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Inspiring | Creative | Fun

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Playground Computing Unplugged

What is a Computer?

Task: Draw a Computer

You have one minute to draw a computer!

Think outside the box!

What is a Computer?

What makes a computer a computer?

How many kinds of computers are there?

How would you describe to someone what a computer is?

Let's Have A Look Inside One!

What does the inside of a computer look like?

What do you think each part is?

Can you find any clues written anywhere?
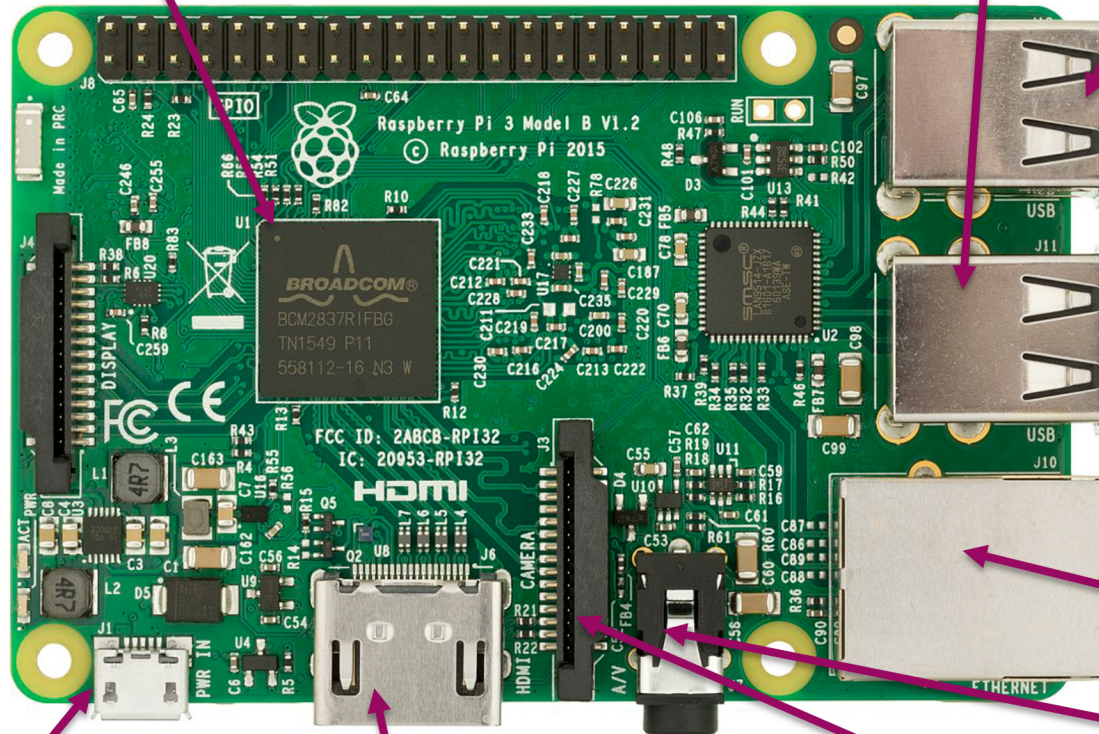
How old do you think these parts are?

Be Careful with the parts!

Parts Of A Raspberry Pi

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CPU – This does all the thinking/computing

USB Ports – Connect Mouse, keyboard, any USB device

Ethernet port – LAN Cable

Micro USB port

HDMI Port – Connect a screen

Camera port

Video + Audio Output

Inputs and Outputs

Most computers that we use let us interact with them in some way. This is done using input and outputs devices.

Can you sort the following items into inputs and outputs?

Input:	Mouse	Output:
Mouse	Screen	Screen
Keyboard	Keyboard	Speakers
Microphone	Microphone	Printer
Scanner	Speakers	Touch-Screen
Touch-Screen	Printer	
	Scanner	
	Touch-Screen	

Could This Computer Play New Games?

