1001 zadań z programowania

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Spis treści

1 Wstęp

Zgromadzone zadania z wielu źródeł, m.in.:

- 100+ Python challenging programming exercises
- Konkurs informatyczny Logia i Minilogia
- Olimpiada Informatyczna Gimnazjalistów oraz Olimpiada Informatyczna
- Project Euler

2 Zadania

Zadanie 1. Napisz program który znajdzie wszystkie liczby z przedziału 2000 oraz 3200 (włączając te wartości), które są podzieelne przez 7, jednocześnie nie bedąc wielokrotnościami 5. Wynik powinien być wydrukowany w pojedynczej linii w postaci liczb oddzielonych przecinkami.

Ze zbioru [1].

Zadanie 2. Napisz program który obliczy wartość silni z danych liczb. Wartości powinny być wydrukowane w jednej linii, oddzielane przecinkami.

Przykład:

Załóżmy że następujące dane wejściowe zostały dostarczone do programu:

```
8
```

Wtedy, output powinien wyglądać następująco:

```
40320
```

Ze zbioru [1].

Zadanie 3. Przy danej wartości całkowitej n, napisz program generujący słownik zawierający (i, i^2) dla każdej wartości pomiędzy 1 oraz n (włączając). Program powinien wtedy wydrukować słownik.

Załóżmy że następujące dane wejściowe zostały dostarczone do programu:

```
8
\end{berbatim}

Wtedy, output powinien być wyświetlony w postaci:
\begin{verbatim}
{1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64}
```

Ze zbioru [1].

Zadanie 4. Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number. Suppose the following input is supplied to the program:

```
34,67,55,33,12,98
```

Then, the output should be:

```
['34', '67', '55', '33', '12', '98']
('34', '67', '55', '33', '12', '98')
```

Ze zbioru [1].

Zadanie 5. Define a class which has at least two methods:

- `getString`- to get a string from console input,

- `printString`- to print the string in upper case.

Also please include simple test function to test the class methods.
Ze zbioru [1].

Zadanie 6. Write a program that calculates and prints the value according to the given formula:

```
Q = Square root of [(2 * C * D)/H]
```

Following are the fixed values of C and H:

- C is 50.
- H is 30.
- D is the variable whose values should be input to your program in a comma-separated sequence.

Example Let us assume the following comma separated input sequence is given to the program:

```
100,150,180
```

The output of the program should be:

```
18,22,24
```

Ze zbioru [1].

Zadanie 7. Write a program which takes 2 digits, X,Y as input and generates a 2-dimensional array. The element value in the i-th row and j-th column of the array should be i*j. Note: i=0,1.., X-1; j=0,1,¡Y-1.

Example Suppose the following inputs are given to the program:

```
3,5
```

Then, the output of the program should be:

```
[[0, 0, 0, 0, 0], [0, 1, 2, 3, 4], [0, 2, 4, 6, 8]]
```

Ze zbioru [1].

Zadanie 8. Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically. Suppose the following input is supplied to the program:

`without,hello,bag,world`

Then, the output should be:

`bag,hello,without,world`

Ze zbioru [1].

Zadanie 9. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized. Suppose the following input is supplied to the program: Hello world Practice makes perfect Then, the output should be: HELLO WORLD PRACTICE MAKES PERFECT

Ze zbioru [1].

Zadanie 10. Write a program that accepts a sequence of whitespace separated words as input and prints the words after removing all duplicate words and sorting them alphanumerically. Suppose the following input is supplied to the program: hello world and practice makes perfect and hello world again Then, the output should be: again and hello makes perfect practice world

Ze zbioru [1].

Zadanie 11. Write a program which accepts a sequence of comma separated 4 digit binary numbers as its input and then check whether they are divisible by 5 or not. The numbers that are divisible by 5 are to be printed in a comma separated sequence.

Ze zbioru [1].

Zadanie 12. Write a program, which will find all such numbers between 1000 and 3000 (both included) such that each digit of the number is an even number. The numbers obtained should be printed in a comma-separated sequence on a single line.

Ze zbioru [1].

Zadanie 13. Write a program that accepts a sentence and calculate the number of letters and digits. Suppose the following input is supplied to the program: hello world! 123 Then, the output should be: LETTERS 10 DIGITS 3

Ze zbioru [1].

Zadanie 14. Write a program that accepts a sentence and calculate the number of upper case letters and lower case letters. Suppose the following input is supplied to the program: Hello world! Then, the output should be: UPPER CASE 1 LOWER CASE 9

Ze zbioru [1].

Zadanie 15. Write a program that computes the value of a+aa+aaa+aaaa with a given digit as the value of a. Suppose the following input is supplied to the program: 9 Then, the output should be: 11106

Ze zbioru [1].

Zadanie 16. Use a list comprehension to square each odd number in a list. The list is input by a sequence of comma-separated numbers. Suppose the following input is supplied to the program: 1,2,3,4,5,6,7,8,9 Then, the output should be: 1,3,5,7,9

Ze zbioru [1].

Zadanie 17. Write a program that computes the net amount of a bank account based a transaction log from console input. The transaction log format is shown as following: D 100 W 200 D means deposit while W means withdrawal. Suppose the following input is supplied to the program: D 300 D 300 W 200 D 100 Then, the output should be: 500

Ze zbioru [1].

Zadanie 18. A website requires the users to input username and password to register. Write a program to check the validity of password input by users. Following are the criteria for checking the password: 1. At least 1 letter between [a-z] 2. At least 1 number between [0-9] 1. At least 1 letter between [A-Z] 3. At least 1 character from [#@] 4. Minimum length of transaction password: 6 5. Maximum length of transaction password: 12 Your program should accept a sequence of comma separated passwords and will check them according to the above criteria. Passwords that match the criteria are to be printed, each separated by a comma. Example If the following passwords are given as input to the program: ABd1234@1,a F#,2w3E*,2We3345 Then, the output of the program should be: ABd1234@1

Ze zbioru [1].

3 Bibliografia

Literatura

[1] 100+ Python challenging programming exercises

[2] Konkurs informatyczny LOGIA.

[3] Olimpiada Informatyczna Gimnazjalistów

[4] Olimpiada Informatyczna