# Homework 4 Arrays Answers

# 1. Trace through the following pseudocode and complete the trace table below.

# 

# maxAge 🡨 0

# FOR index 🡨 0 TO 3

# ageList[index] 🡨 USERINPUT

# IF ageList[index] > maxAge THEN

# maxAge 🡨 ageList[index]

# position 🡨 index

# ENDIF

# ENDFOR

# OUTPUT AgeList[position], position

# Test Data 12, 16, 17, 11

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **ageList** | | | |  |  |  |
| **index** | **0** | **1** | **2** | **3** | **maxAge** | **position** | **Output** |
|  |  |  |  |  | 0 |  |  |
| 0 | 12 |  |  |  | 12 | 0 |  |
| 1 |  | 16 |  |  | 16 | 1 |  |
| 2 |  |  | 17 |  | 17 | 2 |  |
| 3 |  |  |  | 11 | 17 | 2 |  |
|  |  |  |  |  |  |  | 17 2 |

[4]

2. A teacher uses a program to store an array of 20 pupils pupil[0]… pupil[19]. She would like to sort them into two groups for a group activity. Write a pseudocode algorithm that will read the 20 names and then output lists consisting of every other pupil. [6]

Example: GROUP 1 GROUP 2

pupil[0] pupil[1]

pupil[2] pupil[3]

pupil[4] pupil[5]

FOR index 🡨 0 TO 19

OUTPUT “Enter name”

pupil[index] 🡨 USERINPUT

ENDFOR

OUTPUT “Group 1”

FOR index 🡨 0 to 19 STEP 2

OUTPUT pupil[index]

END FOR

OUTPUT “Group 2”

FOR index 🡨1 to 19 STEP 2

OUTPUT pupil[index]

END FOR

3. (a) The results of an Athletics event involving several schools are recorded. An array **school[0:3]** holds the names of the 4 schools participating. A second array **medal[0:3]** holds the number of medals that each school has won. This array is updated each time a new result is announced.

For test purposes, the names of the schools are recorded as AAAA, BBBB, CCCC, DDDD. The medal array is pre-loaded with results [4,7,1,3], meaning that school AAAA has 4 medals, BBBB has 7 medals, etc.

Each time a new result comes in, the user enters the result. They are prompted to enter the school number (1 for AAAA, 2 for BBBB etc.) and the medal array is updated.

When the user enters -1 for the school number, the results are printed in the form

**School number nn School name XXXX Number of medals nn**

Complete the pseudocode for this program. Include validation to ensure that a valid school number is entered. [8]

school = ["AAAA", "BBBB","CCCC","DDDD"]

medal = [4,7,1,3]

OUTPUT (“Enter school number, between 1 and 4 (-1 to exit): ") 1 mark

schoolNumber = USERINPUT 1 mark

WHILE schoolNumber <> -1 1 mark

WHILE (schoolNumber <1 or schoolNumber >4) and schoolNumber <> -1 1 mark

OUTPUT (“Invalid number… enter school number between 1 and 4: ")

schoolNumber = USERINPUT

END WHILE

IF schoolNumber <> -1 THEN 1 mark

medal[schoolNumber-1] = medal[schoolNumber-1] + 1 1 mark

OUTPUT (“Enter school number, between 1 and 4 (-1 to exit): ")

schoolNumber = USERINPUT 1 mark

END IF

END WHILE

FOR n = 0 TO 3 1 mark

OUTPUT ("School number ",n+1, " School name ",school[n],

"Number of medals ",medal[n]) 1 mark

END FOR

*(There will be variations but look for correct validation and 3 different loops, correctly indexing array elements)*

(b) It is possible to have an n-dimensional array holding a set of elements of the same type. Give an example of a program where it might be useful to use a multi-dimensional array. How many dimensions would this array need? [2]

Accept any reasonable suggestion , e.g. a grid reference with x and y coordinates could be held in a 2-dimensional array. Student marks over 3 tests in class of 20, 2-D array.

[Total 20 Marks]