Would you be able to play games of 2018 on the computer we've seen today?

- Do Computers all have the same parts?

What It Would Need:

OS: **Windows 10 – 64-bit**

CPU: Intel i3 6300T or equivalent benchmark – Intel i3 4340 and Intel i3 4350 as alternatives. AMD equivalent is AMD Athlon X4 870K – AMD FX-4350, and FX-4330 as alternatives.

RAM: **8GB**

Hard drive space required: **50.0 GB**

Minimum supported video cards: Nvidia GeForce GTX 660 **2GB** or equivalent. AMD equivalent is Radeon RX 460/R9 270/R7 370

What Does This PC have?

Our Computer:

OS: Windows XP (Stopped in 2008)

CPU: Intel Pentium 4 HT (Stopped in 2008)

RAM: 512MB

Hard drive space: 80GB

Video Cards: 64 MB

FIFA 18:

OS: Windows 10 – 64-bit

CPU: Intel i3 6300T (First Sold 2015)

RAM: 8GB

Hard drive space required: 50.0 GB

Minimum supported video cards: Nvidia GeForce GTX 660 2GB

What does this suggest about computers as time goes on?

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What Language Do Computers speak?

Can a computer understand English or Welsh?

Can we give it instructions in English in order to make it do what we want?

Does anyone think computers might understand other languages?

I don't understand!

Binary

Computers only understand "on" and "off". We show this by using a 0 for "off" and a 1 for "on".

A computer needs any instructions to be translated into Binary before it can understand them.

For example the word "Hello" in binary is:
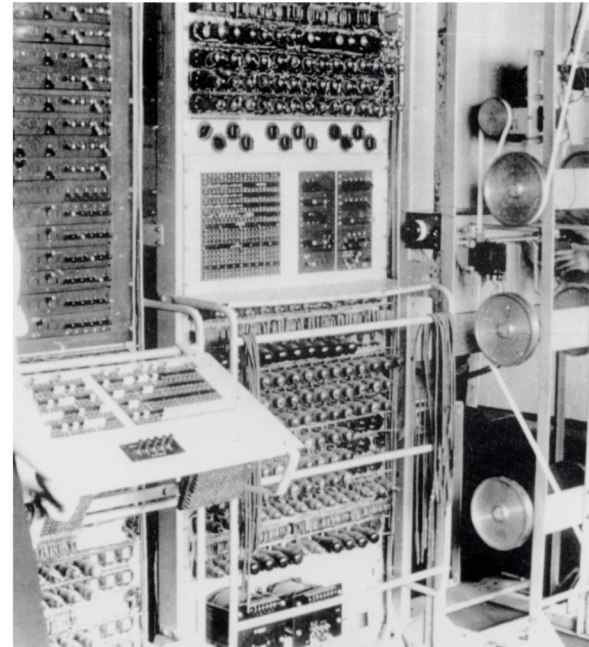
01001000 01100101 01101100 01101100 01101111

Challenge: Break the Code!

Use the tables to translate the binary into letters.

Can you break the code and read the message?

If you finish, try this one:

01010000 01101111 01101110 01110100 01011001 01000010 01110010
01100101 01101110 01101001 01101110 00100000 01101001 01110011
00100000 01110100 01101000 01100101 00100000 01000010 01100101
01110011 01110100

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Challenge: Write your name in Binary!

Try to write your name in Binary!

