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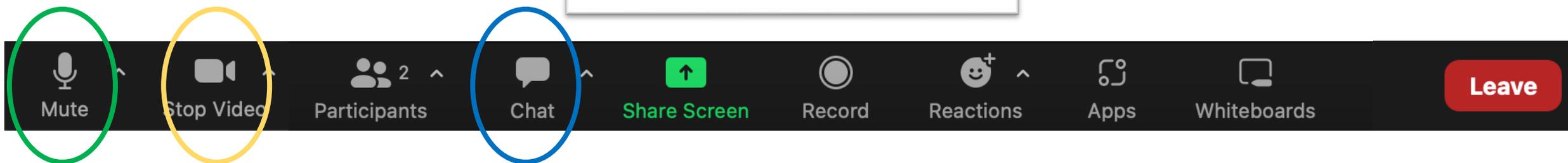
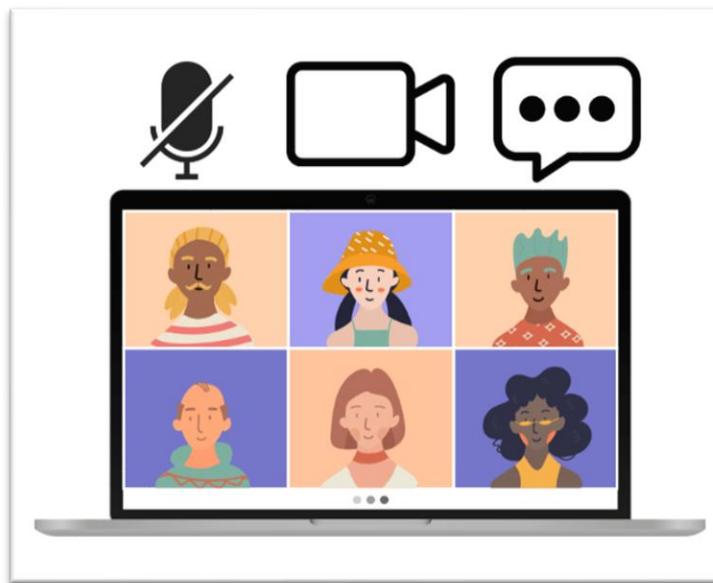
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# Flowcharts & Pseudocode

## Collaborative



# Zoom Functions/Breakout Rooms





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# Collaborative Overview

18:00-18:15	The Design Process
18:15 – 18:45	Flowcharts
18:45 – 19:15	Algorithms and Pseudocode
19:15 – 19:30	Online Design Tools



# Learning Intention

By the end of this collaborative, participants should be aware of:

- The design stage
- The purpose of a flowchart and what each symbol means
- Algorithms, their use and how to write them using pseudocode
- Online design tools to create flowcharts



