# **Tutorial Sheet 3**

## **Exercise 1**

**Re-write the program in Listing 6.1 to include just a single call to scanf().**

### **Listing 6.1:**

#include <stdio.h>

int main(void)

{

long num;

long sum = 0L; /\* initialize sum to zero \*/

int status;

printf("Please enter an integer to be summed (q to quit): ");

status = scanf("%ld", &num);

while (status == 1)

{

sum = sum + num;

printf("Please enter next integer (q to quit): ");

status = scanf("%ld", &num);

}

printf("Those integers sum to %ld.\n", sum);

return 0;

}

## **Exercise 2**

**Write a program to compute n! using a for loop.**

## **Exercise 3**

**Write a program that performs a PIN code check, giving end-users a maximum of 5 attempts before locking them out.**

## **Exercise 4**

**Write a program that tabulates the multiplication tables for numbers 1 through 10 over 10 rows, i.e.:**

1 2 3 4 5 6 7 8 9 10

2 4 6 8 10 12 14 16 18 20

...

## **Exercise 5**

**Write a program that accepts as input a sequence of up to 20 non-unique numbers (between 1 and 100, in ascending order) and then computes the mean, mode, and median.**

## **Exercise 6**

Write a program that calculates your taxes based on the following rates and incentives:

* The first €10,000 are taxed at **18%**.
* The next €8,000 are taxed at **20%**.
* Any remaining income is taxed at **25%**.
* If you're working in the **ICT industry**, a rebate of **5%** on the total tax bill applies.
* If you collect old electronic equipment for green disposal, the first tax bracket is raised to **€15,000**.

## **Exercise 7**

**Write a program that processes an input text stream and takes the following actions:**

* Warns about words that are longer than 10 characters and do not include a hyphen.
* Warns about words containing uppercase characters beyond the first one.
* Warns about words starting with a non-alphabetic character.
* Displays the total number of errors in the form of:
  + "1 error found"
  + "n errors found"
  + "No errors found"

**Test your program on specifically crafted test input files as well as random text files found on your machine.**

## **Exercise 8**

**Modify the program from Exercise 7 so that it also:**

* Warns about punctuation preceded by a space.
* Warns about repeated spaces.

## **Exercise 9**

**Write a program that processes an input stream of real numbers delimited by whitespace, and:**

* Copies them to an output file as long as the numbers fall within a preset range.
* Takes care of validating all inputs while attempting to deal gracefully with non-compliant inputs.

*Note: You may use functions such as fopen(), fscanf(), fprintf(), and fclose() for file operations. Ensure that you handle file opening errors and input validation appropriately.*

## **Exercise 10**

**Write a program that repeatedly displays the following menu options:**

1. Add items to shopping cart

2. Show current total

3. Check out

4. Cancel session

q. Quit

* **Option 1**: Asks the end-user to choose from a list of preset shop items (displayed as code - name - price) and quantity, keeping a running total for the current shopping session.
* **Option 2**: Displays the current total.
* **Option 3**: Displays the itemized bill of purchased products & total, then starts a new session.
* **Option 4**: Cancels the current session and starts afresh.
* **Option q**: Terminates the program immediately.

**Note:** Option selections for **3**, **4**, and **q** should be confirmed by the user.