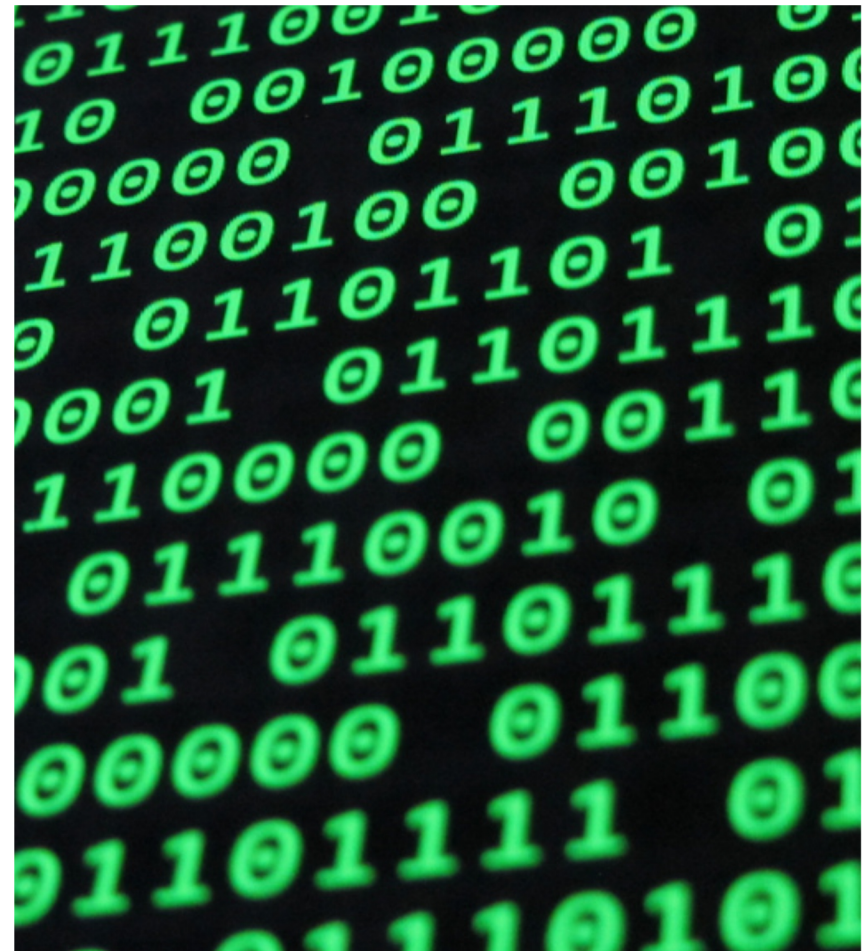Remember, you always start with a capital letter!

Challenge Your Friends!

Write a message in binary for a partner to decipher/decode!

Can they work out the message?

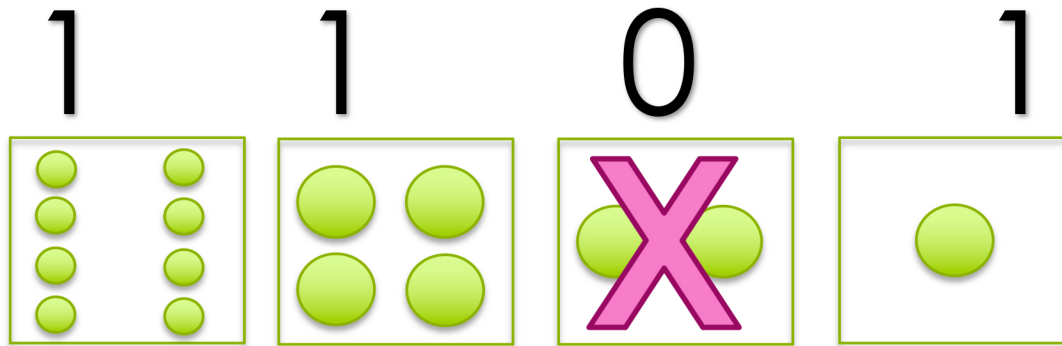Be careful that you leave big enough spaces between each binary number!

Counting in Binary: Count the Dots

In order to count in binary we can use dots to represent each 0 or 1. If there's a 1 we count the dots, if a 0 we don't. By counting the dots, we can work out the value of any binary number.

