Higher
Coursework
Assessment Task

SQA

Higher Computing Science
Assignment
Assessment task
Task 1: software design and development (part B)

This document provides information for teachers and lecturers about the coursework component of this course in terms of the skills, knowledge and understanding that are assessed. It must be read in conjunction with the course specification.

Valid for session 2022-23 only.

This assessment is given to centres in strictest confidence. You must keep it in a secure place until it is used.

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Task 1: software design and development

Problem description

The manager of a theme park would like a program to provide him with data on the park's 26 attractions.

Purpose

The program is required to read the attraction data from a CSV file into parallel arrays. The file contains the attraction name, category of attraction, total number of visitors, number of days open and the height restriction.

The program will find the names of the least visited attraction(s) and the most visited attraction(s).

Attractions in the category 'Roller Coaster' are serviced every 90 days. The program is required to calculate the number of days until the next service. It will use this information to produce an output that identifies all roller coasters that need to be serviced within the next 7 days.

Assumptions

♦ the CSV data file is formatted correctly, is error-free and is updated every day

An example of the data in the file is shown below:

```
Aftershock,Roller Coaster,510324,695,1.2m
Aqua Loop,Water,157288,542,0.9m
Asteroid Belt,Roller Coaster,551218,623,1.4m
Attack of the Smartphones,Simulation,548630,663,1.0m
Beaver Falls,Water,95970,695,1.2m
Bug Blaster,Simulation,293033,542,0.9m
Bumblebee Flyer,Kids,104010,715,0.9m
Candyfloss Carousel,Kids,95970,663,0.9m
...
```

Task 1: software design and development (part B)

Your teacher or lecturer will provide you with a file called 'attractions.csv'.

The design for the program is shown below.

1	Read data from file into parallel arrays	OUT	attraction(), category(), visitors(), daysOpen(), height()
2	Find and display the names of the least visited and most visited attractions	IN	attraction(), visitors()
3	Write to file the names of roller coasters that need a service within 7 days	IN	attraction(), category(), daysOpen()

Refinements

3.1   Create 'service.csv' file
3.2   Loop for each attraction
3.3   If current category is 'Roller Coaster' then
3.4   Set days to current daysOpen modulus 90
3.5   If (90 – days) is less than or equal to 7 then
3.6   Write current attraction to file
3.7   End if
3.8   End if
3.9   End loop
3.10 Close 'service.csv' file

1c(i) Using the problem description and design, implement the program in a language of your choice.

Your program should:

♦ read data from the 'attractions.csv' file and store into parallel arrays
♦ find and display the name(s) of the:
   — least visited attraction(s)
   — most visited attraction(s)
♦ write the names of roller coasters that require a service within 7 days to 'service.csv'
♦ be maintainable and modular

(12 marks)

1c(ii) The theme park's manager wants an update on attractions with a height restriction of 1.0m and above. Height restrictions range from 0.9m to 1.4m.

Implement a new sub-program to count and display the number of attractions with a height restriction beginning with the character '1'.

(3 marks)

Print evidence of:

♦ your program code
♦ program outputs from 1c(i) and 1c(ii)
♦ the 'service.csv' file

1d The sub-program 'Write to file the names of roller coasters that need a service within 7 days' is tested using the sample data below.

```
Aftershock,Roller Coaster,510324,695,1.2m
Aqua Loop,Water,57288,542,0.9m
Asteroid Belt,Roller Coaster,551218,623,1.4m
```

Complete the trace table below to show the values up to the end of the third iteration.

(3 marks)

	If current category is 'Roller Coaster'	days	If (90 – days) is less than or equal to 7
1st iteration			
2nd iteration			
3rd iteration			

Candidate name_____ Candidate number_____

1e A new attraction is added to the theme park and the CSV file now has data for 27 attractions.

Evaluate the maintainability of your first sub-program 'Read data from file into parallel arrays', with reference to data structures and loops, based on this change.

(2 marks)

Candidate name_____ Candidate number_____