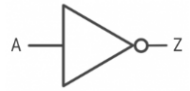
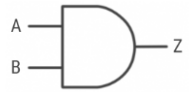
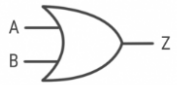
Year 9 - Half-Term 5 – Advanced Binary - Knowledge Organiser

Lesson 1: Boolean & Logic Gates

Boolean means a result that can only have one of two possible values: true or false. Boolean logic takes two statements or expressions and applies a logical operator to generate a Boolean value that can be either true or false.

In binary, 1 represents true and 0 represents false, computers can only process information as 1's and 0's as they use the base 2 number system

Name	Symbol	Explanation
NOT		Inverses the current output, therefore positive (1 or ON) becomes negative (0 or OFF), whilst negative (0 or OFF) would become positive (1 or ON).
AND		Both inputs have to be positive (1) before the output is also positive (1).
OR		At least one input has to be positive (1) to give a positive output (1 or ON). Both inputs could also be positive.

Lesson 2: Binary Conversion

Binary Conversion: to be able to convert from binary to decimal to see what the binary number represents.

16	8	4	2	1
1	0	1	0	1

Sum: 16 + 4 + 1 = 21

Lesson 3: Binary De-conversion

Binary De-conversion: to be able to convert from a decimal number to a binary number to see what the binary number represents.

23

16	8	4	2	1
1	0	1	1	1

Sum: 16 + 4 + 2 + 1 = 23

Lesson 4: Binary Addition

Binary Addition: Adding two binary numbers together using the following rules:

0 + 0 = 0 1 + 0 = 1 1 + 1 = 10 1 + 1 + 1 = 11

	32	16	8	4	2	1	
	1				1		Carried Number
+		1	1	0	0	1	Binary Number 1
		1	0	0	0	1	Binary Number 2
	1	0	1	0	1	0	Answer

Lesson 5: Binary Shifting

Binary numbers are multiplied and divided through **binary shifting**. Completing a binary shift gives us a very quick way of performing calculations with binary numbers. To multiply a number, a binary shift moves all the digits in the binary number along to the left and fills the gaps after the shift with 0. to multiply by two, all digits shift **one place** to the left

To divide a number, a binary shift moves all the digits in the binary number along to the right and fills the gaps before the shift with 0. to divide by two, all digits shift **one place** to the right

Lesson 6: Gaming Addiction Prevention

1. **Set time limits for gameplay**. Experts on children's health agree that school-aged children should not spend more than two hours each day in front of any screen. Between online streaming, mobile phone usage, homework, and gaming, time can add up quickly. Start by limiting play to no more than 1 hour each day.
2. **Remove gaming devices from your bedroom**. Having gaming devices in the bedroom makes it too easy to play whenever you feel like it. In addition, playing before bedtime can result in poor-quality sleep. Keeping the bedroom screen-free will help you control your gaming time and help ensure you feel rested and energised.
3. **Engage in other stress-relieving activities**. Gaming relieves stress for many people. Developing other coping strategies will make it easier to limit game time, for example exercising, playing sports or reading.

Year 9 - Half-Term 6 – Python: Fractal Art- Knowledge Organiser

Lesson 1: Sequence

Python: a type of high-level programming language which is defined as any programming language that enables the development of a program in a much more user-friendly programming context.

Hashtags: used in Python to assign comments, these comments do not appear when the code runs.

There are 3 main pillars of computing which are all used in Python code:

- **Sequence**
- **Selection**
- **Iteration**

Sequence: a set of instructions and statements written in order, performed by a computer, one after another

Algorithm: a step-by-step solution to a problem, or the rules to follow to solve the problem

```
#Sequence - Square
from turtle import *
forward (100)
left (90)
forward (100)
left (90)
forward (100)
left (90)
forward (100)
```

Lesson 2: Count-Controlled Iteration

Iteration: the repetition or loops of steps in a piece of code. **Count-controlled** iteration: also referred to as a FOR loop. This is used when a programmer sets the number of times a code will repeat for, they have counted the number of times the code will loop.

```
#Count-Controlled - Square
from turtle import *
for i in range (4):
    forward (100)
    left (90)
```

Lesson 3: Condition-Controlled Iteration

Condition-controlled iteration: a piece of code that repeats until a condition has been met.

```
#Condition-Controlled Shape
from turtle import *
i = 100
while i > 0:
    left(i)
    forward(i)
```

Lesson 4: Nested Iteration

Nested loop: a loop within a loop. Nested loop utilise count-controlled, the inner loop is run a set number of times, which is set within the outer loop which also runs a set number of times

```
#Nested Loops
from turtle import *
for i in range (6):
    for j in range (3):
        forward (100)
        left (120)
    left (60)
```

Lesson 5: Speed & Colour

Speed: speed (100)

Colour: color (‘blue;)

Background colour: bgcolor (‘yellow’)

```
speed (100)
color ('blue')
bgcolor ('yellow')
```

Lesson 6: Impact of Filters & Editing Tools

- They can affect young people's self-esteem and body image.
- Young people may feel pressure to post certain images to ‘fit in’.
- Young people may feel disappointment or embarrassment if they don’t get enough ‘likes’ or comments.
- Seeing a friend, influencer or celebrity posting an edited image or video online can put pressure on them to post certain types of images.