

GCSE OCR

Computer Science
J277

6

Records and files

Unit 7 Programming



PG ONLINE

Objectives

- Understand and use basic file handling operations:
 - open
 - read
 - write
 - close
- Read from and write to a text file

Starter

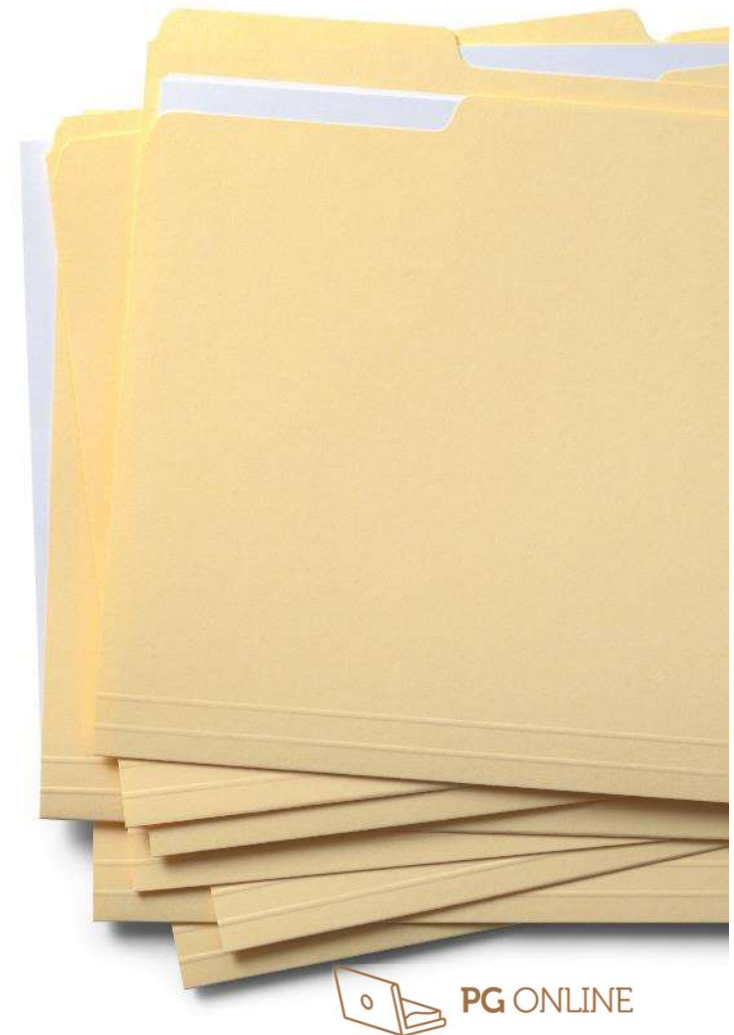
- In a programming language, when we read from, or write to a file what three steps always need to be taken?



Starter

Answers

- Reading from and writing to files requires the following steps:
 - Open the file
 - Read from, or write to, the file
 - Close the file
- If the file doesn't yet exist it will need to be created first



Data structures

- A data structure is a collection of elementary data types such as integer, real, Boolean, char or string
- The last lesson described the **array** data structure
 - An array can only hold items of an identical type – all integers, all strings, and so on

The record data structure

- A **record** is a data structure consisting of a number of fields which can all be of different types
- We can define what the structure looks like and then define variables with this structure

Record data structure

- A record declaration in a language such as Pascal or Delphi looks like this:

```
type filmType = record
    filmID      :string[8]
    title       :string[30]
    yearReleased :integer
end;
var
    film: filmType
```

- A **field** is a single item of data in a record
- This record has fields filmID, title and yearReleased

Records in a database

- Records can also be held in tables in a database
 - This example shows three records

FilmID	Title	YearReleased
F365	The Legend of Tarzan	2016
F380	The Magnificent Seven	2016
F250	Paddington	2015

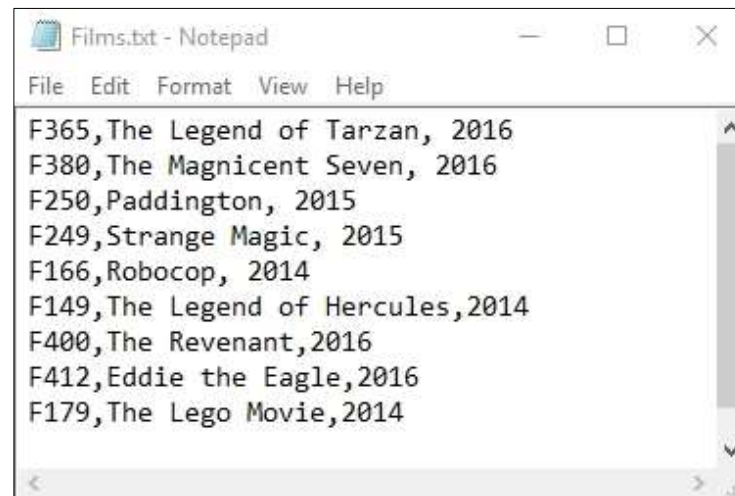
Text files

- A **file** is able to store a collection of **records**
 - With **text files**, the only data type is “string”
- A file may have several text fields, typically separated by commas
 - Each record is placed on a new line
 - F365, The Legend of Tarzan, 2016
 - F380, The Magnificent Seven, 2016
 - F250, Paddington, 2015
- This is known as a **CSV** (comma-separated values) file



