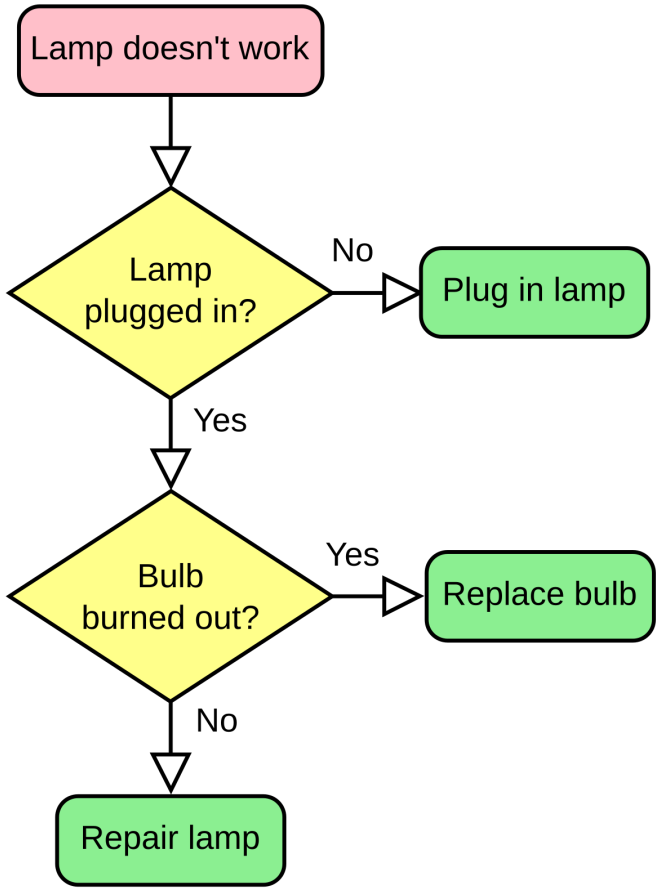
Flowcharts

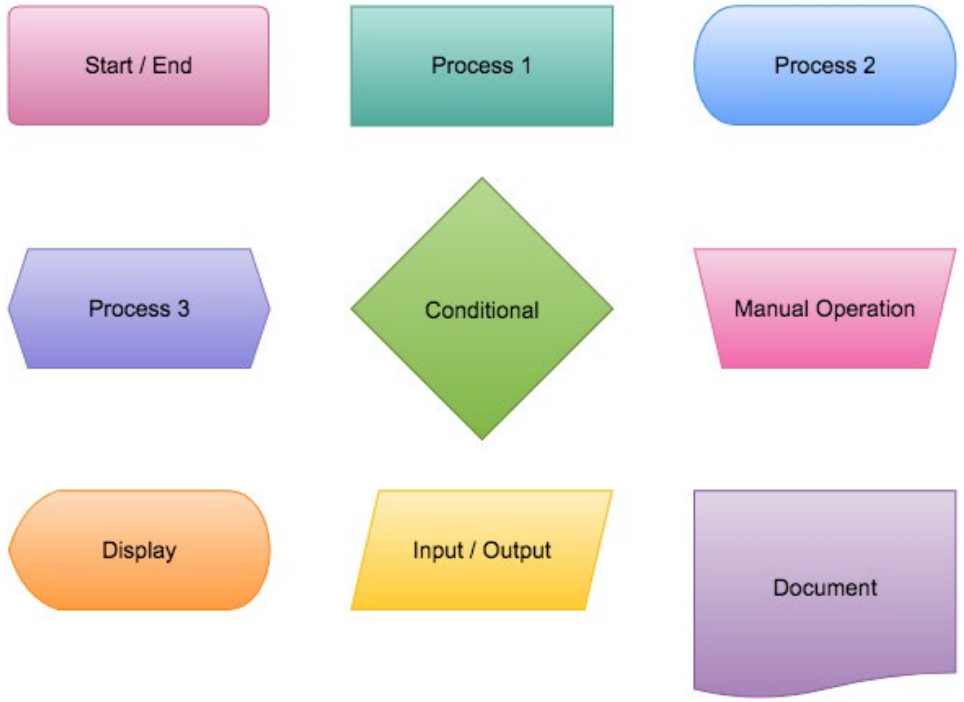
What are flowcharts?