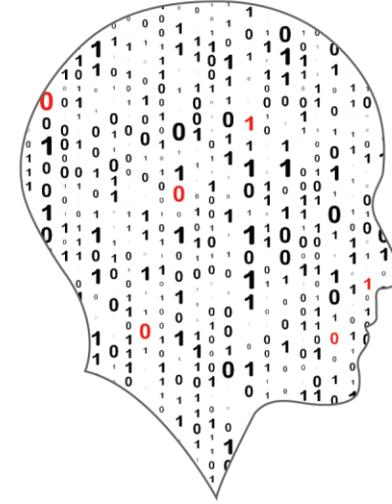


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# Design



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# The Design Process

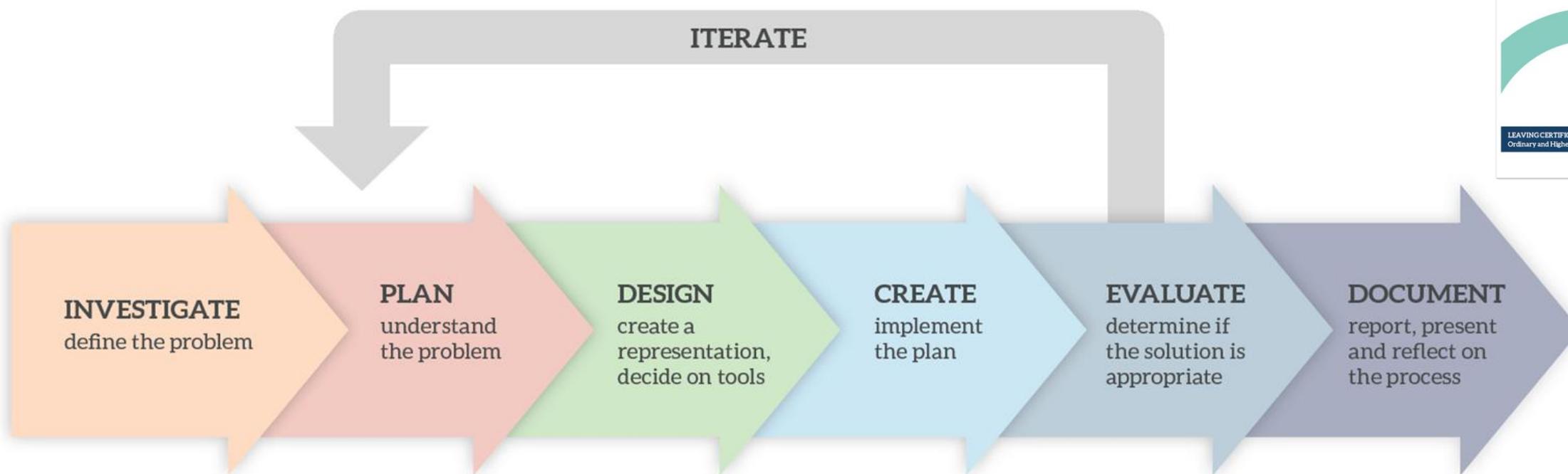


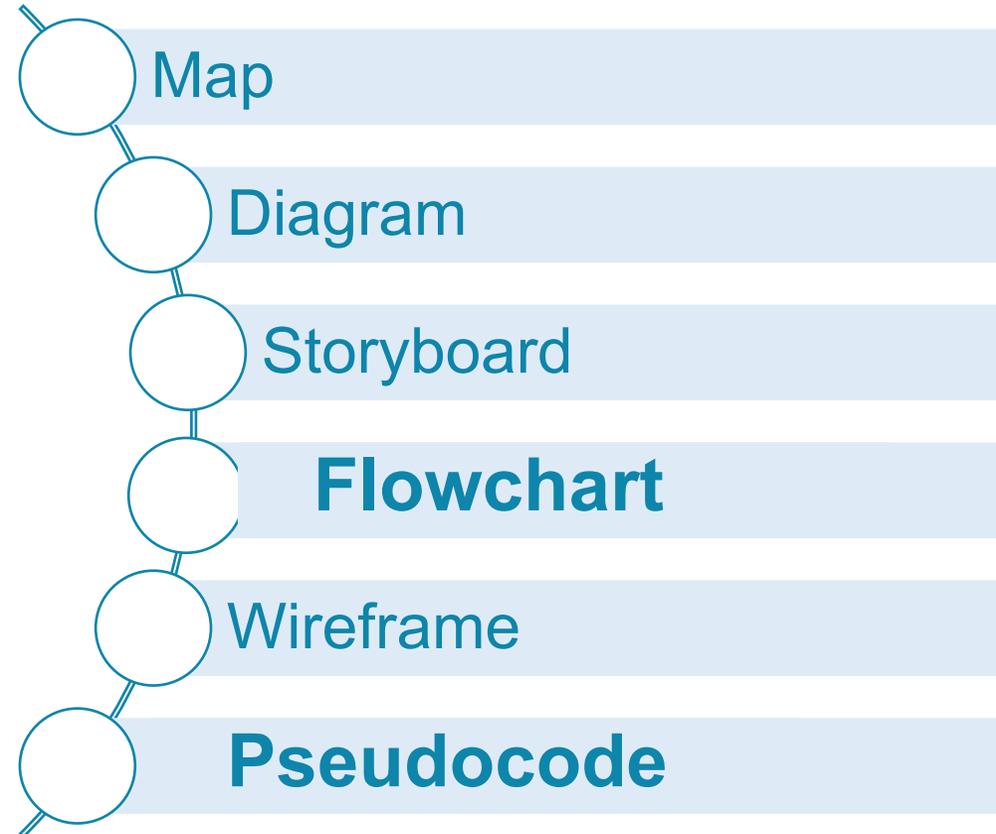
Figure 3: Overview of a design process



# The Design Stage

## DESIGN

create a  
representation,  
decide on tools



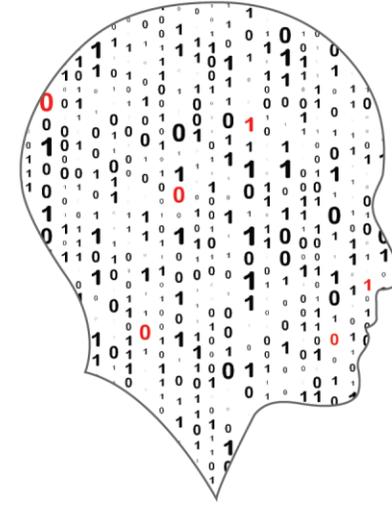


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# Flowcharts



