Reference to Robbot Resources

Year 8 Computer Science – Data Representation

Test Yourself

What is Binary?

Binary is a number system that only uses 2 digits: 1 and 0. All information that is processed by a computer is in the form of a sequence of 1's and 0's. Any information we want the computer to process needs to be converted to binary for the computer to understand it.

Binary Number System: is the number system which computers use. It represents the electrical current running through the computer as being ON (1) or OFF (0). The binary system is known as the base 2 system.

Base 10 Number Systems

Denary/Decimal Number System: uses the digits 0-9 (10 digits, hence the name). Each digit is given a value based on where it is placed in a number. For example in the number 458, the digit 5 represents 5 tens. This is also known as base 10.

Key Terms

Memory	Number of bytes
Bit	1/8 byte
Nibble	1/2 byte
Byte	1 byte
Kilobyte	1000 bytes
Megabyte	1000 000 bytes
Gigabyte	1 000 000 000 bytes
Terabyte	1 000 000 000 000 bytes

Using the ASCII Table

1. Find the character you need.
2. Locate the first half of the binary number using the top column
3. Add the second half of the binary number using the start of the row your character is in
4. Join them together to get your binary number. **A = 100 0001**

ASCII

ASCII stands **for American Standard Code for Information Interchange**. ASCII uses 7 bit binary numbers which means it can create up to 128 different characters.

First half

Second half	000	001	010	011	100	101	110	111
0000	NULL	DLE		0	@	P	`	p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	"	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EDT	DC4	$	4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	'	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[	k	{
1100	FF	FS	,	<	L	\	l	|
1101	CR	GS	-	=	M	]	m	}
1110	SO	RS	.	>	N	^	n	~
1111	SI	US	/	?	O	_	o	DEL

Convert 8 bit Binary to Denary

Example: Convert the binary number 01000110 into denary.

Step 1: Create a binary table

128	64	32	16	8	4	2	1	Ans

Step 2: Add the binary number (Always work from right to left)

128	64	32	16	8	4	2	1	Ans
0	1	0	0	0	1	1	0	

Step 3: Add up all the numbers with a 1 underneath them to get your answer

128	64	32	16	8	4	2	1	Ans
0	1	0	0	0	1	1	0	70

Convert Denary to 8 bit Binary

Example: Convert the denary number 45 into binary

Step 1: Create a binary table

128	64	32	16	8	4	2	1	Ans
								45

Step 2: Place a 1 under each number you use to make up 45

128	64	32	16	8	4	2	1	Ans
		1		1	1		1	45

Step 3: Add a 0 to the left over columns

128	64	32	16	8	4	2	1	Ans
0	0	1	0	1	1	0	0	45

Year 8 Computer Science – Micro:bit (Pro)