- Flow charts are a visual way of representing a program or system
- They allow us to put a program into a nice middle ground between English and code
- They allow us to easily explain what a program is meant to do before we even start to program it



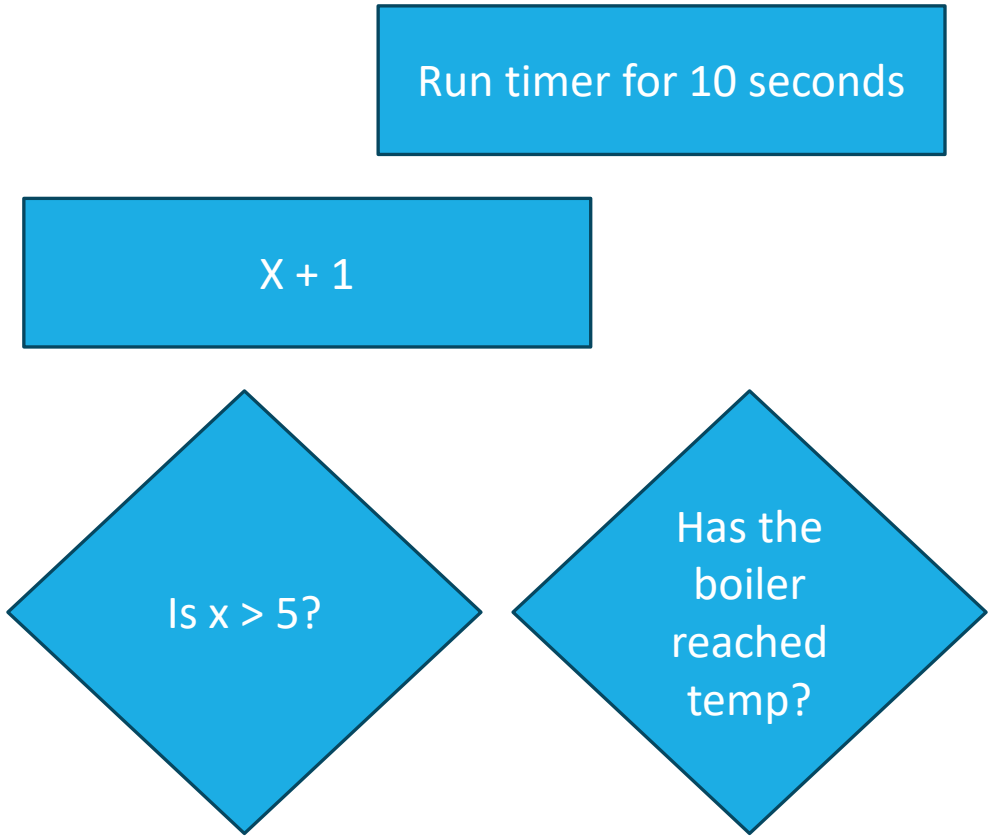
Flowchart Symbols

- We use symbols to represent logic inside our program
- Each symbol has a purpose
- We connect these symbols with arrows to show how they link together (how they “flow”)



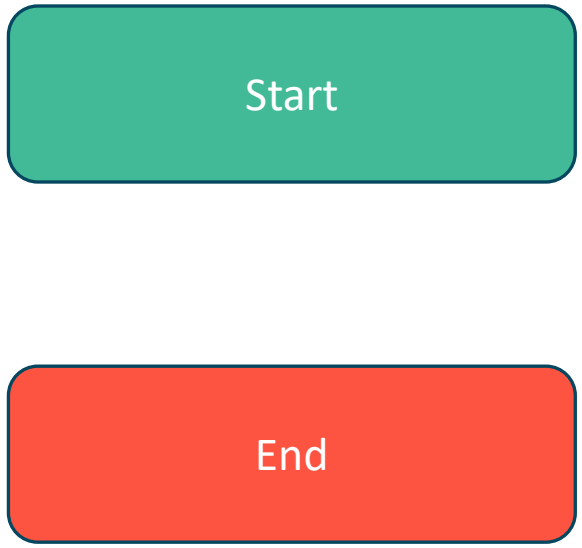
Writing Inside of Flowchart Symbols

- When writing our instructions into our flow diagram we use plain English
- The commands should be short and quick to read
- Generally, you put one action per command
- We can use maths and logic notation within our blocks too