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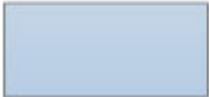
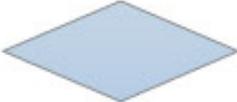
# Flowchart

A flowchart is a diagram that represents a process, a system or a computer algorithm. It provides a breakdown of essential steps in solving a problem.





# Flowchart Symbols

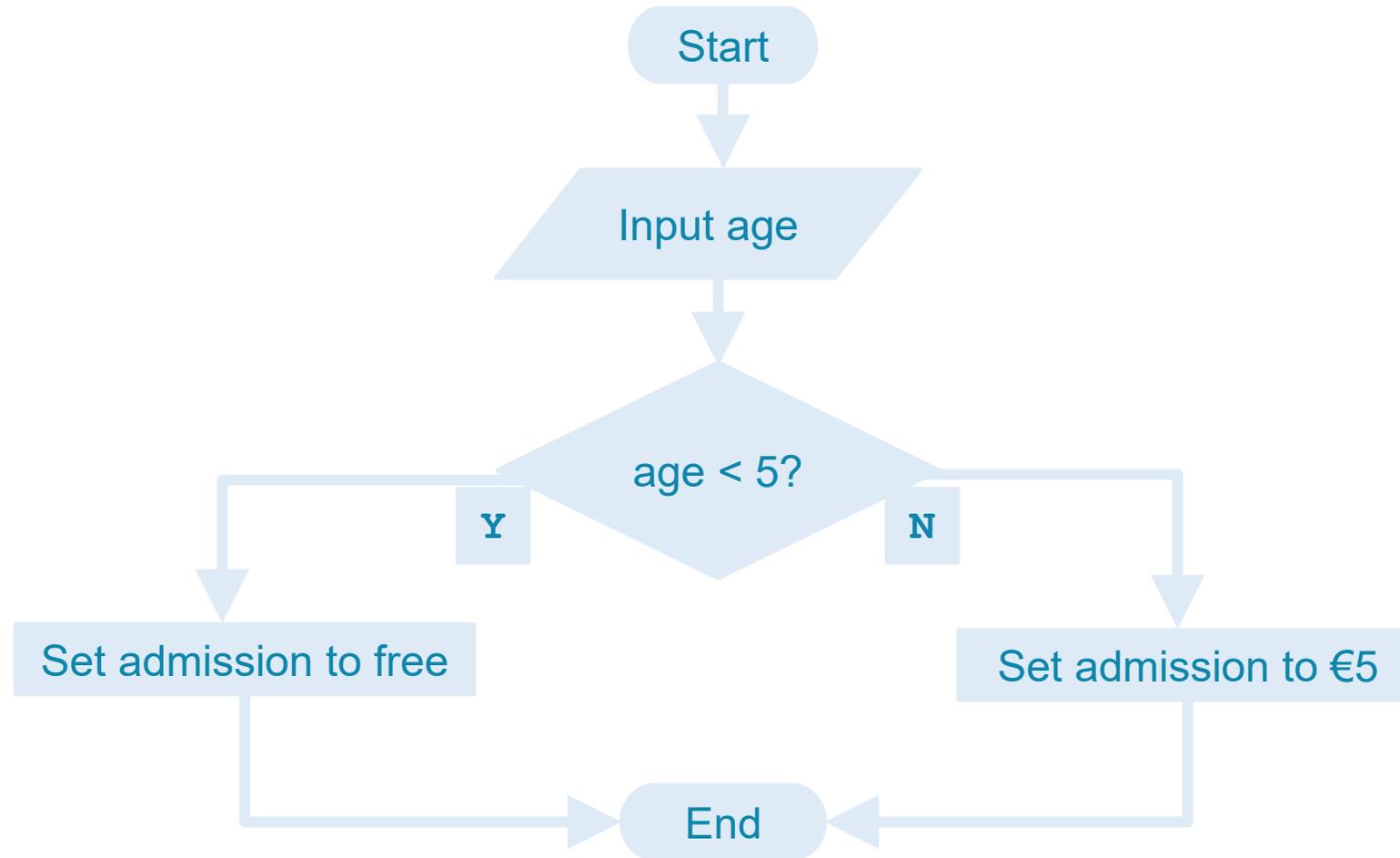
Symbol	Name	Function
	Start/end	An oval represents a start or end point
	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision

