

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

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

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

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

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

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

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

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

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

1) Copy the following program (you may omit the docstring):

```
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 Θ)?

1) Copy the following program (you may omit the docstring):

```
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 Θ)?

1) Copy the following program (you may omit the docstring):

```
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 Θ)?