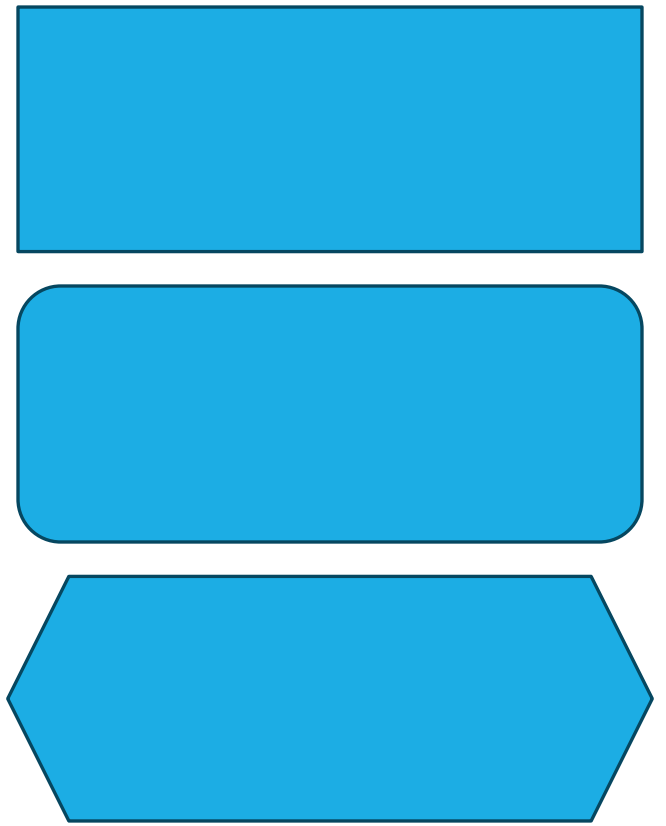
Start/End

- Sometimes referred to as the “terminator”
- Used to denote where the flow begins and ends
- Often has “start” or “end” written in them
- Start indicates where the program begins
- End indicates where the program finishes



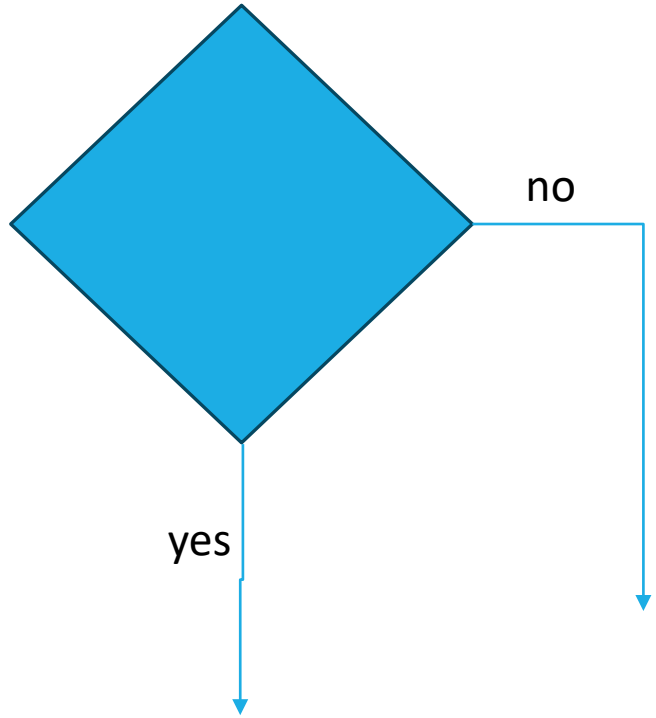
Processes

- A process is used to represent a system performing an action
- For instance, “heat the tea pot”, “check for animal” ect.
- Can be both internal and external parts of the system



Conditional/Decision

- For making a decision in our system or checking if something is true
- Only symbol that has two outputs
- Must be a yes/no (true/false) question
- You write yes or no on the arrow coming from the symbol, yes always comes out the bottom with no from the side
- For example, “has the task been completed?”, “is the kettle boiled?”, “is x>5?”)



