Midterm2

Tartalomjegyzék

- <u>1 Programming</u>
 - Problems:
 - ◆ <u>1.1</u> <u>Problem 1</u> <u>(2 points)</u>
 - ◆ <u>1.2</u> <u>Problem 2</u>
 - (<u>3 points</u>) ◆ 1.3
 - Problem 3 (5 points)
 - ◆ <u>1.4</u> <u>Problem 4</u>
 - (6 points)

Programming Problems:

Problem 1 (2 points)

Write a variadic function, which can have an arbitrary number of keyword arguments (**kwargs). The inputs are names and the age of the persons. Return the names of the persons whose age is above 50.

Problem 2 (3 points)

Write a variadic function, whose inputs are real numbers, and the function returns whether the given numbers form an arithmetic or geometric sequence or both or none of them.

Problem 3 (5 points)

Write a Polynomial class, whose input is a dictionary. In the dictionary the keys are the degrees, and the values are the corresponding coefficients.

```
a. Write the __init__ method. (0.5 point)b. Write the __str__ method, which can print a polynomial in an aesthetic form. (1.5 point)
```

1. Remark: Be careful not to print the parts with zero coefficients, and if the coefficient is 1 or -1 then only show it with a + or - sign before that part.

2. Remark: We can assume that the keys (degrees) in the dictionary are given in a monotone decreasing order.

c. Write an __add__ method for the Polynomial class. It might be useful to write a degree() method

Example:

```
Let p = Polynomial(\{24:1, 12:-1, 2:0, 1:0, 0:2\}).
Then print(p) returns the following:
x^{24} - x^{12} + 2
```

Problem 4 (6 points)

Write an iterable Primes class, which input is an n natural number, which is the upper bound of the primes.

a. Write the __init__ method. You should also test whether the input n is a natural number. If it

- b. Write the __next__ and __iter__ methods. (Make the instances of the Primes class iterable, you
 c. Write the Mersenne_primes child class of the Primes class, which has a power() method which ret
- c. write the hersenne_primes chird crass of the frimes crass, which has a power() i