MODULE R EXAM TECHNIQUE · R6

The 15-mark scenario question (0478 Paper 2)

Original practice questions · 21 marks · ~25 minutes · Cambridge 0478 syllabus Paper 2 scenario question, 7.4, 7.5, 7.8, 7.9, 8.1, 8.2

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **21 marks**. Questions 1 and 2 are about the scenario in the box below. Read it carefully before you start: Question 3 asks you to write the full program. In the exam, allow about 30 minutes for the 15-mark question; aim to spend about 20 minutes on Question 3 here.

Scenario: a city cycle-hire scheme

A city cycle-hire scheme has 12 docking stations. Data about the number of bikes hired from each station is recorded for one week (7 days).

The one-dimensional (1D) array `StationName[]` already stores the name of each of the 12 stations.

The two-dimensional (2D) array `Hires[]` is used to store the number of bikes hired from each station on each day. The position of each station's data in `Hires[]` is the same as its position in `StationName[]`. For example, `Hires[1, 1]` stores the number of bikes hired from the station in `StationName[1]` on day 1.

The 1D array `StationTotal[]` is used to store the total number of bikes hired from each station in the week.

The program must:

- **R1** allow the number of bikes hired from each station on each day to be input and stored in `Hires[]`, validating each number on entry: it must be from 0 to 300 inclusive
- **R2** calculate and store in `StationTotal[]` the total number of bikes hired from each station in the week, and output the name of each station with its total
- **R3** count and output how many stations had **fewer than** 150 bikes hired in the week
- **R4** find the highest weekly total, and output this total together with the name of **every** station that has this total.

1

Total: 4 marks

(a) State what is stored in `Hires[3, 5]` **[1]**

(b) Before writing a program, plan which standard method each requirement needs. Tick (✓) **one** box in each row to show the main standard method needed for each requirement. **[3]**

Requirement	Validation	Totalling	Counting	Finding the maximum
R2 (weekly total for each station)				
R3 (stations with fewer than 150 hires)				
R4 (highest weekly total)				

2 **Total: 2 marks**

A programmer wrote this pseudocode to meet requirement **R1**. It would **not** gain full credit in the 15-mark question.

```
01 FOR Station ← 1 TO 12
02     FOR Day ← 1 TO 7
03         INPUT Hires[Station, Day]
04         IF Hires[Station, Day] < 0 OR Hires[Station, Day] > 300
05           THEN
06             OUTPUT "Error"
07             INPUT Hires[Station, Day]
08         ENDIF
09     NEXT Day
10 NEXT Station
```

Identify **two** different problems with this pseudocode and describe how to correct each problem. **[2]**

Problem 1

Correction

Problem 2

Correction

3 **Total: 15 marks**

Write a program for the cycle-hire scheme in the box at the start of this worksheet that meets requirements **R1**, **R2**, **R3** and **R4**.

You must use pseudocode or program code **and** add comments to explain how your code works.
You do **not** need to declare any arrays or variables; you may assume that this has already been done.
You must use the array names given in the scenario.
All inputs and outputs must contain suitable messages.

Write your program here. **[15]**

Before you finish: check each requirement R1 to R4 against your code, and check every input and output has a message.

Total for this worksheet: 21 marks