PyPhos

– Phoscript (Lightweight FORTH Shell) in Python

https://github.com/udexon/PyPhos
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1. Phoscript is a lightweight FORTH derived metaprogramming script, based on the following token processing algorithm, as shown in function SM from line 173 in Phos_chrome.py (figures 1A and 1B) below:

A. Line 176: split a SPACE delimited string into an array (list) of tokens.
B. Line 180: loop through the list of tokens:
    i. (At the end of while loop) Line 218: push data tokens on to the stack S. (figure 1B)
    ii. If token t matches any of the function token, evaluate (execute) the target function. (Lines 182 onwards.)

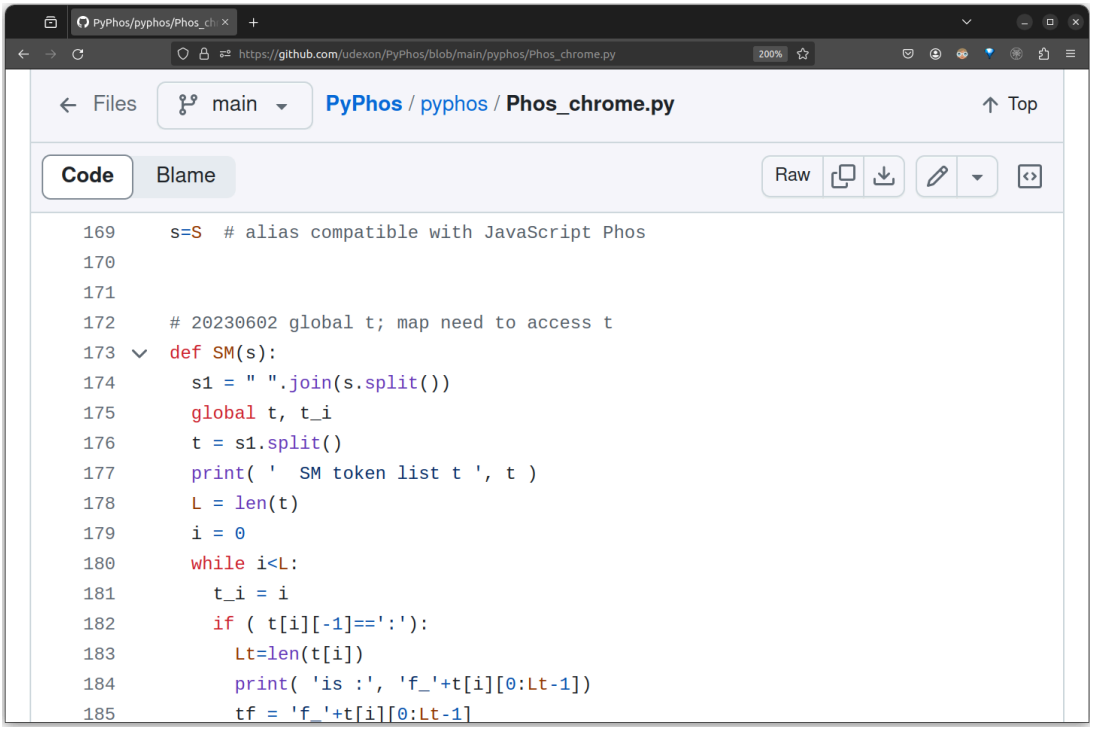

Figure 1A

As such, Phoscript could well be the simplest introduction into FORTH and related stack machine (metaprogramming) languages, which can easily be picked up by anyone with 3 months of programming experience, and can be (theoretically and practically) ported to any known programming language, including but not limited to:

- C, C++, C#, Java, JavaScript, PHP, Python, Rust, LISP, Haskell, HTML, etc.

