N5 Computing Homework

Software Design & Development

Name:

Grade: /

Data Types and Input Validation 2

Answer the questions below in the spaces provided.

1. Sam is a DJ for KeepItReal Radio. When she creates the playlist for her show, she must ensure that the music lasts at least 45 minutes and no longer than 1 hour 10 minutes.

Sam creates the following program design which takes in the name of each track and it's length then calculates the total time for her chosen music:

```
Line 1    SET total TO 0
Line 2    SET item TO 0
Line 3    REPEAT
Line 4        SET item TO item + 1
Line 5        RECEIVE trackName(item) FROM (STRING) KEYBOARD
Line 6        RECEIVE trackTime(item) FROM (REAL) KEYBOARD
Line 7        SET total TO total + trackTime(item)
Line 8    UNTIL total>=45 AND total<=70
Line 9    SEND total TO DISPLAY
```

a) Identify the *variables*, *data structures* and their *data types* in the above program design. The first one has been done for you. (3)

	Data Structure/Variable	**Data Type**
1.	trackTime array	Real numbers
2.	_____	_____
3.	_____	_____
4.	_____	_____

b) **(i)** The above design was created using *pseudocode*. Name another *design notation* that could have been used instead. (1)

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(ii) Describe **one** advantage of using this *design notation* rather than *pseudocode*. (1)

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1. **c)** Sam's producer tells her that the length of each track should be no shorter than 1 minute and no longer than 4 minutes. The following code shows refinements for step 6.

```
Line 6.1    REPEAT
Line 6.2        RECEIVE trackTime FROM (REAL) KEYBOARD
Line 6.3        IF trackTime < 1 OR trackTime > 4 THEN
Line 6.4            SEND <error message> TO DISPLAY
Line 6.5        END IF
Line 6.6    UNTIL trackTime >= 1 AND trackTime <= 4
```

Using the line numbers above, describe what will happen at each line if Sam enters 0 as an item of *test data* for trackTime. (3)

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d) **(i)** A *test data* table is used to test if the program is validating trackTime successfully.

The above test has been entered into the first line of the table.
Complete the remaining rows: (3)

Test data (trackTime)	Type of test data
0	exceptional
1	
	extreme
	normal

(ii) Explain the purpose of fully testing a program using a variety of *test data*. (1)

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