Creating a CSV file

- You can create, read and print a CSV file with any text editor
 - Here is one created in Notepad:

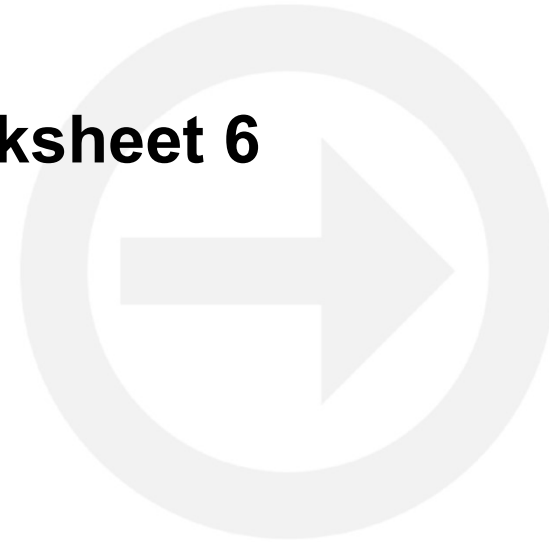


```
Films.txt - Notepad
File Edit Format View Help
F365,The Legend of Tarzan, 2016
F380,The Magnificent Seven, 2016
F250,Paddington, 2015
F249,Strange Magic, 2015
F166,Robocop, 2014
F149,The Legend of Hercules,2014
F400,The Revenant,2016
F412,Eddie the Eagle,2016
F179,The Lego Movie,2014
```

- This could also be saved as Films.csv and opened with either a text editor or spreadsheet

Worksheet 6

- Now complete **Task 1** on **Worksheet 6**



Creating a file

- To create a new file use the code:

```
names = newFile("names.txt")
```

- `newFile("names.txt")` creates a new file with the filename "names.txt"
 - The variable `names` now refers to this created file



Opening a file

- Programming languages have different syntax for writing to and reading from a file
- Typically, a statement to **open the file** will be required
- There are three modes that files can be opened in:
 - Write mode – allows writing to a file
 - Append mode – allows more data to be added to a file
 - Read mode – only allows the file to be read
- The **actual file name** and **path** needs to be assigned to the identifier used for the file in the program



Reading from a text file

- Reading from a text file involves opening the file, processing each line then closing the file

```
marksFile = open("marks.txt")  
while NOT markFile.endOfFile()  
    line = marksFile.readLine()  
    print(line)  
endwhile  
close marksFile
```

Open "marks.txt"

Loop until end of file

Read one line and store in variable *line*

Close "marks.txt"

- How do you think we can write to a file?

Writing data to a text file

- Here is an algorithm which writes to a text file:

```
marksFile = open("marks.txt")  
name = input("Input student name: ")  
mark = input("Input student mark: ")  
marksFile.writeLine(name + "," + mark + "\n")  
close marksFile
```

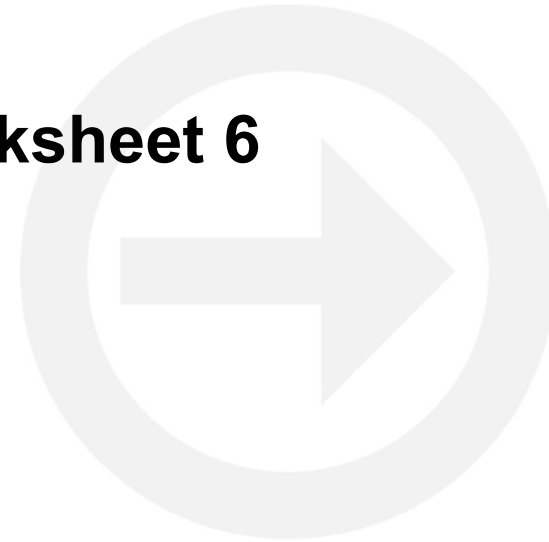
- If the user's name is "Sandra" and their mark is 85 the following will be added to the file:

Sandra, 85

- "\n" is the newline character indicating the end of this record

Worksheet 6

- Now complete **Task 2** on **Worksheet 6**



Plenary

- With a partner, answer the following questions:
 - What are the three steps required to read from, or write to, a file?
 - What file format can be used to save records in a text file?
 - Explain how this file format works



Plenary

Answers

- What are the three steps required to read from, or write to, a file?
 - Open, Read/Write, Close
- What file format can be used to save records in a text file?
 - CSV
- Explain how this file format works
 - Each record is on a new line
 - Each field is separated by a comma



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