Name: Class:

Task 1

# An algorithm has been given below.

1. MoreItems 🡨 TRUE
2. A 🡨 0
3. REPEAT
4. INPUT ItemPrice
5. A 🡨 A + ItemPrice
6. INPUT More
7. IF More = "No"
8. THEN
9. MoreItems 🡨 FALSE
10. ENDIF
11. UNTIL NOT MoreItems
12. OUTPUT A

(a) What is the minimum number of times that the loop will be run?

(b)The user enters the text “Yes” in line 7. What will the value of MoreItems be at the ENDIF in line 11?

(c) The user enters the text “No” in line 7. What will the value of MoreItems be at the ENDIF in line 11?

(d) Explain the line of code in line 6.

(e) State the purpose of this algorithm.

(f) Give a more suitable name for the variable currently named A.

Task 2

An array named Ages is set up that has five numbers stored in it:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 |
| Ages |  | 17 | 15 | 13 | 14 | 16 |

To access age 13 in the array, the programmer uses Ages[3].

Make use of a FOR loop to calculate the average for all the ages in the array. Output the average that is calculated.

|  |
| --- |
|  |

Task 3

An array named Players is set up that has five names stored in it:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 |
| Players |  | "Tony" | "Amy" | "Aruna" | "Sophia" | "Jack" |

The pseudocode to search this array is given below.

1. DECLARE Names : ARRAY[1:5] OF STRING
2. Names 🡨 ["Tony", "Amy", "Aruna", "Sophia", "Jack"]
3. Found 🡨 FALSE
4. INPUT SearchItem
5. FOR i 🡨 1 TO 5 //alternatively 1 TO LENGTH(Ages)
6. IF Names[i] = SearchItem
7. THEN
8. OUTPUT SearchItem, "Found"
9. Found 🡨 TRUE
10. ENDIF
11. ENDFOR
12. IF NOT Found
13. THEN
14. OUTPUT SearchItem, "Not Found"
15. ENDIF

Describe each of the following lines of code in the table below:

|  |  |
| --- | --- |
| **Line of code** | **Description** |
| 3 |  |
| 5 |  |
| 7 |  |
| 8 |  |
| 10 |  |
| 11 |  |
| 14 |  |
| 16 |  |

(b) State the name of this algorithm.

Task 4 Bubble sort

Your teacher will give you a set of name cards.

Place the cards in the sequence of numbers 1, 2, 3… 10

Perform a manual Bubble Sort to get the cards in alphabetical order.

1. What are the last two names after the first pass?

2. What are the first two names after the second pass?

3. What are the third and fourth names after the third pass?

4. What are the seventh and eighth names after the fourth pass?

5. What are the fourth and fifth names after the fifth pass?

6. What are the first two names after the sixth pass?

7. Which names are out of sequence after the seventh pass?

8. Are any names out of sequence after the eighth pass?

9. How many passes were needed to sort the cards?

Task 5: Algorithms

You have studied three algorithms for sorting.

Look at the following algorithm written in pseudo-code for one type of sorting algorithm.

1 Names ← ["Toby", "Abdul","Gale","Ruby","Amy","Boris"]

2 NumItems ← LENGTH(Names) - 1

3 WHILE NumItems > 1 DO

4 FOR Item ← 0 TO NumItems

5 IF Names[Item] > Names[Item+1]

6 THEN

7 Temp ← Names[Item]

8 Names[Item] ← Names[Item+1]

9 Names[Item+1] ← Temp

10 ENDIF

11 ENDFOR

12 NumItems ← NumItems - 1

13 ENDWHILE

14 FOR i ← 0 TO NumItems

15 OUTPUT Names[i]

16 ENDFOR

1. There is a for loop at the end of the algorithm (lines 13-15) which contains the
pseudo-code:

 OUTPUT names[i]

 What do you think this does?

2. At the start of the program, the array called names is initialised with six names.

 What will the value be that is stored in numItems?

3. Look at lines 5 to 10 in the code and explain what they are doing.

4. State the name of this algorithm.