# Homework 3 Iteration

1. The following pseudocode prints out a pattern. In this pseudocode, the statement

 **Write (“\*”)** will print a star without moving to a new line. The statement

 **WriteLine** will move to the start of a new line.

* + - 1. star = 1
			2. While star <5
			3. For n = 1 to star
			4. Write (“\*“)
			5. End for
			6. Writeline
			7. Add 1 to star
			8. Endwhile

(a) Draw in the box beside the code the pattern that this program produces. [3]

(b) Give the line numbers of two lines that represent the programming construct “**Sequence**” \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [1]

(c) Give the line numbers of two lines that represent the start of the programming construct “**Iteration**” \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [1]

(d) Write pseudocode for a program that prints 5 lines in the pattern shown below.

 X

 XXX

 XXXXX

 XXXXXXX

 XXXXXXXXX [3]

2. A floor turtle uses these instructions.

|  |  |
| --- | --- |
| **Instruction** | **Meaning** |
| FORWARD ***d*** | Move ***d*** cm forward |
| BACKWARD ***d*** | Move ***d*** cm backwards |
| LEFT ***t*** | Turn left ***t*** degrees |
| RIGHT ***t*** | Turn right ***t*** degrees |
| REPEAT ***n*** | Repeat the next set of instructions ***n*** times |
| ENDREPEAT | End of REPEAT loop |
| PENUP | Raise the pen |
| PENDOWN | Lower the pen |

 (Each square in the drawing is 10cm by 10cm)

 (a) Complete the set of instructions to draw the shape shown below in bold lines, starting at the point shown. [6]

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Start

End

 PENDOWN

 FORWARD 20

3. Write a pseudocode algorithm which asks a user to enter a number between 5 and 20. If they enter a number outside this range, the program asks them repeatedly to re-enter the number until they enter a valid number.

 If a valid number **n** is entered, the program asks the user to enter n temperatures, (all integer values) then calculates and outputs the average. [6]

 [Total 20 marks]