

Data types and storage



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1. Data types

Reminder

Integer numbers with no decimal or fractional parts

Floating point numbers that can contain a decimal or fractional part

Boolean can take two possible values such as true/false or yes/no

Date/time the number of days or seconds passed since the 'epoch' date

Character a single text character which can be a letter, number or symbol

Section 1.1

1) State the data type for each of these examples.

Example	Data type
Number of people at a football match	
Length of the Queensferry crossing (2.7km)	
£	
Are the tickets sold out for a concert? Yes/No	
Your birthday	
@	
Distance in miles (168.9miles) between Inverness and Glasgow	

Section 1.2

2) State the data type and explain the reason behind your choice.

Example	Data type	Reason
Number of 'likes' on a Facebook post		
Weight of bag of flour		
\$		
Whether someone voted in an election? Yes/No		
Date of a lesson (DD/MM/YYYY)		
&		
Average depth (95.0m) of the North Sea		

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Section 1.3

3) What is meant by the 'epoch' date?

4) Fill in the missing values in this table

Reminder: the stored value is the number of days between the 'epoch' date and the displayed date

Software	Epoch date	Stored value	Displayed date
Excel	01/01/1900	44000	19 Jun 2020
Python	01/01/1970	15	16 Jan 1970
Excel		25569	01 Jan 1970
Excel	01/01/1900	10	
Python	01/01/1970	10	
Excel	01/01/1900		01 Jan 1900
Python	01/01/1970		15 Feb 1970

2. Data structures

Reminder

String collection of characters combined to create alphanumeric text

Array structure of a fixed size which can hold items of the same data type

Dataset a two-dimensional structure that has rows and columns

Section 2.1

- 1) State the most appropriate data structures these examples could be stored in.

Example	Data type
Your name	
Table, 2 rows by 3 columns containing only integers	
To do list	
Name and address for your customers	
Time taken to run a race with the name of the runner and age	
Flight number (e.g. BA1254)	

Section 2.2

- 2) Turn this article into a dataset with the following column names, 'name', 'distance_km', 'finish_position', 'time_to_finish', 'personal_best'

"On Sunday 12th July, 5 competitors ran in the local fun run. The winner 'J. King' finished the 5K course in 15mins 10secs. 4 of the competitors finished the course however 'L. Smith' had to drop out after 3.5 kilometres. The other 3 runners achieved personal bests, R. Gate 16mins 45secs, W. Henry 17mins 1sec, B. Perkins 18mins 49secs."

name	distance_km	finish_position	time_to_finish	personal_best

2. Data structures

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String collection of characters combined to create alphanumeric text

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- 3) Turn this article into a dataset with the following column names, 'tree_name', 'tree_type' and 'height_m'.

"Within the grounds of the house there are a mixture of trees. They are 2 broadleaf trees (oak and silver birch) and a coniferous tree (scots pine). The scots pine is 36.5m tall, the oak is 30.0m and the silver birch is 24.0m."

tree_name	tree_type	height_m

What type of data are in these columns?

tree_name

tree_type

height_m

Section 2.3

- 4) What data structure is this data in? Explain why.

3	3	54
4	15	
5		14
4	4	
4	100	45
5	5	4

2. Data structures

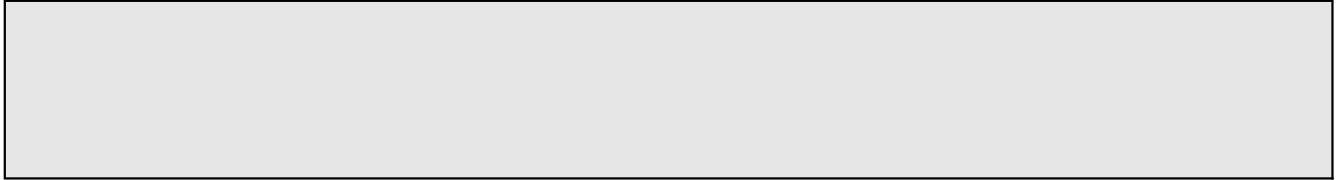
Reminder

String collection of characters combined to create alphanumeric text

Array structure of a fixed size which can hold items of the same data type

Dataset a two-dimensional structure that has rows and columns

-
- 5) What are the benefits in terms of flexibility, if you choose a dataset rather than an array when storing data?



3. Extension

This extension section will cover,

Data types
Display formats
Data Structure
File formats

Section 3.1

You are planning a group outing to the beach and you are asking people for **ideas on where and when** to go.



- 1) Give an example of how you could collect this data in unstructured and structured way.

Structured	Unstructured

- 2) Can you think of some pros/cons of collecting data in a structured way?

Pros	Cons

- 3) Imagine you are setting up a structured way of holding the ideas. What type of data structure would you use and why?

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3. Extension

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- 4) You decide to conduct a survey to capture everyone's ideas for the beach trip. Design a question that you could ask for each of these data types, then decide on the best display format.

Data type	Question	Display format
Floating point		
Boolean		
Date/time		

- 5) What file format would you hold this data in?

- 6) Can you list 5 data items you might want to collect as part of organising this trip? Then state the data type and the display format you would like to see the data in.

Data item	Data type	Display format
Number of people coming	Integer	Integer