Test Yourself

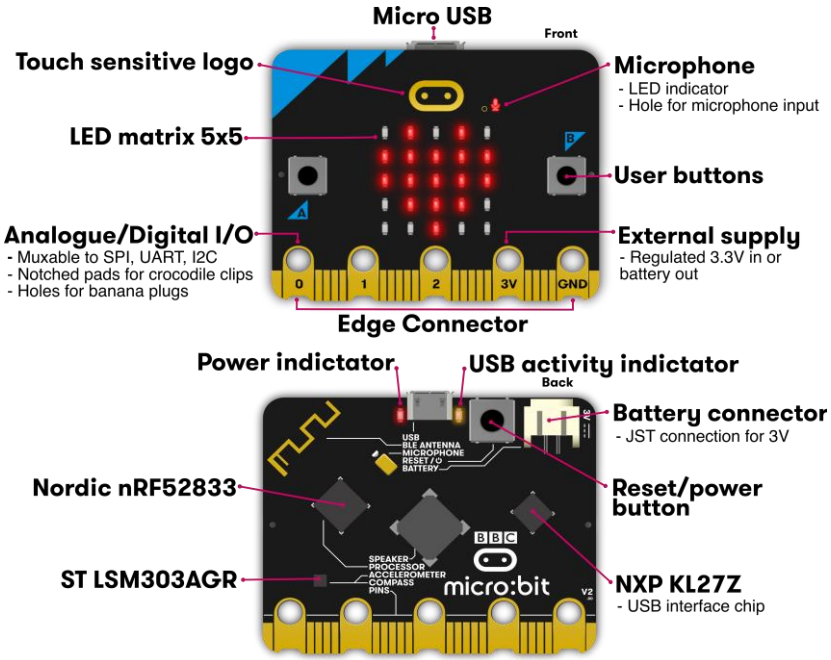
Keywords

Keyword	Definition
Algorithm	Step by step instructions to solve a given problem
Pattern Recognition	Looking for similarities or characteristics that can help solve the problem
Decomposition	Breaking the problem down into smaller problems to solve
Abstraction	Removing aspects that are not required to solve the problem
Selection	A choice built into the program to determine the next section of code to execute based on the output to a set condition
Sequence	The order the program code must be in to work correctly
Repetition	A loop of a set section of the program code
Variable	A single temporary storage location within the program code that can be changed or edited
Function	A set of instructions that are given a name and only when this name is called in the main program, is it executed

Micro:bit Hardware

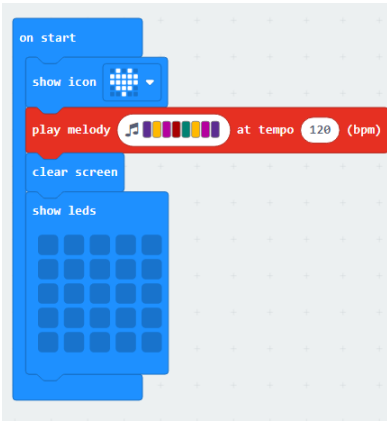
Definition: The micro:bit is a tiny computer.

You can write programs for the micro:bit on your computer and then transfer them to the micro:bit to be run.



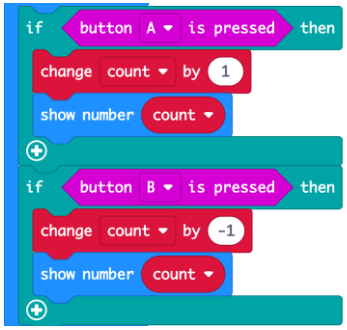
Sequence

A program which is executed line by line



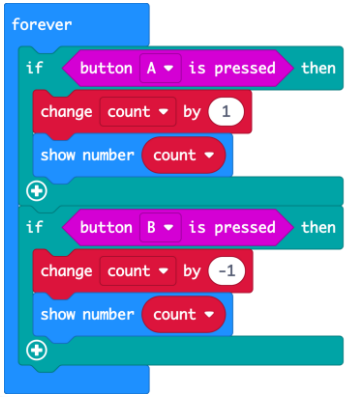
Selection

A program which makes a choice or decision – sometimes there may be more than one.



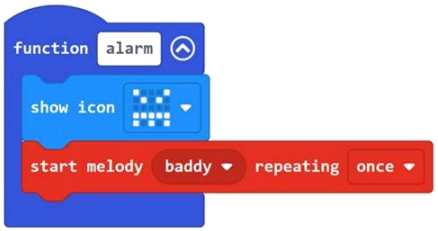
Iteration

A program which repeats a number of times or until a condition is met



Functions

A function is a piece of code that is created with a name and you can call this function anywhere else by using its name.



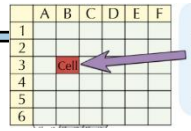
Year 8 Computer Science – Spreadsheets

Reference to CGP Revision Books

Test Yourself

Spreadsheet Basics

A spreadsheet is a program that can display and process data is a structured way. You can record data, search and sort, perform calculations and functions and create graphs and charts. A spreadsheet is made up of rows (numbers) and columns (letters).



The red cell is in Column B and Row 3 — so its cell reference is B3.

