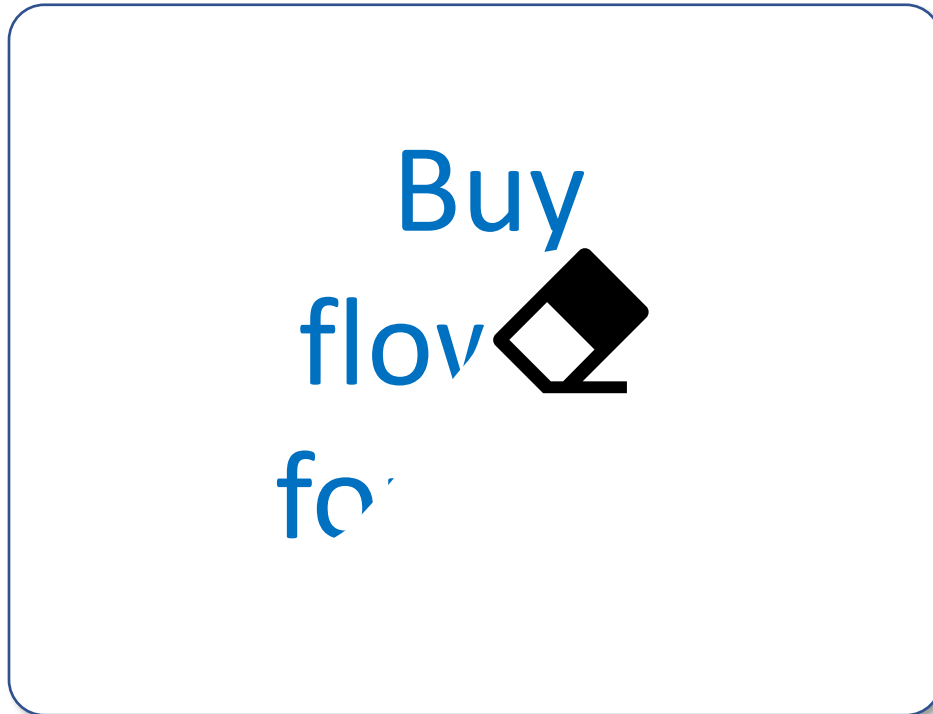
You can write on a whiteboard

# Variables are like whiteboards

12 

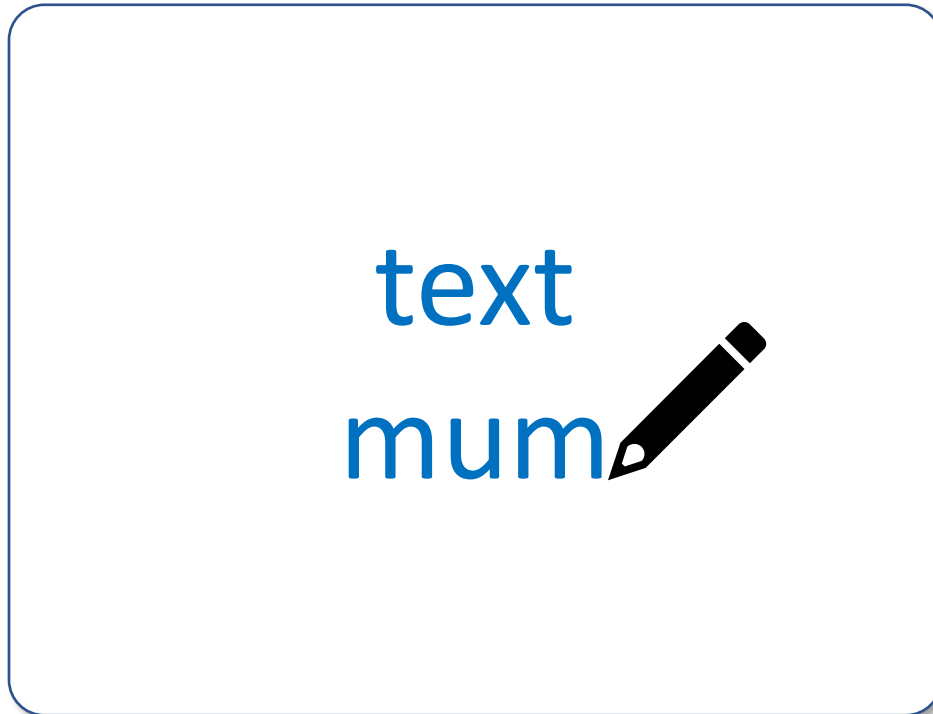
Any type of data, text or numbers

# Variables are like whiteboards



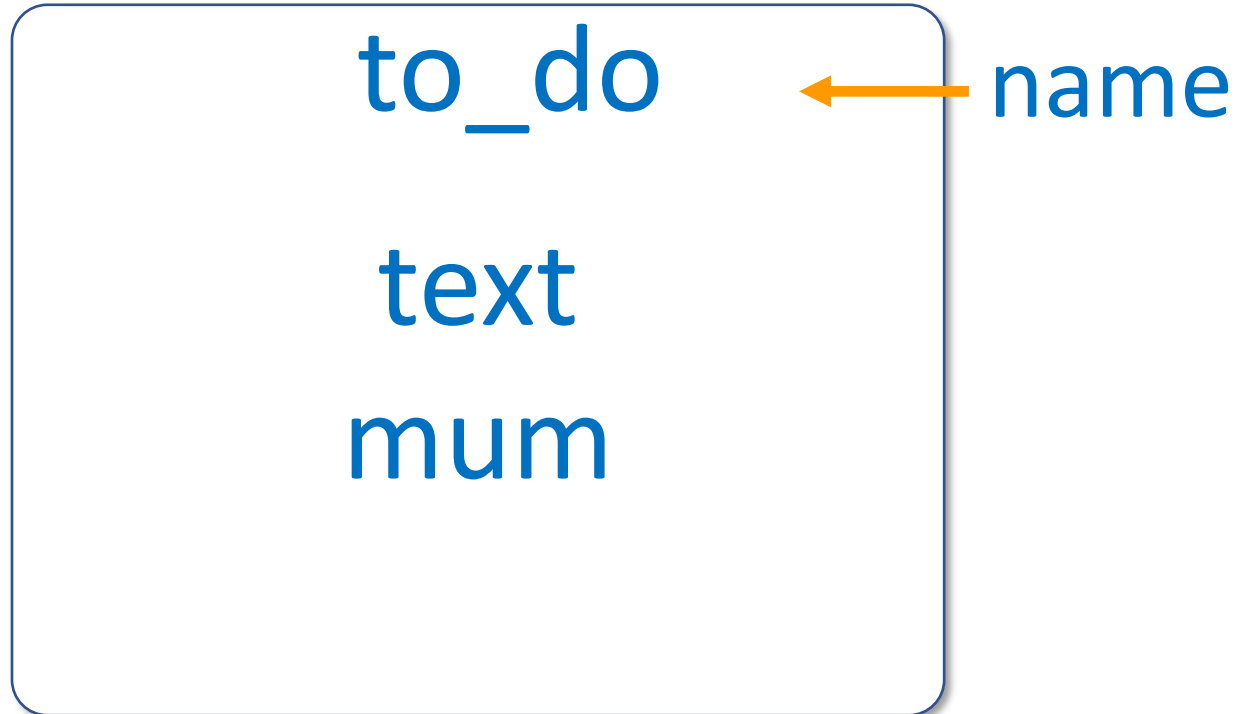
You can rub out your message