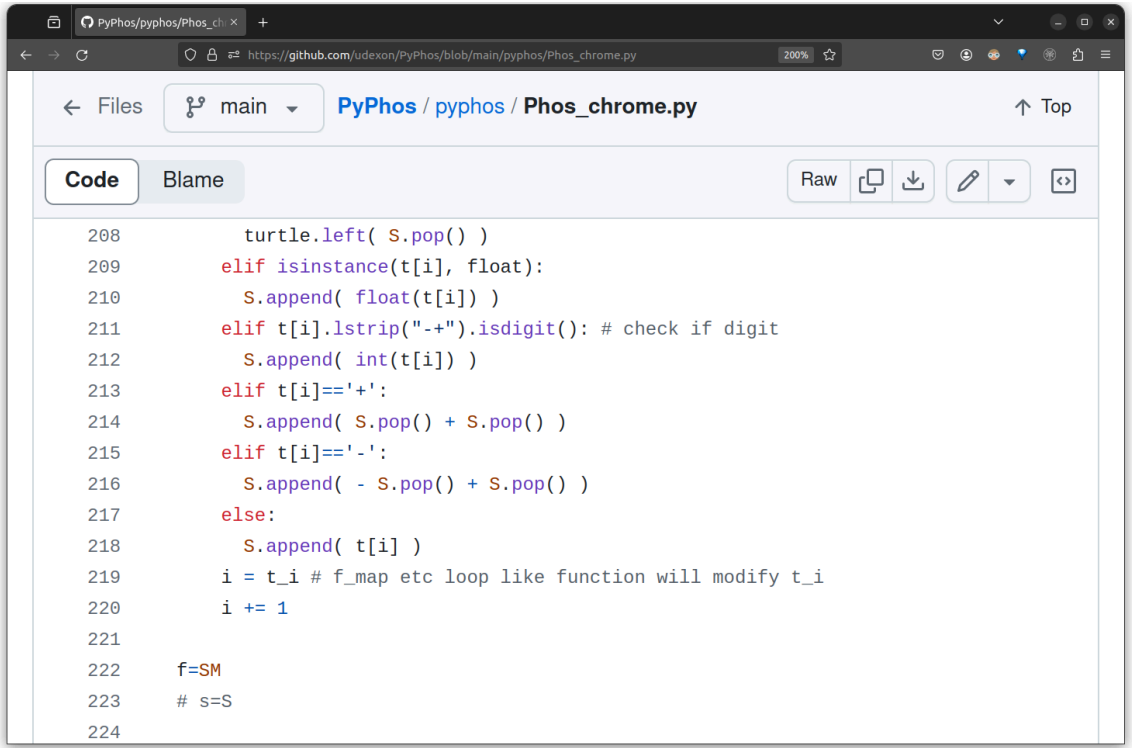

Figure 1B

2. To illustrate, run Phos_chrome.py in python interactive mode:

$ python -i Pho_chrome.py

This will load all necessary libraries and open a Chrome web browser using Selenium library, which will serve to illustrate the power, simplicity and versatility of Phoscript as an interface to both Python and JavaScript programming languages.

