# Worksheet 4 Testing

**Task 1**

1. (a) Write an algorithm to allow a user to input the maximum and minimum daily temperatures for a number of days until a maximum temperature of 999 is entered.

 The program then calculates the average temperature and outputs the number of days that the temperature was above average. It also outputs the number of days that the temperature was negative.

 (b) Write a test plan to test the program.

**Task 2**

2. Use the trace table below to help you answer (a), (b) and (c) below.

 What would be the values of integer variables x, y and z after execution of these statements if the initial values of x and y are

 (a) 2 and 7

 (b) -4 and -4

 (c) 27 and 3

**Trace table**

|  |  |  |
| --- | --- | --- |
| **x** | **y** | **z** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

 z = x

 IF x = y THEN

 x = x \* x

 y = (x + y) / 2

 ELSE

 IF x < y THEN

 y = y \* y

 z = y - x

 ELSE

 IF x > 0 THEN

 z = x/y

 ENDIF

 ENDIF

 y = 200

 ENDIF

 OUTPUT x, y, z

3. Use a trace table to determine the output from the following algorithm.

 x = 5

 k = 10

 sum = 45

 WHILE sum < 75

 sum = sum + k

 OUTPUT k

 k = k + x

 ENDWHILE

 OUTPUT sum

4. Study the following algorithm and fill in the trace tables below to discover what it does.

y = 2

z = 1

OUTPUT ("Please enter a positive integer: ")

x = USERINPUT

WHILE z<>0

 z = x mod y

 IF z <> 0 THEN

 y = y + 1

 ENDIF

ENDWHILE

IF x = y

 print (x, " is in category 1")

|  |  |  |
| --- | --- | --- |
| **flag** | **y** | **x** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

ELSE

 print (x, " is in category 2")

ENDIF

|  |  |  |
| --- | --- | --- |
| **flag** | **y** | **x** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

 (i) If the user inputs the integer 25, what is output?

 (ii) If the user enters the integer 7, what is output?

 (iii) What are “category 1” and “category 2”? What is the purpose of the program?

 (iv) Suggest ways in which the program could be made easier to understand.

(v) This is a “brute force” algorithm. Suggest how the algorithm could be made more efficient.