cinnamon

Disruptive AI to extend human potential

CHALLENGES FOR RESEARCHER

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Letter from Cinnamon

Dear talented researcher,

Soon enough until human are released from repetitive and boring tasks in the office. Then they can focus their mind and energy on the comlicated work like making judgement, being creative, interacting to people and so on.

Those applications are no longer just imagination thank to favourable conditions:

- Fast growth of AI and IoT technology
- Cost reduction in data capturing
- Strong demand of further improving human productivity

Consequencely, product-mindset will play crucial role for researchers to develop technology and transfer it into applicable products. Without truly understanding what kind of impact you want to create and whom you create it for, your valuable work will always be on the paper.

We need more great talents like you to sail Cinnamon ship to the ocean. Join us and create globally impactful products.

Cinnamon Vietnam management board

Instruction

Assessment Criteria

- First priority: Quality of the answers (Correctness and Method to find answer)
- Second priority: Duration to finish (Please submit as soon as you finish the test. However, remember that the Quality of answers is still highest priority)

Answer format

- Assignment 1,2 & 3: coding in your chosen programming language (prefer in Python)
- Assignment 4: accept both handwritting & typed format

Submission

- Cinnamon in Hanoi: erik@cinnamon.is (cc to mai@cinnamon.is)
- Cinnamon in Hochiminh: pop@cinnamon.is (cc to mai@cinnamon.is)

Challenge 1

Write codes (prefer in Python)

Implement a function to calculate the chemical formula weight.

database

H	1
C	12
O	16
N	14
K	39

Only 5 atoms can be calculated

Input/Output Example

H_2	2
H_2O	18
O_{20}	320
$K(OH)_{20}O$	395
$KH_2(OH(OH)_2(OH)_3(OH(K_5)_2)_{20})_6$	49493

Write codes (prefer in Python)

Example of a “Happy Number” is shown as below:
19 is a happy number, because:

$1^2 + 9^2 = 82$
$8^2 + 2^2 = 68$
$6^2 + 8^2 = 100$
$1^2 + 0^2 + 0^2 = 1$

Requirement: Write code to detect if one number is "happy number"

Write codes (prefer in Python)

Given **n** points on a 2D plane (random points as input), write code to find the maximum number of points that lie on the same straight line

Challenge 4

Make a mathematic answer

Supposed that average of $x_1, x_2, \ldots, x_n$ is calculated by $\overline{x}_n = \frac{\sum_{i=1}^{n} x_i}{n}$

and variance is calculated by $\sigma_n = \frac{\sum_{i=1}^{n} (x_i - \overline{x}_n)^2}{n}$

In order to save the memory of the calculation when the sample number is too big, We decided NOT TO SAVE the past numbers.

Here,

Specify how to calculate $\overline{x}_{n+1}, \sigma_{n+1}$ ONLY by using $\overline{x}_n, \sigma_n, x_{n+1}$