If the name or function content was removed, could you fill in the table?



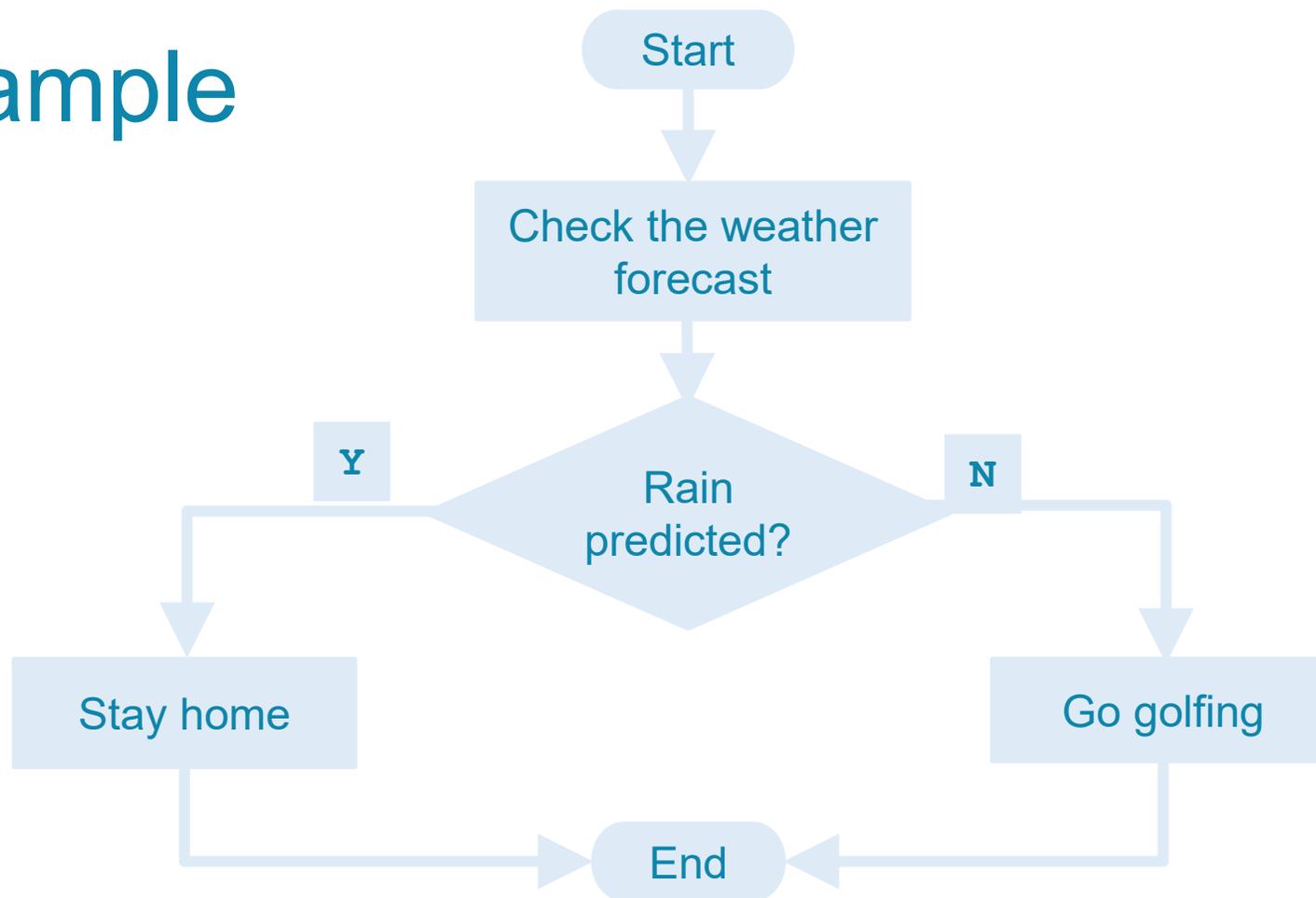


# Admission Example

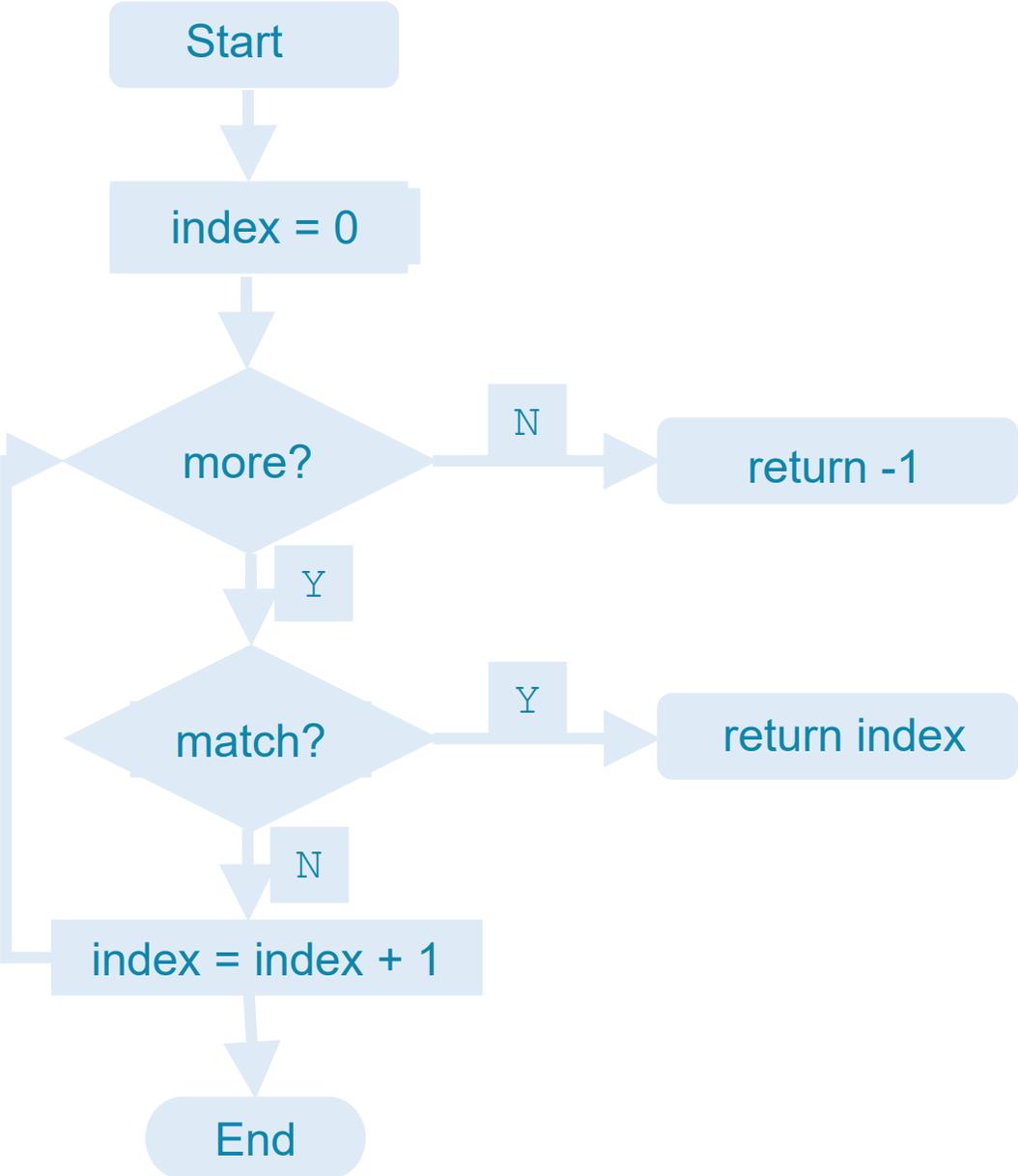




# Golf Example

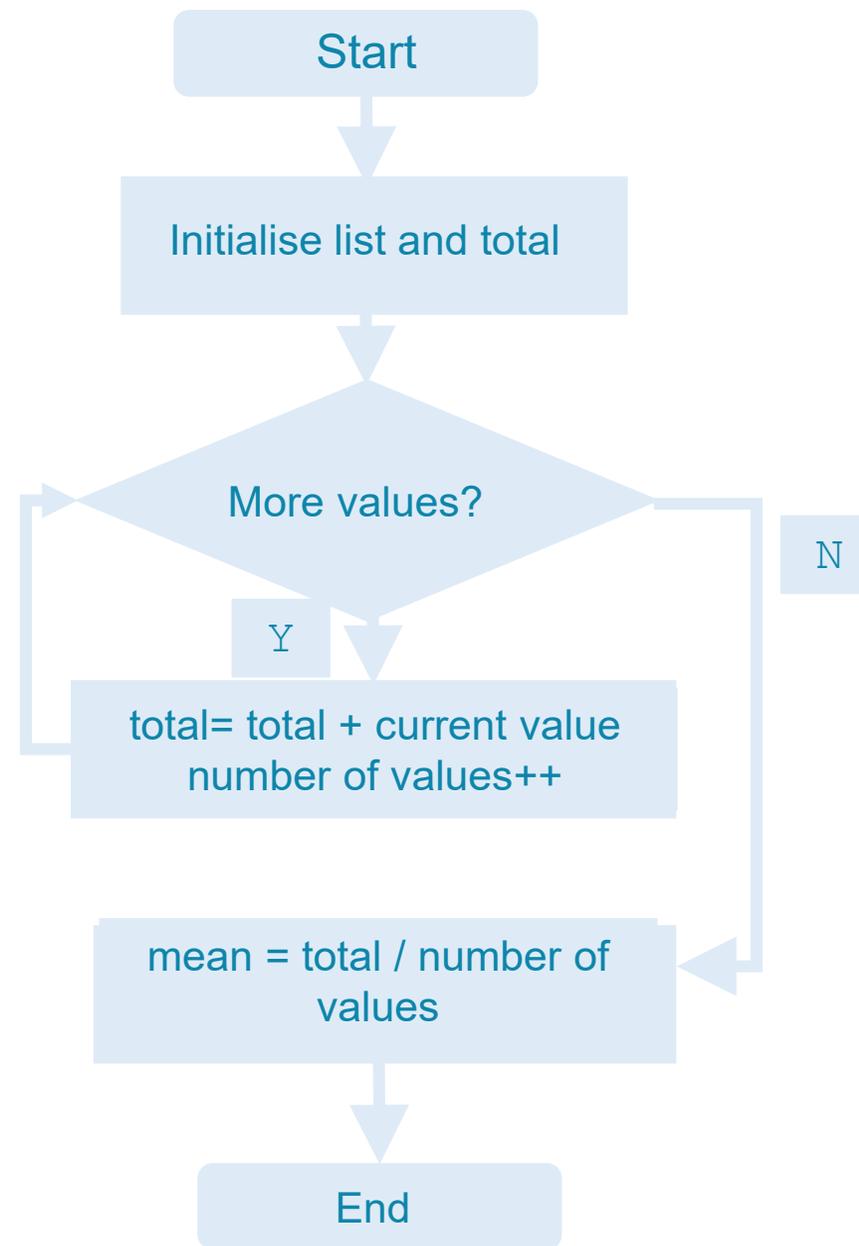


# Linear Search Example



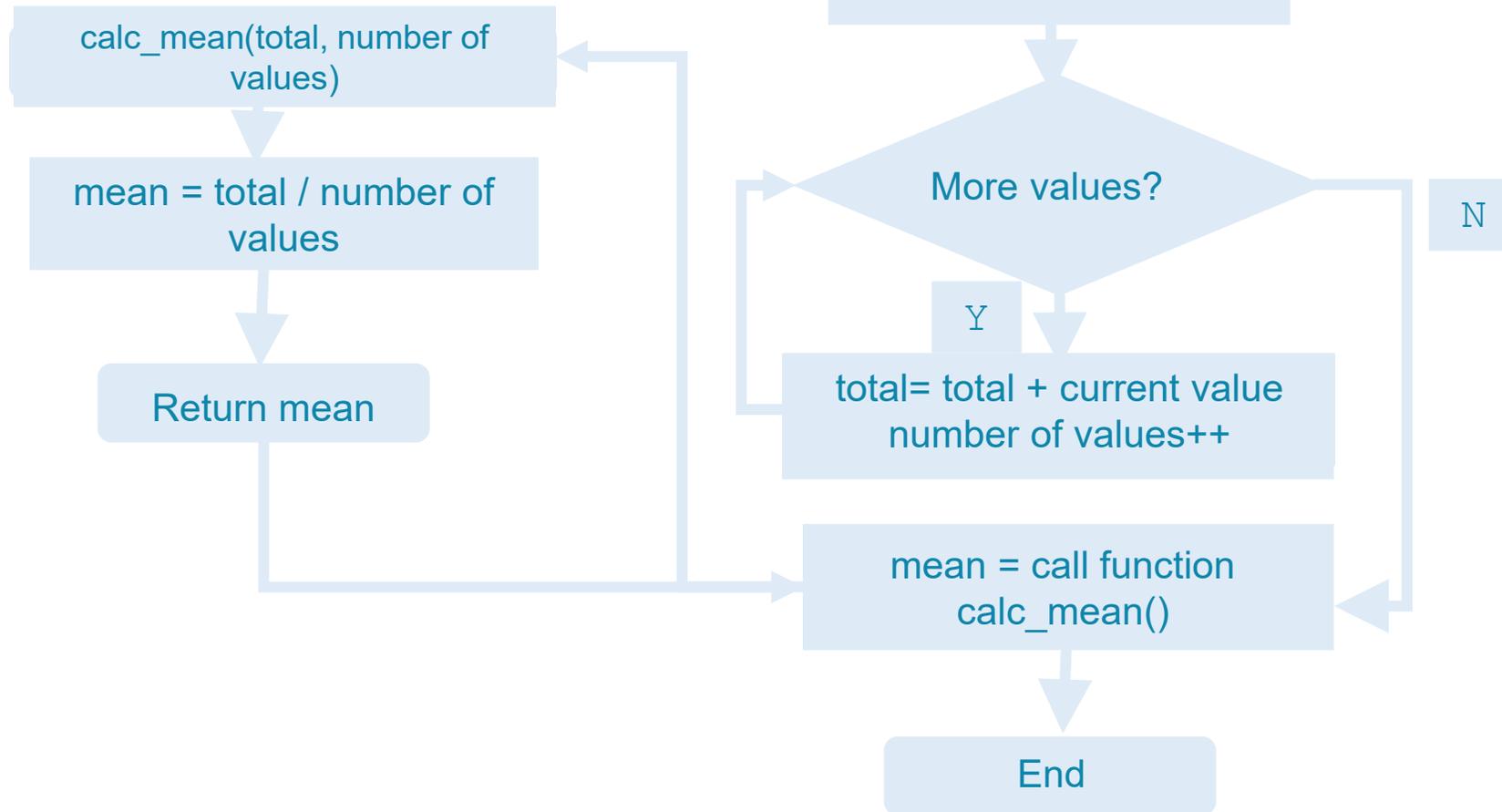


# Calculate Mean Example





# Calculate Mean Using Functions





# Activity 1 – Create a flowchart

```
1. # Guess Game - 3 guesses
2. import random
3.
4. number = random.randint(1, 10)
5. print(number) # have a sneak peek!
6.
7. # Initialise a loop counter
8. counter = 0
9.
10. # Loop 3 times
11. while counter < 3:
12.
13.     guess = int(input("Enter a number between 1 and 10: "))
14.     if guess == number:
15.         print("Correct")
16.         break # exit the loop immediately!
17.     elif guess < number:
18.         print("Too low")
19.     else:
20.         print("Too high")
21.
22.     counter = counter + 1
23.
24. print("Goodbye")
```



