MODULE O ROBUST PROGRAMS · O2

Input validation

Original practice questions · 21 marks · ~25 minutes · Cambridge 0478 syllabus 7.5(a), 7.7, 7.8, 7.9

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**. Write all algorithms in pseudocode. In all strings on this sheet, the first character is in position 1. All data on this sheet is made up.

1

Total: 2 marks

(a) Explain why a program should carry out validation checks on input data. **[2]**

2

Total: 4 marks

Each pseudocode statement in the table is used in a program to find invalid input data.

(a) Complete the table by writing the name of the validation check that each statement carries out. **[4]**

Pseudocode statement	Validation check
`IF (Height < 50) OR (Height > 250)`	
`IF LENGTH(TownName) > 30`	
`IF Surname = ""`	
`IF SUBSTRING(BatchCode, 3, 1) <> "/"`	

3 **Total: 4 marks**

A ferry company's booking system asks how many passengers are travelling in a vehicle. This algorithm validates the input.

```
01 REPEAT
02     INPUT Passengers
03     IF (Passengers < 1) OR (Passengers > 9)
04       THEN
05         OUTPUT "Error: enter a number from 1 to 9"
06     ENDIF
07 UNTIL (Passengers >= 1) AND (Passengers <= 9)
08 OUTPUT "Booked for ", Passengers, " passengers"
```

(a) Complete the trace table for the algorithm using the input data: 0, 12, 9, 4 **[3]**

You may not need to use all the rows.

Passengers	OUTPUT

(b) A user types the word `three` instead of a number. **[1]**

Identify the type of validation check that should be used to reject this input.

4

Total: 3 marks

A parcel locker asks a courier to enter the surname of the person a parcel is for. A surname must be from 2 to 30 characters long. This algorithm should keep asking until a valid surname is entered.

```
01 REPEAT
02     OUTPUT "Enter the surname"
03     INPUT Surname
04     IF (LENGTH(Surname) < 2) AND (LENGTH(Surname) > 30)
05       THEN
06         OUTPUT "Surname must be 2 to 30 characters"
07     ENDIF
08 UNTIL (LENGTH(Surname) > 2) AND (LENGTH(Surname) <= 30)
09 OUTPUT "Surname saved"
```

(a) There are **two** errors in the algorithm. **[2]**
Identify the line number of each error and suggest a correction for each error.

Line number	Correction

(b) Explain why the algorithm uses a `REPEAT ... UNTIL` loop and not only an `IF` statement. **[1]**

5

Total: 2 marks

A warehouse worker types the 7-digit product code `5018274` as `5081274`. Two of the digits have been swapped.

(a) Identify the validation check that could detect this error. **[1]**

(b) Explain why a length check would **not** detect this error. **[1]**

6 **Total: 6 marks**

An equipment-hire company puts an asset tag on each item it hires out. A valid asset tag:
- is exactly 7 characters long
- has the letter `H` as its first character, for example `H204913`.

(a) Write an algorithm using pseudocode to: **[6]**
- ask the user to enter an asset tag, and input it
- use a length check and a format check to validate the asset tag
- output an error message and make the user enter the asset tag again each time it is invalid
- output `Tag accepted` once a valid asset tag has been entered.

You do not need to declare any variables.

Total for this worksheet: 21 marks