# Variables are like whiteboards



You can write a new message

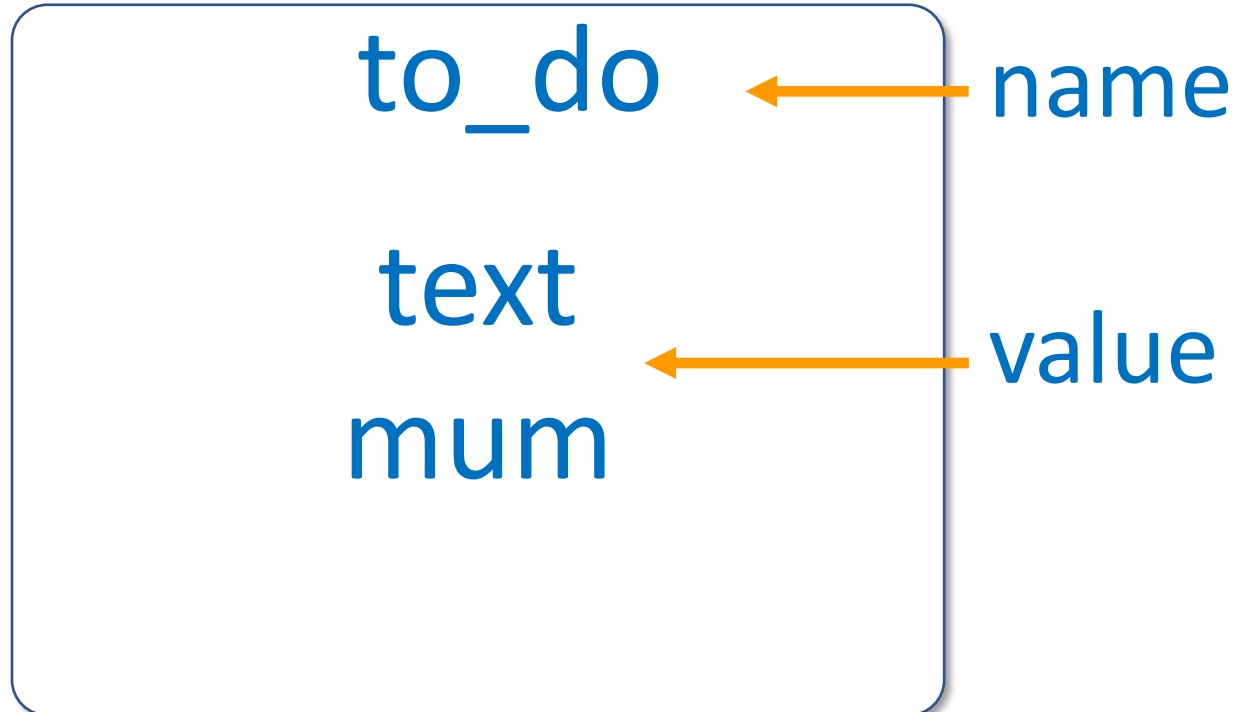
# Variables are **NOT** like whiteboards



You **have** to give a variable a name

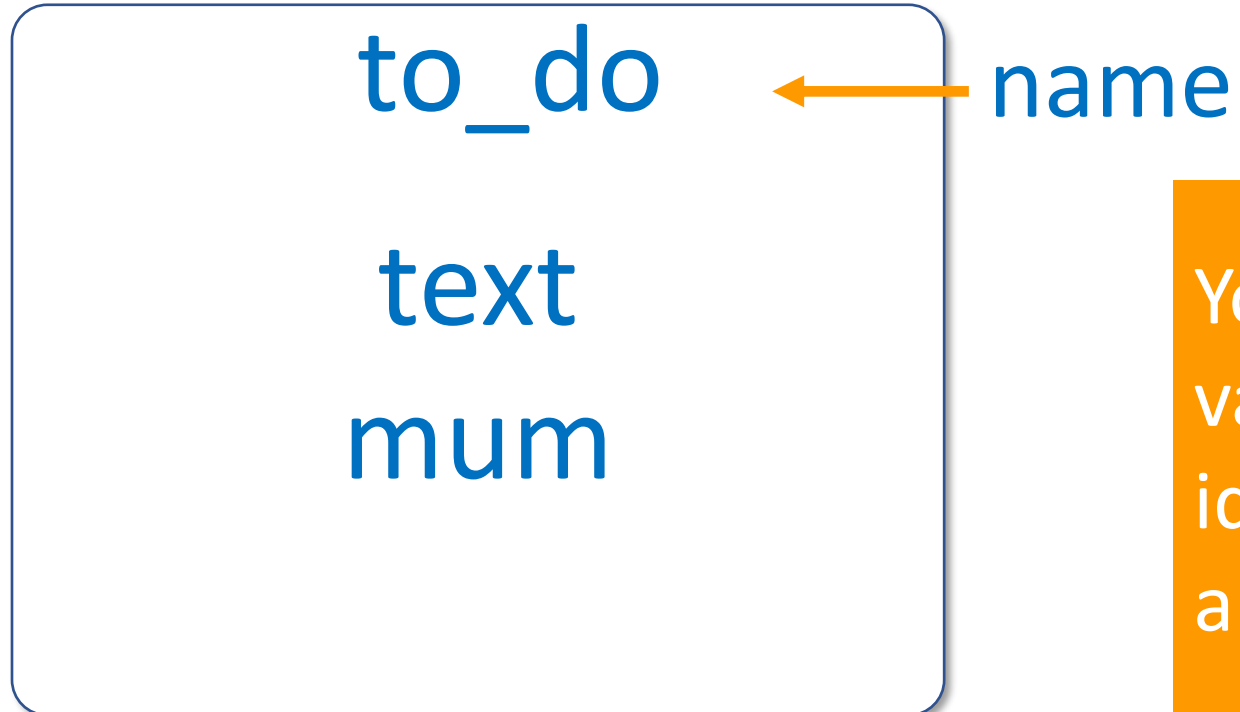


# Variables are **NOT** like whiteboards



We call the data written the value

# Variables are **NOT** like whiteboards



You **have** to give a variable a name to identify it in an algorithm or code

# Variables

## Variables like a whiteboard ✓

- Write
- Rub out
- Write new values

hours\_day

24

## Variables not like a whiteboard ✗

- Each variable needs its own name
- Read the name act on the value
- Can change the value using maths

