1) Find the running time $T(n)$ and the asymptotic running time (using $\Theta$-notation and $O$-notation) of the following piece of code:

```python
n=eval(input("Enter an integer number greater than 2:"))
for i in range(n):
    print(i)
for j in range(n):
    print(j)
```

$T(n) =$ $T(n) = \Theta( )$

2) Find the running time $T(n)$ and the asymptotic running time (using $\Theta$-notation and $O$-notation) of the following piece of code:

```python
n=eval(input("Enter an integer number greater than 10:"))
for i in range(n):
    for j in range(n):
        print(i,"\t",j)
```

$T(n) =$ $T(n) = \Theta( )$

3) Find the running time $T(n)$ and the asymptotic running time (using $\Theta$-notation and $O$-notation) of the following piece of code:

```python
n=eval(input("Enter an integer number greater than 12:"))
while n>1:
    print(n)
    n=n//2
print(n)
```

$T(n) =$ $T(n) = \Theta( )$
1) Copy the following program (you may omit the docstring):

```python
def summation1(n):
    """ finds the sum (n+i)^2/i, where i runs from 1 to n
    """
    pre: n in positive integer
    post: returns a positive integer number."""
    sum = 0
    for elem in list(range(n)):
        sum += (n+1+elem)**2/(elem+1)
    return sum
```

2) run the defined procedure on different inputs, for example $n = 1, 2, 10$. Write down the results.

3) Write the sum of fractions that the program calculates on inputs $n = 1, 2, 10$ don't calculate it!

4) find the running time $T(n)$ of the procedure (depending on $n$), assuming that it takes one unit of time for each of math operations; the assignment operator and `range` function take also one time unit, and function `list` takes $n$ time units.

5) What is the order of growth (in terms of $O$ and $\Theta$)?
1) Copy the following program (you may omit the docstring):

```python
def summation2(n):
    """ finds the sum 2^i/i, where i runs from 1 to n
    pre: n in positive integer
    post: returns a positive integer number."""
    sum = 0
    for elem in list(range(n)):
        sum += 2**(elem+1)/(elem+1)
    return sum
```

2) run the defined procedure on different inputs, for example $n = 1, 2, 10$. Write down the results.

3) Write the sum of fractions that the program calculates on inputs $n = 1, 2, 10$ don't calculate it!

4) find the **running time** $T(n)$ of the procedure (depending on n), assuming that it takes one unit of time for each of math operations; the assignment operator and `range` function take also one time unit, and function `list` takes $n$ time units.

5) What is the order of growth (in terms of $O$ and $\Theta$)?
1) Copy the following program (you may omit the docstring):

```python
def summation3(n):
    """ finds the sum i^2/(i+1), where i runs from 1 to n
    pre: n in positive integer
    post: returns a positive integer number."""
    sum = 0
    for elem in list(range(n)):
        sum += (elem+1)**2/(elem+2)
    return sum
```

2) run the defined procedure on different inputs, for example \( n = 1, 2, 10 \).
Write down the results.

3) Write the sum of fractions that the program calculates on inputs \( n = 1, 2, 10 \) don't calculate it!

4) find the **running time** \( T(n) \) of the procedure (depending on \( n \)), assuming that it takes one unit of time for each of math operations; the assignment operator and `range` function take also one time unit, and function `list` takes \( n \) time units.

5) What is the order of growth (in terms of \( O \) and \( \Theta \))?