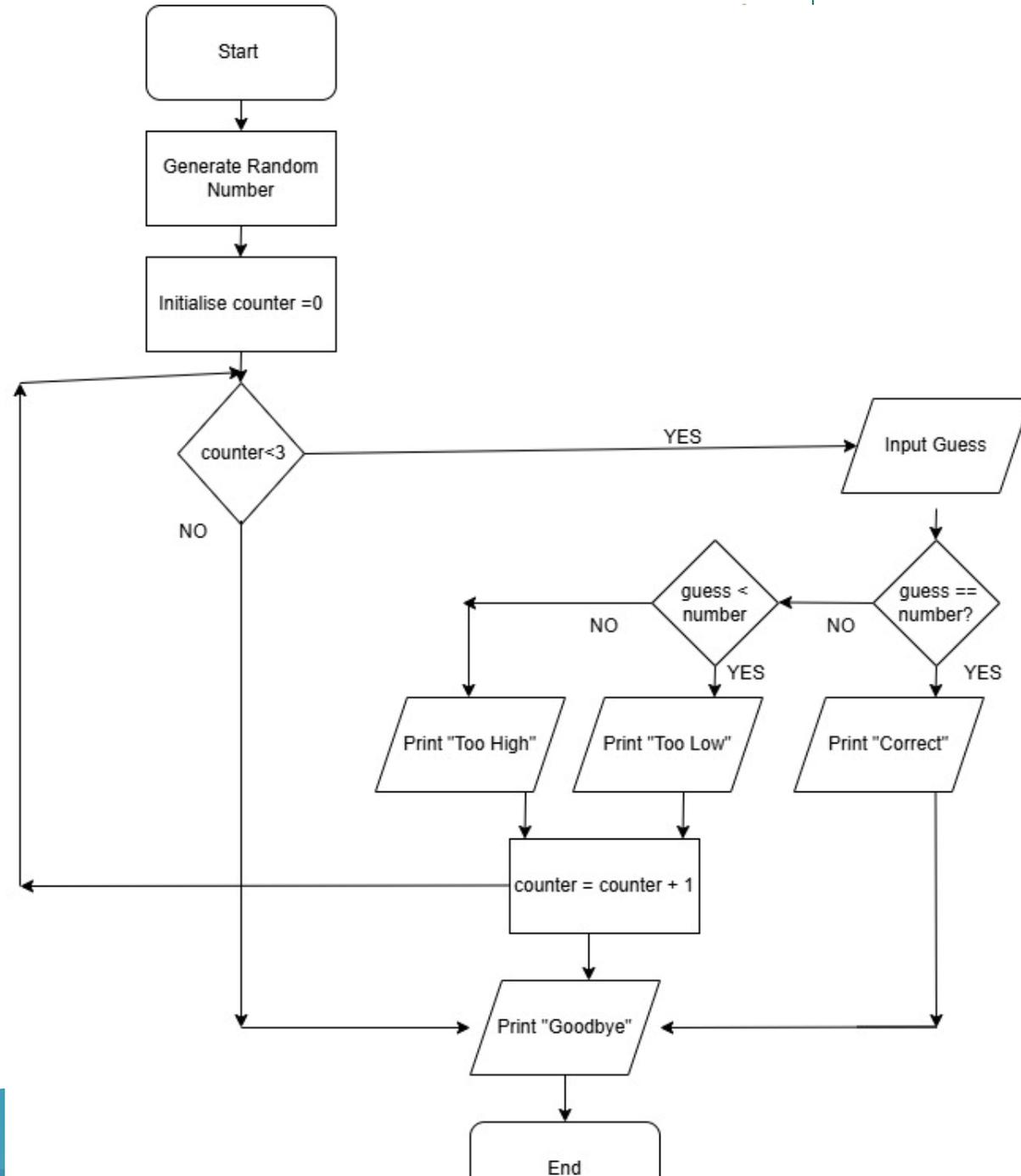
Guessing Game v4

# Activity 1 – Solution

```
1. # Guess Game - 3 guesses
2. import random
3.
4. number = random.randint(1, 10)
5. print(number) # have a sneak peek!
6.
7. # Initialise a loop counter
8. counter = 0
9.
10. # Loop 3 times
11. while counter < 3:
12.
13.     guess = int(input("Enter a number between 1 and 10: "))
14.     if guess == number:
15.         print("Correct")
16.         break # exit the loop immediately!
17.     elif guess < number:
18.         print("Too low")
19.     else:
20.         print("Too high")
21.
22.     counter = counter + 1
23.
24. print("Goodbye")
```



Guessing Game v4



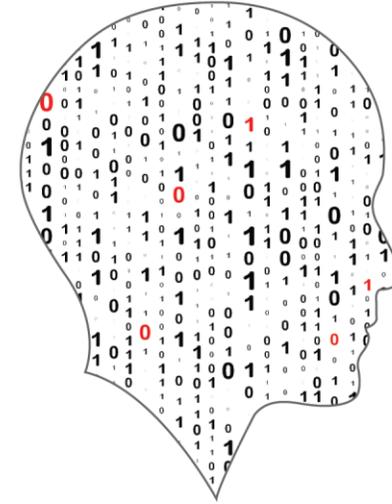


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# Algorithms and Pseudocode



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# Algorithms



An algorithm is a step-by-step procedure for solving a problem or completing a task. It describes how to accomplish something.