Formatting

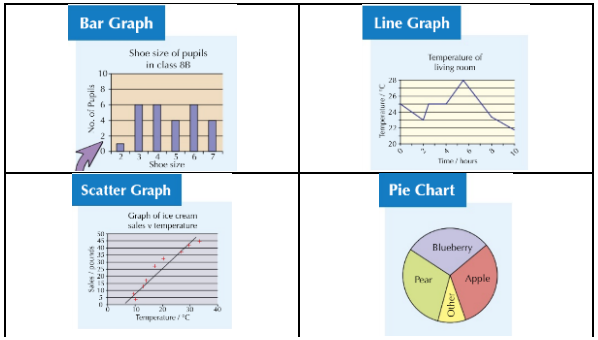
Data in a spreadsheet can be formatted in the same way any other Office product by used fill, bold, italic, text alignment, and borders. These formatting techniques are unique to spreadsheets:

Technique	Use
Conditional formatting	The format of the cells changes when a certain condition is met – e.g. Pass or Fail
Merge & centre	Two or more cells can become one. This is useful for headings or labels
Text wrap	Let's you display text over a number of lines so the text does not run over into another cell

Charts

How to create a chart:

1. Highlight the data you want to use
2. Select the chart type you want from the Insert tab
3. Choose a meaningful title and axis labels



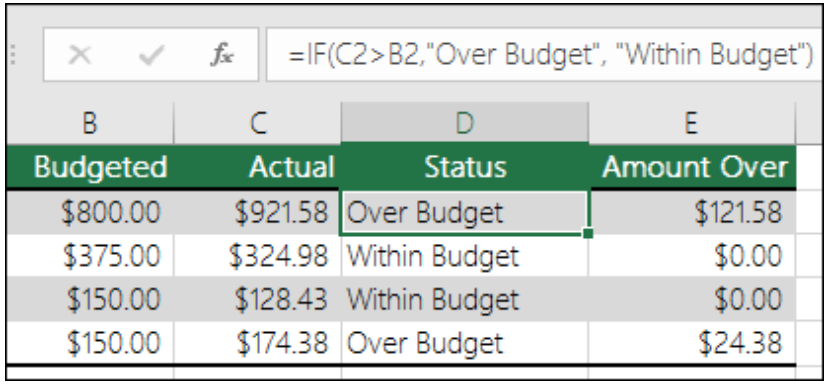
Functions and Formula

A formula is an instruction given to the computer to help it process data held in specific cells.

Function	Use	Example
SUM	Adds up numbers in a cell range	=SUM(C3:C5)
AVERAGE	Finds the average of a set of numbers	=AVERAGE (C3:C5)
MIN	Finds the smallest of a set of numbers	=MIN (C3:C5)
MAX	Finds the largest of a set of numbers	=MAX (C3:C5)

IF Statements

An IF statement is used to check if the data matches a certain condition. They can be simple, like the one below, or more complicated with lots of different data matches.



B	C	D	E
Budgeted	Actual	Status	Amount Over
$800.00	$921.58	Over Budget	$121.58
$375.00	$324.98	Within Budget	$0.00
$150.00	$128.43	Within Budget	$0.00
$150.00	$174.38	Over Budget	$24.38

IF

VLOOKUPS

VLOOKUP

A VLOOKUP function displays data from a table in another part of a spreadsheet

	A	B	C	D	E
1	ID	Last name	First name	Title	Birth date
2	101	Davis	Sara	Sales Rep	12/08/68
3	102	Fontana	Olivier	VP (Sales)	02/19/52
4	103	Leal	Karina	Sales Rep	08/30/63
5	104	Patten	Michael	Sales Rep	09/19/58
6	105	Burke	Brian	Sales Manager	03/04/55
7	106	Sousa	Luis	Sales Rep	07/02/63
8					
9					
10	Formula	=VLOOKUP(B3,B2:E7,2,FALSE)			
11	Result	Olivier			
12					

VLOOKUP looks for *Fontana* in the first column (column B) in table_array B2:E7, and returns *Olivier* from the second column (column C) of the table_array. FALSE returns an exact match.