Software Design & Development: Revision Questions 4

1. A program is used to replace the first space in the name of a school with another character provided using ASCII.

   The user will provide two inputs, the name of a school and the number of ASCII positions to increase the space by (e.g. Belmont Academy could become Belmont-Academy).

   Both inputs are passed to a function that generates and returns the new school name.

```
…
Line 11 FUNCTION replaceSpace(STRING schoolName,

        INTEGER replacementDifference) RETURNS STRING

Line 12 DECLARE newSchool INITIALLY ""
Line 13 DECLARE letterNum INITIALLY 0
Line 14 DECLARE currentLetter INITIALLY ""
Line 15 FOR index FROM 1 TO LEN(schoolName)
Line 16     SET currentLetter TO schoolName[index]
Line 17     SET letterNum TO <ascii value of
            currentLetter>
Line 18     IF letterNum = 32
Line 19         SET letterNum to letterNum +
                replacementDifference
Line 20     END IF
Line 21     SET newSchool TO newSchool & <character
            equivalent of letterNum>
Line 22 END FOR
Line 23 RETURN newMessage
Line 24 END FUNCTION
…
…
Line 52 RECEIVE school FROM STRING KEYBOARD
Line 53 RECEIVE change FROM INTEGER KEYBOARD
Line 54 SET updatedSchool TO replaceSpace(school, change)
Line 55 DISPLAY updatedSchool
…
```

   (a) Identify the actual and formal parameters
   ACTUAL: school, change
   FORMAL: schoolName, replacementDifference

(b) A breakpoint is set at line 22. The function is tested by entering the two inputs shown

> Input 1: Don Academy
> Input 2: 13

Copy and complete the table below to show the values of character and letterCount each time the execution stopped.

Break in Execution	currentLetter	newSchool
First	D	D
Second	o	Do
Third	n	Don
Fourth	<space>	Don-
Fifth	A	Don-A

(c) Using a programming language with which you are familiar, identify the pre-defined functions that could be used in lines 17 and 21.
ASC

(d) Give an example of an execution error that could occur when related to the function inputs. Which line of code would cause the execution error to occur?
The replacement difference could be a number that would result in the new letter exceeding the values of the ASCII table.

2. Other than breakpoints, state three other debugging techniques that can be used to find errors.
Trace Tables, Watch Points, Dry Run

3. A program stores the string "kind positive yourself" in variable called, *wellbeing*. Using a programming language of your choice, write a line of code that will extract the word "positive" from the input string and store it in a variable called, *middle*.

middle = MID(wellbeing, 6, 8)

4. State the output from the following line of code:
SEND 6 mod 4 TO DISPLAY

2 (6 divided by 4 is 1 **remainder 2**)

5. When developing software, explain why the iterative model would be a better choice than agile when the client is based on the other side of the world.

Agile emphasises regular face to face discussion with the client. This would be difficult if the client and developer and in different locations with different time zones.

6. Explain why is it a bad idea to use global variables in a program?

Global variables reduce the modularity of a program and can cause the following problems:

- The same variable names are accidentally used in different modules (sub-programs).

- It may be difficult for more than one programmer to work on the code due to lack of sub-programs

- Variables accidentally updated by a module.