# Algorithms in Computer Science

A sequence  
of instructions

Expressed in  
a variety of  
ways

Characterised  
by inputs,  
processing  
and outputs

General  
solution to a  
problem

A way of  
capturing  
intelligence



# How to write an algorithm using Pseudocode

Artificial, informal language

No syntax rules

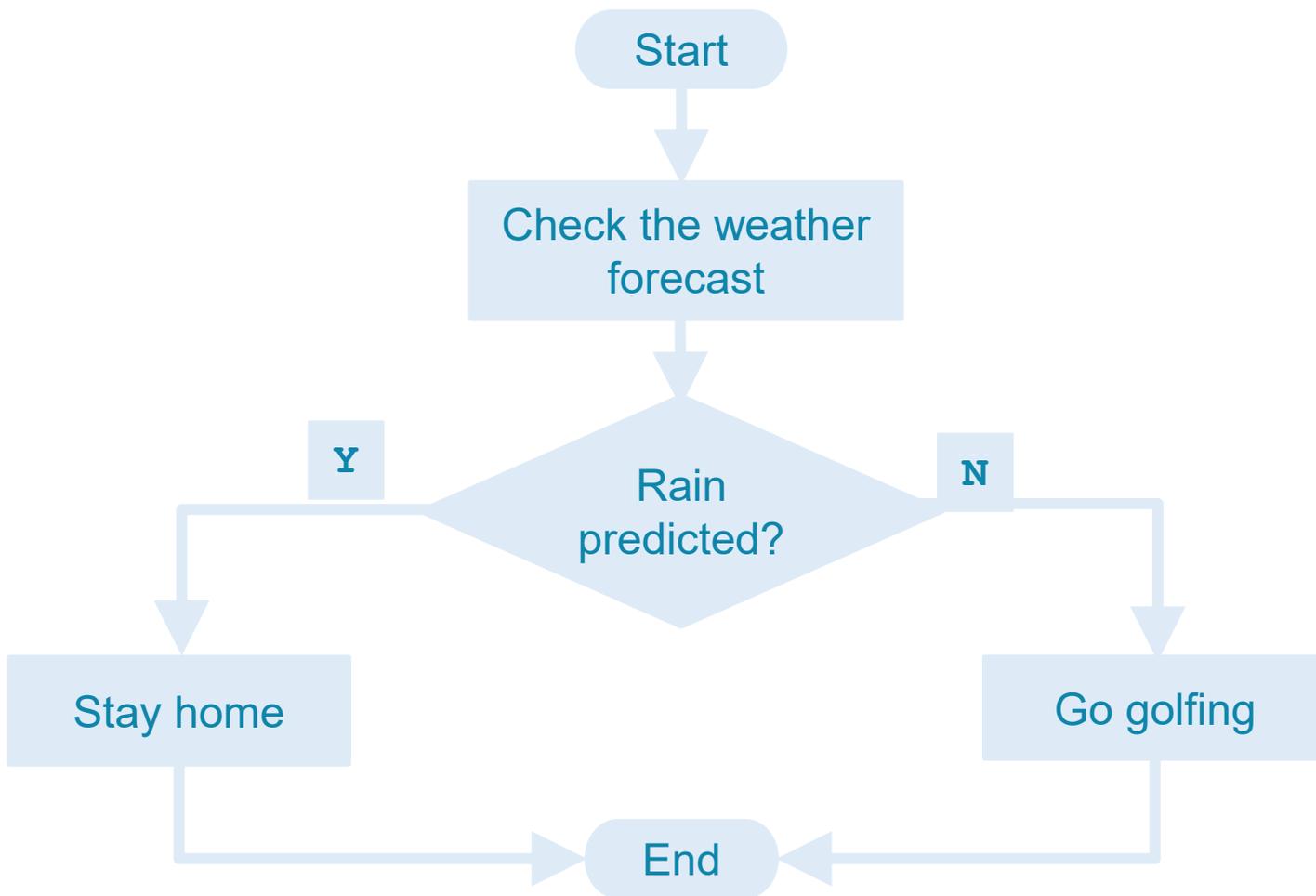
Pseudocode

Plain, readable description

Not a programming language



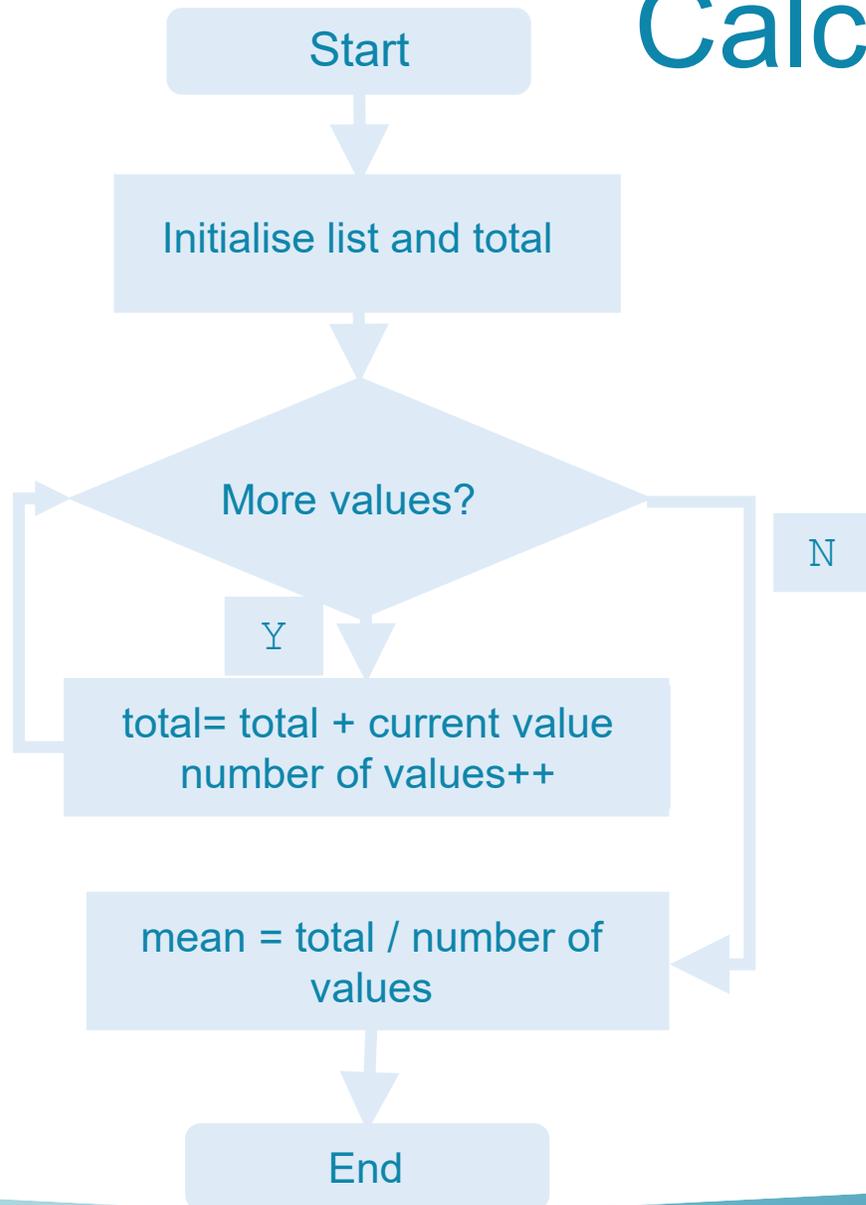
# Recall Golf Example



Start program  
Check the weather forecast  
If rain is predicted  
    Stay at home  
else  
    Play golf  
End program