For example, the binary number 1111 can be worked out by counting:
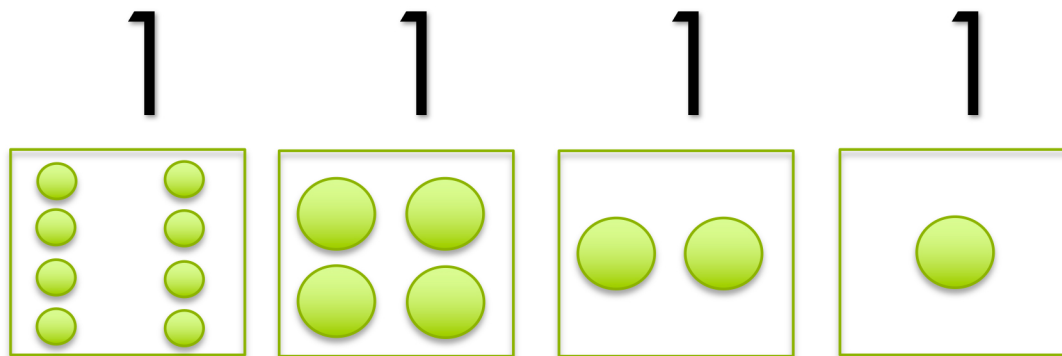
So 1111(binary) = 8 + 4 + 2 + 1 = 15

1 1 0 1

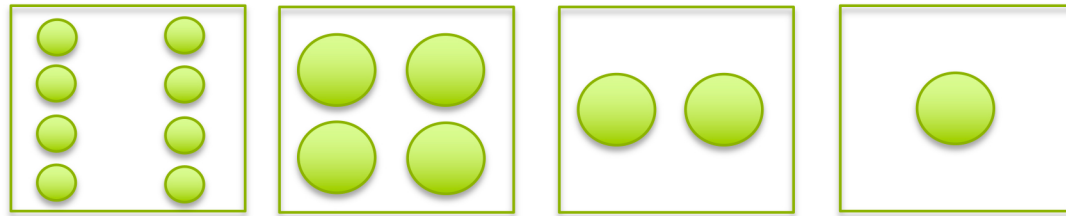Because of the 0, we do not count the 2 dots.

So what is the value of 1101?

1101(binary) = 8 + 4 + 0 + 1 = 13

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What are the values of the following binary numbers:

8	4	2	1	
0	0	0	1	**= 1**
0	1	0	1	**= 5**
1	0	0	1	**= 9**
1	1	0	0	**= 12**

What is the value of this number?

$$1 0 0 1 + 0 1 0 1 = 1 4$$

Sorting Data

Volunteers: How quickly can we arrange ourselves in order from 1 to 8?

Can computers sort data in the same way?

Is there only one way of sorting data?

6 5 3 1 8 7 2 4

Who can sort the numbers themselves?

Volunteer: We need to sort these numbers, can you explain step-by-step how you would sort the numbers into their correct order?

6   5   3   1   8   7   2   4

Insertion Sort

How to use insertion Sort:

Take a number out, and place in the correct position in the numbers before it. Repeat for all numbers.

6   5   3   1   8   7   2   4

Bubble Sort

How to Bubble Sort:

From left to right, compare two numbers, swap if needed. Repeat until all numbers in correct order.

