Degree in Software Engineering – Computing Basics

Solution to Unit 2.5 Exercises: Subprograms and Functions

This document includes the solution to the exercises of the document "Unit 2.5 Exercises: Subprograms and Functions". It is recommended that you try doing the exercises without looking at the solutions first, and then you check your answers. Please note there might be multiple solutions to the same problem.

Exercise 1

Proposed solution:

```
def gcd(a, b):
    for i in range(min(a, b), 1, -1):
        if a % i == 0 and b % i == 0:
            return i
    return 1

a = int(input("Input the first natural number: "))
while a <= 0:
    a = int(input("Input the first natural number: "))

b = int(input("Input the second natural number: "))
while b <= 0:
    b = int(input("Input the second natural number: "))

print("The greatest common divisor is {}".format(gcd(a, b)))
```

Exercise 2

Proposed solution:

```
def factorial(n):
    fact = 1
    for i in range(2, n + 1):
        fact = fact * i
    return fact

k = int(input("Input the maximum value to calculate the factorial: "))
while k < 0:
    k = int(input("Input the maximum value to calculate the factorial: "))

for i in range(0, k + 1):
    print("{}! = {}".format(i, factorial(i)))
```

Exercise 3

Proposed solution:

```
def sum_digits(n):
    count = 0
    while n > 0:
        count = count + n % 10
        n = n // 10
    return count

def count_digits(n):
    count = 1
    while n >= 10:
        count = count + 1
        n = n // 10
    return count

n = int(input("Input a non-negative integer value: "))
while n < 0:
    n = int(input("Input a non-negative integer value: "))

print(n)
while count_digits(n) > 1:
    n = sum_digits(n)
    print(n)
```

Exercise 4

Proposed solution:

```
def is_prime(n):
    if n < 2:
        return False

    for i in range(n // 2, 1, -1):
        if n % i == 0:
            return False

    return True

n = int(input("Input a natural number: "))
while n > 0:
    if is_prime(n):
        print("{} is a prime number".format(n))
    else:
        print("{} is NOT a prime number".format(n))
    n = int(input("Input a natural number: "))
```