Lab2

```
# 5. Algorithm for computing the value of Euler's function for natural numbers. For a given value
# v and a given bound b, list all natural numbers less than b which have v as the value of Euler's
# function.

def gcd_euclid_algorithm_recursive(nr1, nr2):
    """
    Calculate the GCD of two numbers using the recursive Euclidean algorithm.
    """
    if nr1 == 0:
        return nr2
    return gcd_euclid_algorithm_recursive(nr2 % nr1, nr1)

def euler_phi_function(nr):
    """
    Calculate The Euler Phi Function for a natural number nr using this formula:
    (Z/n)*={m∈N:1<=m<n,gcd(m,n)=1}.
    ϕ(n) equals the size of (Z/n)*
    """
    k = 0
    for i in range(1,nr):
        if gcd_euclid_algorithm_recursive(nr,i) == 1:
            k = k+1
    return k

def nrLessThanBForWhichVIsValueOfEuler(v,b):
    """
    v,b natural numbers
    return list all natural numbers less than b which have v as the value of Euler's function.
    """
    list = []
    i = 1
    while i < b:
        if euler_phi_function(i) == v:
            list.append(i)
        i = i+1
    return list

if __name__ == "__main__":
    v = 10
    b = 150
    print(nrLessThanBForWhichVIsValueOfEuler(v,b))
```