6 5 3 1 8 7 2 4

Merge Sort

Similar to Bubble Sort but sort into two separate "arrays" and then compare the numbers in both.
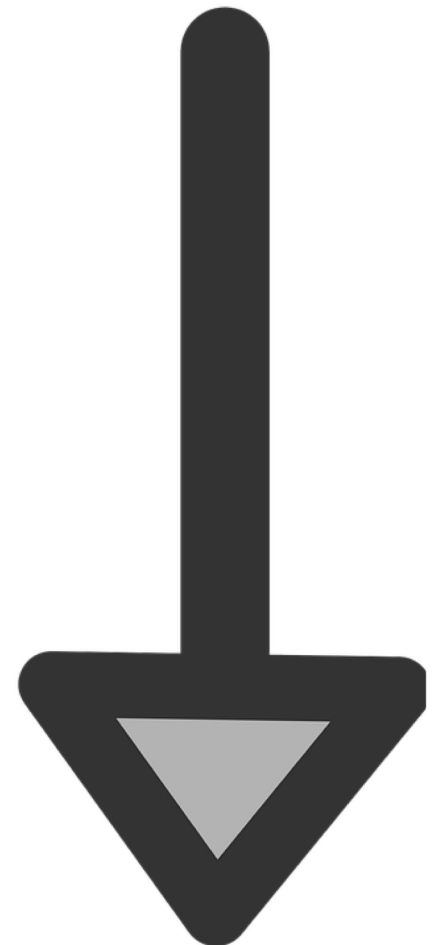
6 5 3 1 8 7 2 4

How do we decide which is the best?

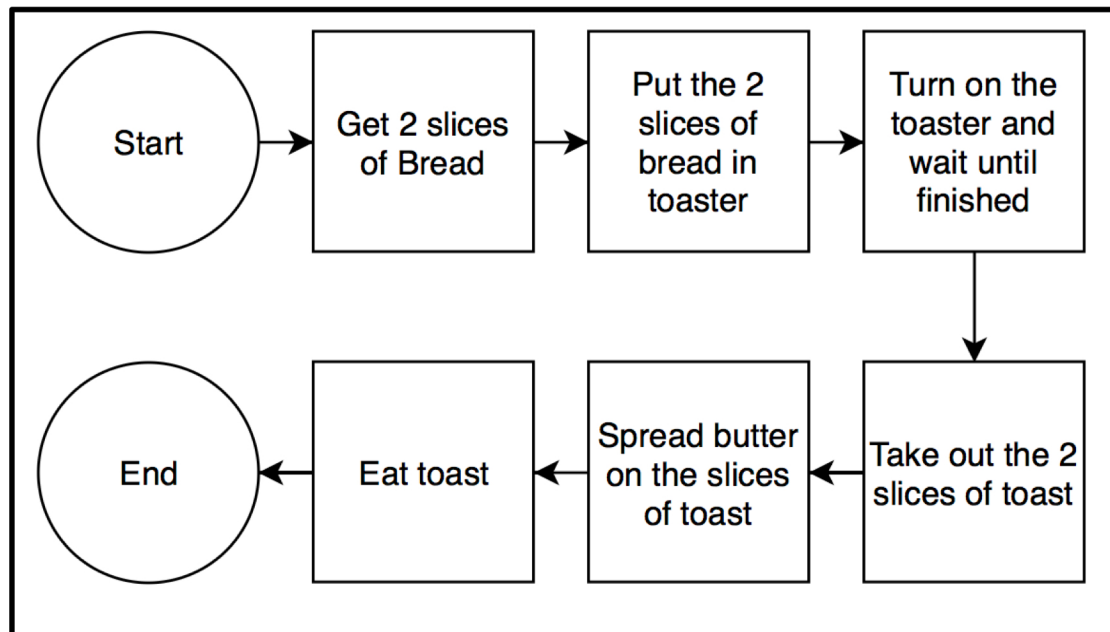What do we care about most when we want our computer to sort something?

Programming

What is programming?

Algorithms

An Algorithm is a set of simple instructions that are done in a certain order to solve a problem.

Here's an example: Making and eating Toast

Challenge: Instructions for drawing

You are not allowed to ask any questions.

Follow the instructions and let's see how we all do!

Who or what else do you think may have the same issues?