# Calculate Mean Example



Start program  
Initialise list of values  
Initialise total to 0  
Continue until there are no more values in the list  
    total = total + current value  
    number of values++  
Mean value = total / number of values  
End program



# Pseudocode Example with Functions

Main Program:  
Initialise list  
Initialise total, number of values  
As long as there are more values to read in?  
    total=total+current value  
    number of values++  
Call function calc\_mean(total, number of values)  
Display mean value

Function calc\_mean:  
calc\_mean(total, number of values)  
    mean = total/number of values  
return mean

Main Program:  
1. Initialise list  
2. Initialise total, number of values  
3. As long as there are more values to read in?  
    a. total=total+current value  
    b. number of values++  
4. Call function calc\_mean(total, number of values).  
5. Display mean value  
6. End Program/Exit

Function calc\_mean:  
1. calc\_mean(total, number of values)  
2. mean= total/number of values.  
3. Return mean value



## Activity 2 – Create Pseudocode

Problem: A user is asked to enter the kilometres they travel to get to work. The program should call a function that will calculate the equivalent number of miles. The number should be returned to the main program and it's value displayed.



# Activity 2 –Solution Create Pseudocode

Problem: A user is asked to enter the kilometres they travel to get to work. The program should call a function that will calculate the equivalent number of miles. The number should be returned to the main program and it's value displayed.

Main Program:

Enter number of kilometres to work (noKms)

Call function noOfMiles(noKms)

Display kms and numMiles

Function noOfMiles (noKms)

numMiles = 0.6214 \* noKms

return numMiles

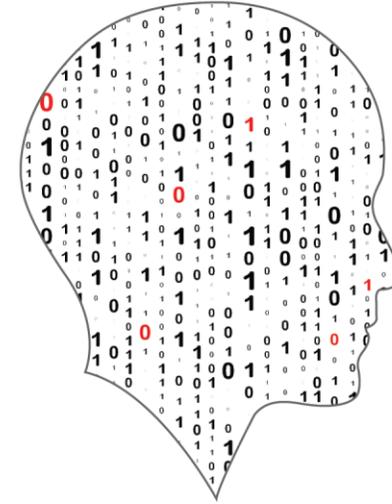


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# Online Tools for Flowcharts and Pseudocode



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# Online Flowchart Tools



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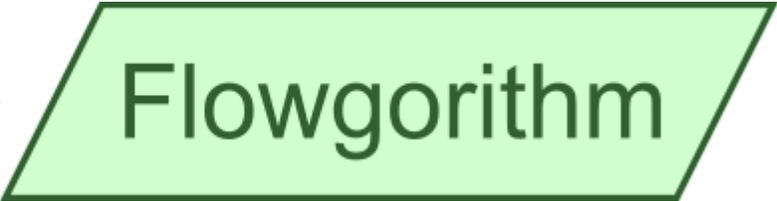
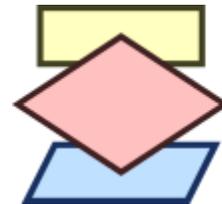


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# Demo of Tools

## Online flowchart maker

Get everything you need to map out the flow of ideas, processes, and systems.

Sign up free



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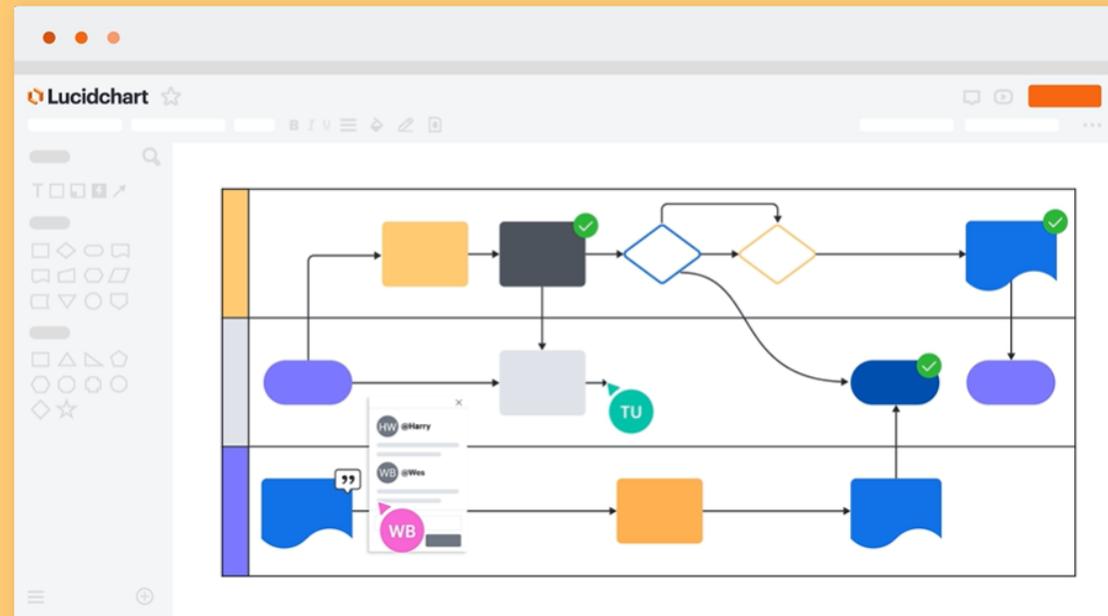


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# Reflection

In what ways could online tools support you in teaching flowcharts and algorithms?

What limitations do you envisage and how would you address them?