# Variables in an algorithm

Assign 3 to **myNum**

Bow **myNum** times

Say **myNum**

Add 3 to **myNum**

Clap **myNum** times

Subtract 4 from **myNum**

Loop **myNum** times

    raise both arms

    lower both arms

Say **myNum**

Act out this algorithm

# Variables in an algorithm

Assign 3 to **myNum**

Bow **myNum** times ←

Say **myNum**

Add 3 to **myNum**

Clap **myNum** times ←

Subtract 4 from **myNum**

Loop **myNum** times ←

    raise both arms

    lower both arms

Say **myNum**



A



B



C

What is the value of myNum at A, B and C?

# Variables in an algorithm

Assign 3 to **myNum**

Bow **myNum** times ←

Say **myNum**

Add 3 to **myNum**

Clap **myNum** times ←

Subtract 4 from **myNum**

Loop **myNum** times ←

    raise both arms

    lower both arms

Say **myNum**



A, 3



B, 6



C, 2

What is the value of **myNum** at A, B and C?

# Variables in an algorithm

Assign 3 to **myNum**

Bow **myNum** times

Say **myNum**

Add 3 to **myNum**

Clap **myNum** times

Subtract 4 from **myNum**

Loop **myNum** times

    raise both arms

    lower both arms

Say **myNum**

Can a variable be used to set how many loops  
in a count-controlled-loop?



# Variables in an algorithm

Assign 3 to **myNum**

Bow **myNum** times

Say **myNum**

Add 3 to **myNum**

Clap **myNum** times

Subtract 4 from **myNum**

Loop **myNum** times

    raise both arms

    lower both arms

Say **myNum**

 Yes it can!

Can a variable be used to set how many loops  
in a count-controlled-loop?



# Variables in an algorithm

Assign 3 to **myNum**  
Bow **myNum** times  
Say **myNum**  
Add 3 to **myNum**  
Clap **myNum** times  
Subtract 4 from **myNum**  
Loop **myNum** times  
    raise both arms  
    lower both arms  
Say **myNum**

Write your own  
algorithm for your  
partner to act out

- Name variable
- Assign a value
- Use value in algorithm
- Change value by + & -

# Variables in Scratch

Assign a value using set



```
set myNum to 5
say join I used to be myNum for 2 seconds
change myNum by 1
say join Now I am myNum for 2 seconds
change myNum by -2
repeat myNum
  next costume
  wait 1 seconds
change myNum by 1
say join Next year I will be myNum for 2 seconds
```

# Variables in Scratch

Read name use value



```
set myNum to 5
say join I used to be myNum for 2 seconds
```

Read name use value



```
change myNum by 1
say join Now I am myNum for 2 seconds
change myNum by -2
```

Read name use value



```
repeat myNum
  next costume
  wait 1 seconds
change myNum by 1
```

Read name use value



```
say join Next year I will be myNum for 2 seconds
```

# Variables in Scratch

Change value by + →

Change value by - →

Change value by + →

```
set myNum to 5
say join I used to be myNum for 2 seconds
change myNum by 1
say join Now I am myNum for 2 seconds
change myNum by -2
repeat myNum
  next costume
  wait 1 seconds
change myNum by 1
say join Next year I will be myNum for 2 seconds
```

# Variables in Scratch

Use value in count-controlled-loop



```
set myNum to 5
say join I used to be myNum for 2 seconds
change myNum by 1
say join Now I am myNum for 2 seconds
change myNum by -2
repeat myNum
  next costume
  wait 1 seconds
change myNum by 1
say join Next year I will be myNum for 2 seconds
```

# Variables

Named unit of **data** that holds a **value**

## Variables like a whiteboard ✓

- Write
- Rub out
- Write new values

hours\_day

24

## Variables not like a whiteboard ✗

- Each variable needs its own name
- Read the name act on the value
- Can change the value using maths

# Terms of use

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<https://computing.hias.hants.gov.uk/course/view.php?id=51>