Solving Problems

What instructions would you give to the arrow to reach the treasure? (Avoid the skulls!)
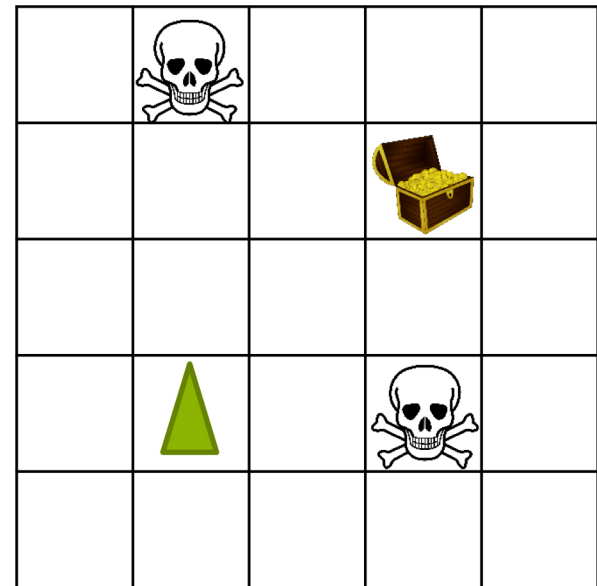
Instructions:

Move forward

Turn Right

Turn Left

Is there more than one solution?

How can you decide which one is best?

Guide the Cat Game

If I was a robot, how would you instruct me to ...

Walk Forward

Find the nearest wall

Move in a square

Guide the Teacher

Creating our own Instructions

In groups we're going to form our own instructions and we'll see who can guide the teachers the fastest through the room.

Using your own key words and giving the teachers the instructions for the words, guide them around the room.
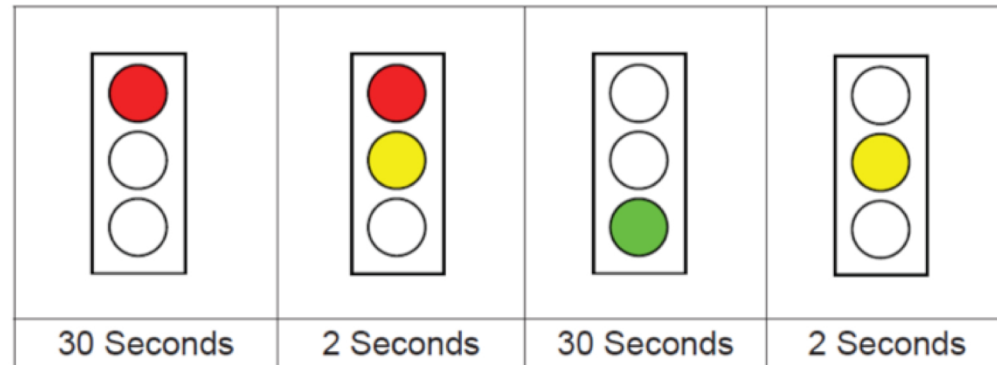
Example:

Banana = Move Forward

Pear = Stop Moving

Apple = Turn left 90 degrees

Orange = Turn right 90 degrees

# Repetition (Looping)

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- Some processes include steps or a series of steps that are repeated.
- Example: Simple Traffic Lights

- What instructions would you use for this process?
- What needs to be repeated?
- How could you show that in a flowchart?
- Does this process ever end?