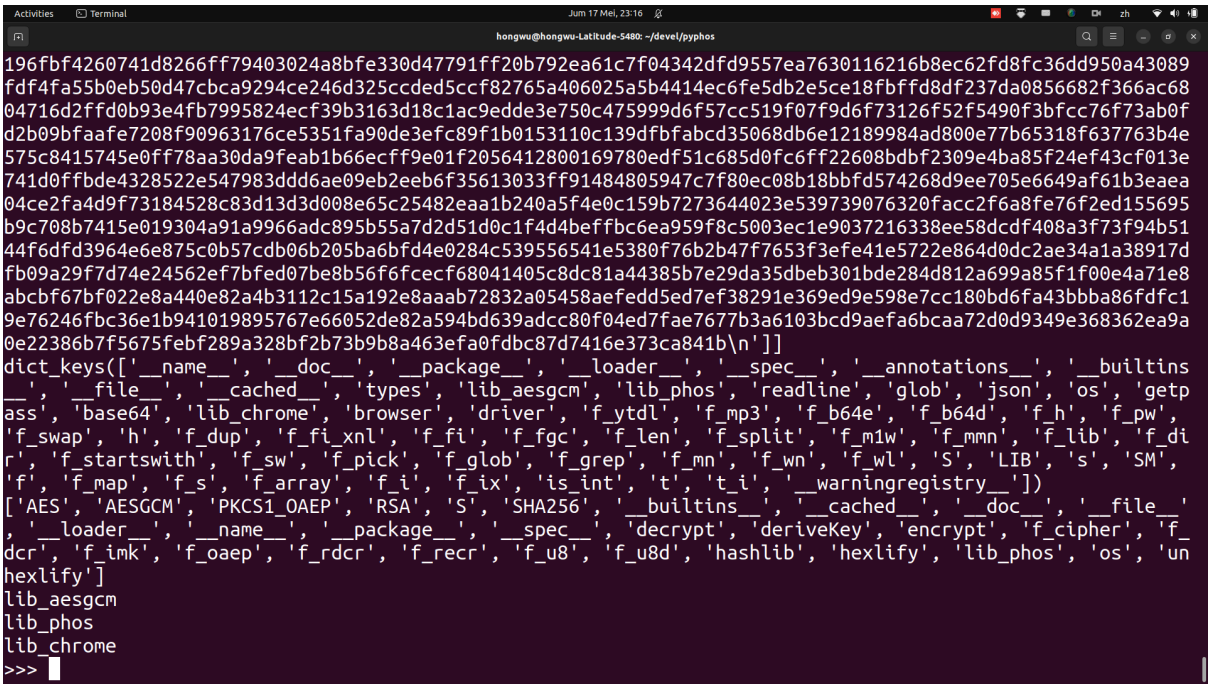

Figure 2A

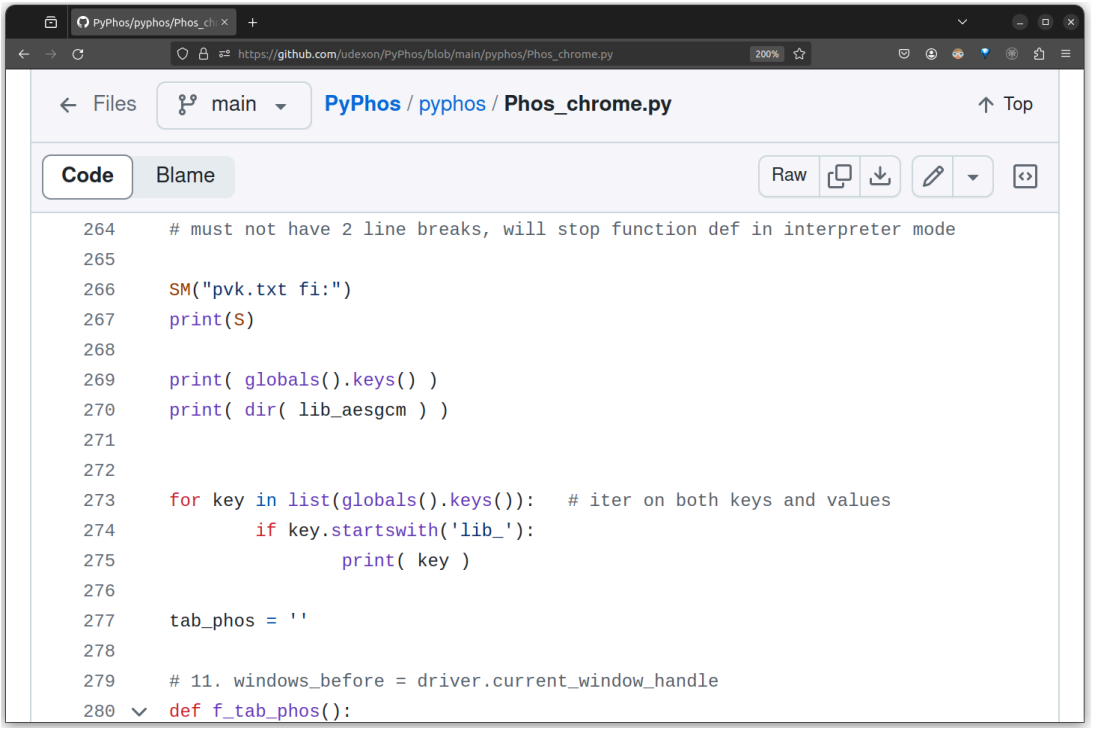

Figure 2B

The initialization code in line 266 loads a private key file and push it on to the stack, and line 267 prints the stack S, and can be seen in the top part of figure 2A. The remaining part of the screen are outputs from lines 269 to 275, which are the defined functions callable using Phoscript (FORTH) syntax.

