# Worksheet 3 Iteration

**Task 1**

1. Test the algorithm below by completing the trace table.

number1 🡨 5

number2 🡨 100

total 🡨 0

count 🡨 0

average 🡨 0

WHILE number1 < 30

 number1 🡨 number + 5

 number2 🡨 number2 – number1 + 10

 OUTPUT number1, number2

 total 🡨 number1 + Total

 count 🡨 count + 1

ENDWHILE

average 🡨 total/count

OUTPUT count, total, average

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| --- | --- | --- | --- | --- | --- |
| **number1** | **number2** | **total** | **count** | **average** | **Output** |
| 5 | 100 | 0 | 0 | 0 |  |
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2. A doctor records a patient’s temperature once an hour for six hours. Any time the temperature is > 37C, an incidence of fever is recorded.

 The average temperature is calculated at the end.

 (a) Calculate the expected result using test data 36, 36, 38.5, 37, 38, 36.

(b) Complete the trace table using the pseudocode below for this data.

temp 🡨 0

hour 🡨1

total 🡨 0

fever 🡨 0

WHILE hour < 7 THEN

 OUTPUT “Enter temperature: ”

 temp 🡨 USERINPUT

 IF temp > 37 THEN

 fever 🡨 fever + 1

 END IF

 total = total + temp

 hour = hour + 1

ENDWHILE

average 🡨 ROUND(total/hour,1) #round to 1 decimal place

OUTPUT “Average temperature:”, average

OUTPUT “Incidents of fever:”, fever

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **temp** | **hour** | **fever** | **total** | **average** | **Output** |
| 0 | 1 | 0 | 0 | 0 |  |
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(c) Is the result correct? If not, make changes to the pseudocode so that it gives the correct result.

(d) Rewrite the pseudocode to include a range check to ensure that a temperature is between 30 and 44. Produce an error message for invalid data. The program should allow the user to re-enter the temperature if it is incorrect.

**Task 2**

3. A parts supply company uses 4-digit part numbers. The last digit indicates the production run. If the production run is 6,7 or 8 it is considered to be an old model.

 Write a pseudocode algorithm that prompts the user to enter a part number.

 The length of the part number should be equal to 4 digits, otherwise an error message will be displayed and the user will be prompted to input the part number again.

 The algorithm should count the the total number of parts entered and the number of old model parts and output these totals.

 Data input will terminate when the user inputs 9999.

4. What is a common cause of an accidental infinite loop?

**Task 3**

5. A teacher has a class of 30 pupils. Each pupil has taken 3 tests throughout the year. The teacher needs to know the average score for test1, test2 and test3. She also needs to know the average test score for the year. Write an algorithm in pseudocode that will accomplish this task. The ouput should include total1, total2, total3 and the total for the entire year.

6. A Hallowe’en display needs a computer controlled light which will flicker. Flicker the light for a random number of seconds between 1/10 and 1/100 of a second. You can use a **pause** function that takes the number of milliseconds to pause to program. For example **pause(1000)** will pause the program for 1 second. To turn the light on and off, set the value of light to HIGH for ON and LOW for OFF. The control loop should run continuously.