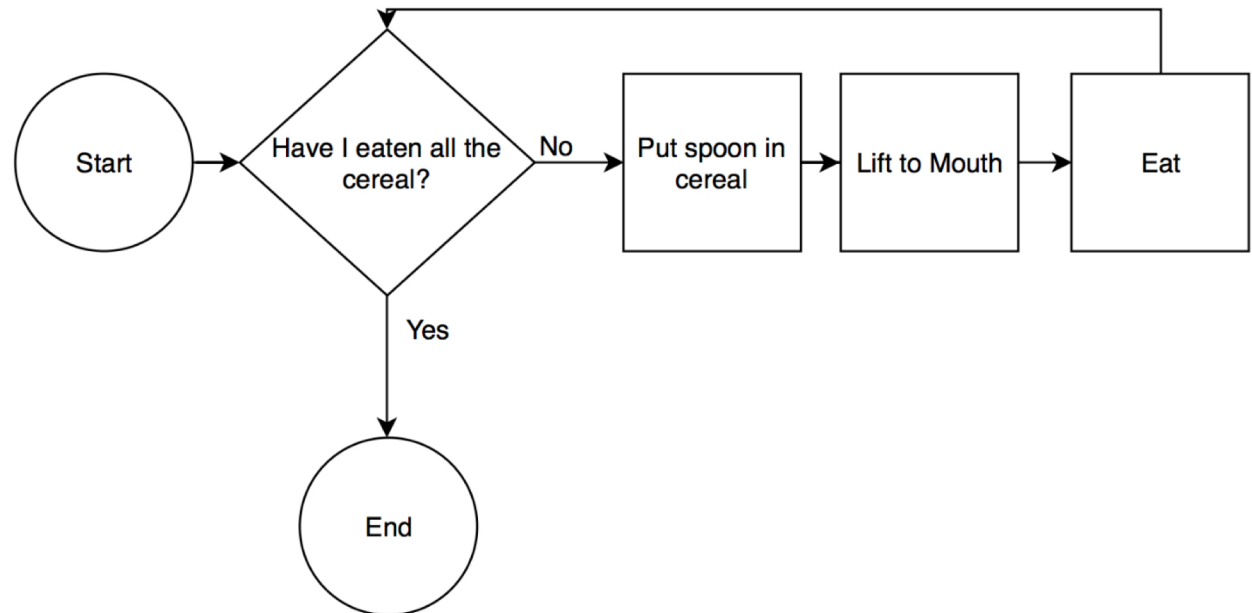| 30 Seconds | 2 Seconds | 30 Seconds | 2 Seconds |

Conditionals

- Conditionals are used to make decisions in processes. Depending on if a certain condition is true or false, the next step in the process will be different.
- Example: Waking up in the morning
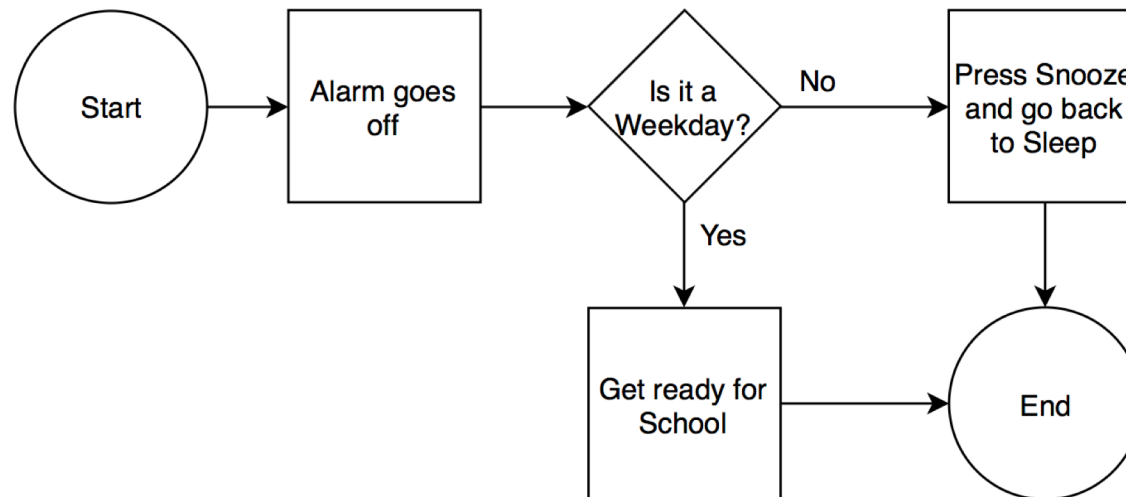
Conditionals + Loops

- We can use conditions in processes to decide when certain steps should stop repeating.
- Example: Eating Cereal

- What decides if the loop stops?