Input Output

- Used for information coming into or leaving the system
- Can be used for reading a sensor
- Can also be used for moving an actuator
- For example, “move motor 10 rotations”, “activate solenoid”, “read thermometer”

Manual Operation

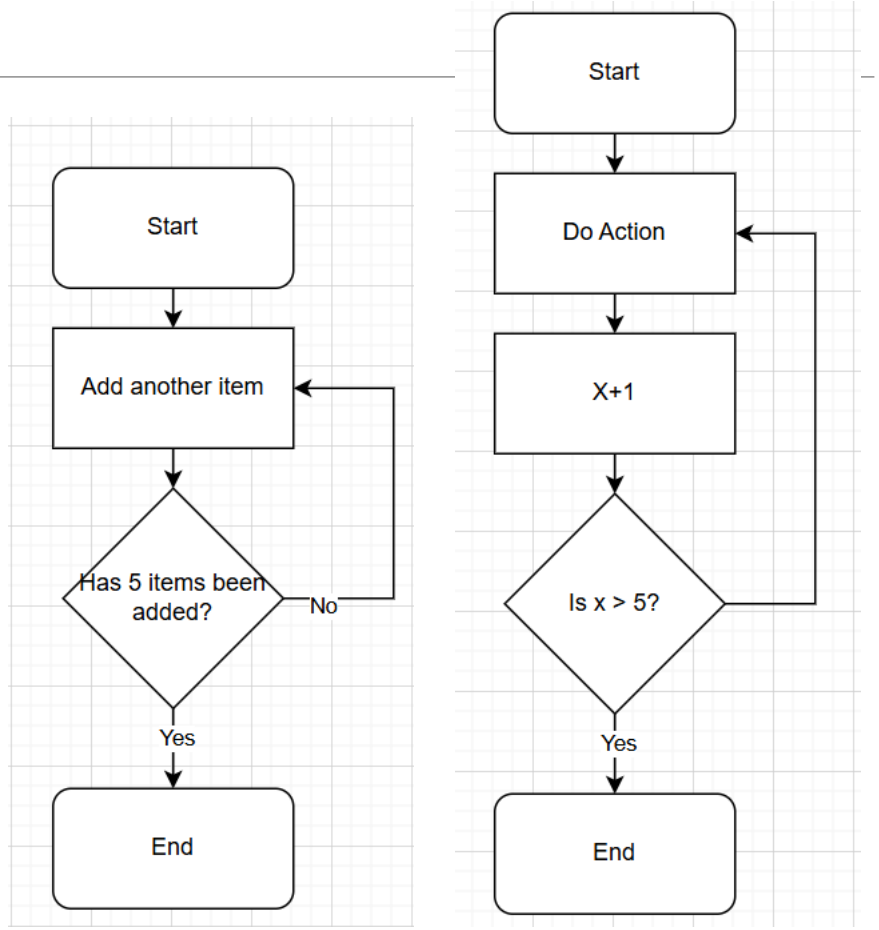
- Used for a user input
- For example, “the user pressing the button”, “user selecting age”

Display

- Displays information to the user
- For example, “output “tea made!!””, “output age input not valid”
- Useful for debugging

