

Different types of data require different amounts of memory to store them. For instance, a number may be stored as 1 byte and just store whole numbers. A single character will only require 1 byte, but a string of 5 characters will need 5 bytes. The different types of data that can be stored are known as **data types**.

When **variables** or **constants** are created the computer needs to know what data types each of them are. Programming languages like C/C++/Java/C# expect the programmer to state which data type each variable will hold. Other languages like Python will assume what data type they should be using by the first value which is assigned to a variable or constant.

The following are data types that you can use.

Data type	Explanation	Example values
Integer	An integer will store a whole number . Some languages let you even specify how many bytes will be taken up by the integer and therefore how big the numbers that it stores can be.	0 51 29385 -812
Real / Floating point	A real or floating point number is one that have a fractional component . It would be used to store the height of a student or the price of something in pounds and pence.	145.28 5.0 0.29300 -4.23
Boolean	A boolean is a data type that stores two options that are either True or False , or in some languages 1 or 0.	True False
Character	A character is one single letter , number etc. It is important to remember that space is also a character. Single quotes normally tell a programming language that something is a character.	'b' 'A' '8' ' ' '£'
String	A string is a sequence of characters that are all stored together. It has a variable length and used to store text. Most languages have double quote marks around strings.	"Hello world!" "Sam" "This is text." "4\$3f\$sdj"

Most modern languages won't allow you to store the wrong data type in a variable. For instance, if you create a variable to store a Boolean and then try to put an integer in it then you will get a **type mismatch error**. E.g.

```
playAgain = True
playAgain = 0
```

This line of code would cause an error as playAgain would have been created as a Boolean and you are now trying to store an integer in it.

1. Match the data types on the left to the example values on the right.

Character	43.987
String	'b'
Boolean	-2189
Real	"Tree"
Integer	False

[5]

2. For each of the situations on the left, tick whether you would store them in a variable or constant. Tick once per row.

Explanation and value	Constant	Variable
Used to store a score in a game		
Used to store the value of π (3.14159)		
The strength of an enemy character which changes as they are hurt		
The value of gravity (which is always 9.8)		

[4]

3. What is another name for a real number?

[1]

4. In a programming language you try to compile the following program that will initialise and then change a password:

```
username = "peterm"
password = "3845"
password = 8392
```

The compiler fails to compile giving you a syntax error.

- a) What is the = operator called in each line of code? [1]
- b) What data type is the username in? [1]
- c) What data type is the password originally in? [1]
- d) What error will the compiler give? [1]
- e) Rewrite the last line of code so that it will compile. [1]

5. Match the following values on the left to their data types on the right.

0.0	Integer
0	String
' '	Real
" "	Character

6. Which data type only stores two possible values? [4]

[1]



- Fill a glass half full with water and place a spoon in it.
- Turn the glass around until you have a good view of the distorted spoon.
- Draw the glass, spoon and water in as much detail as you can in the box below.
- Try to include all of the reflections, effects of light and different tones that you see.