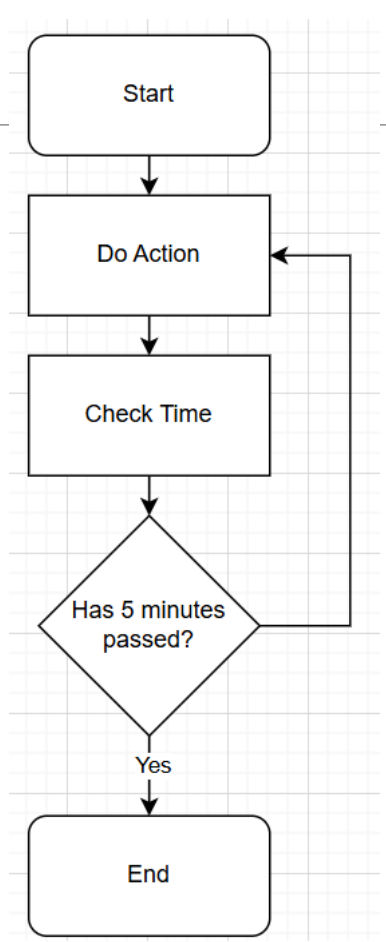
Counting Loop

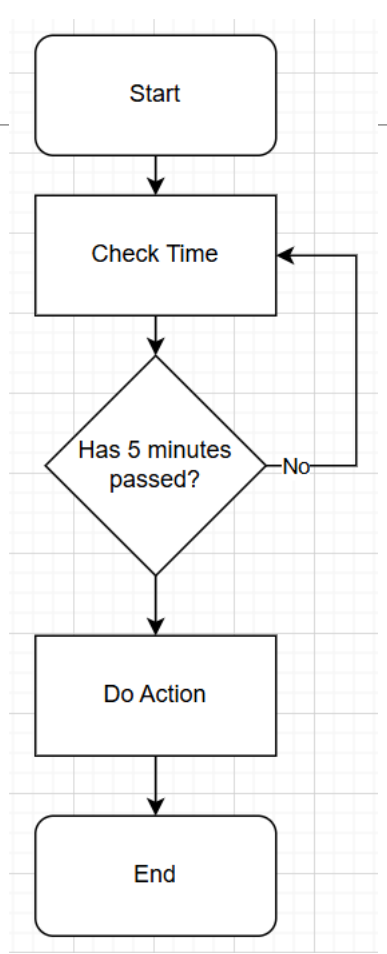
- Counts how many times something has happened
- Useful for ensuring the correct number of items have been added to something ect.

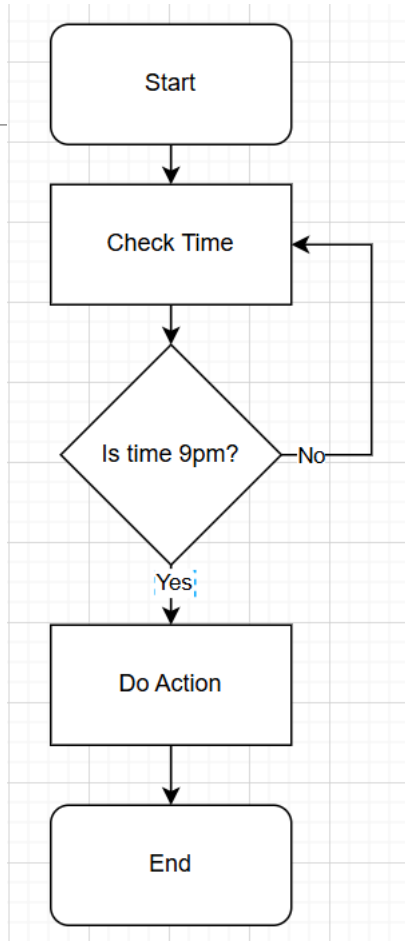


Timer Loops

- Does an action for the duration of a timer
- Useful for timed circuits
- Can either do action after a set time or do action for a set time







Common Mistakes

- Using the wrong symbols
- Flowing in the wrong directions
- Using too many or not enough colours
- Inconsistent branch directions
- Inconsistent spacing

Example

- Making a flow diagram to make a pot of tea
- Steps:

1) Add water to kettle
2) Boil Kettle
3) Put teabag in mug
4) Add water to mug
5) Wait to brew
6) Remove teabag
7) Add milk to mug
8) Add sugar to mug
9) Stir
10) Drink

Considerations

- Water boiled?
- How many sugars?
- Has it brewed enough?
- How much milk?

Diagram

Your turn

- Use draw.io
- Make a flowchart of what to do if you discover a fire in the college