Let us illustrate how Phoscript works by decrypting the encrypted private key file.

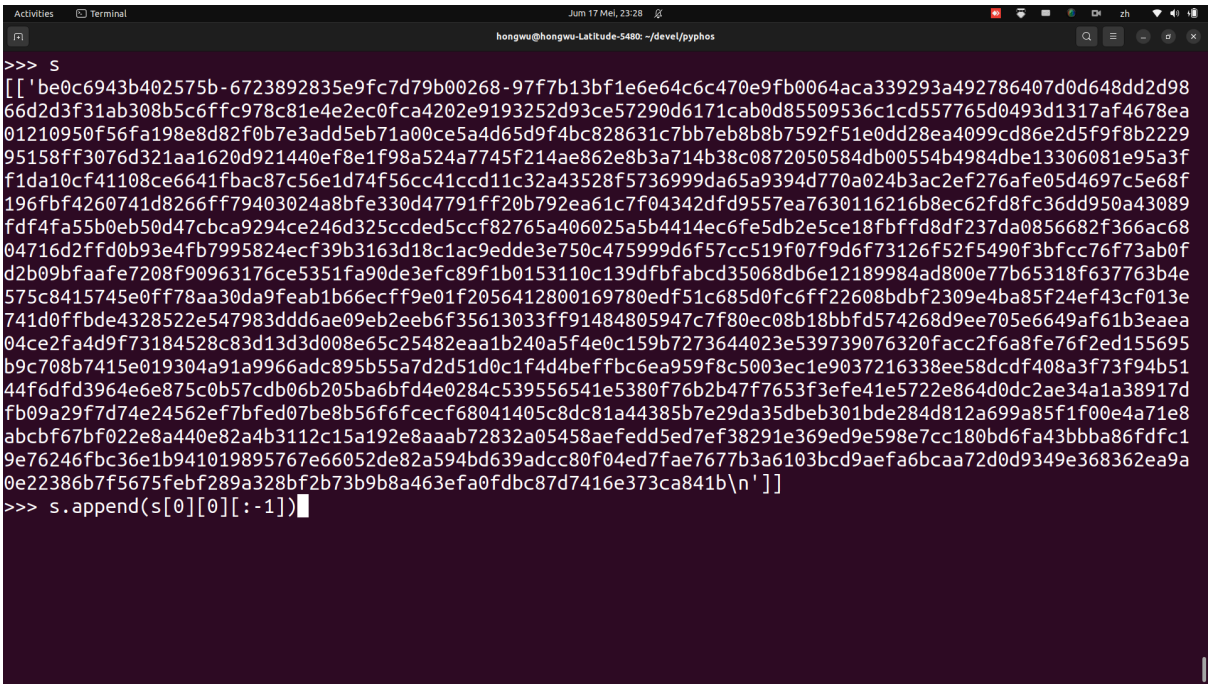

Figure 3A

Lowercase s (alias to uppercase S) will show the stack, as shown in figure 3A.

>>> s.append(s[0][0][:-1])

The command above drop the last newline character from the contents of the private key file, and push the result on to the stack, as s[1], as shown in figure 3B.

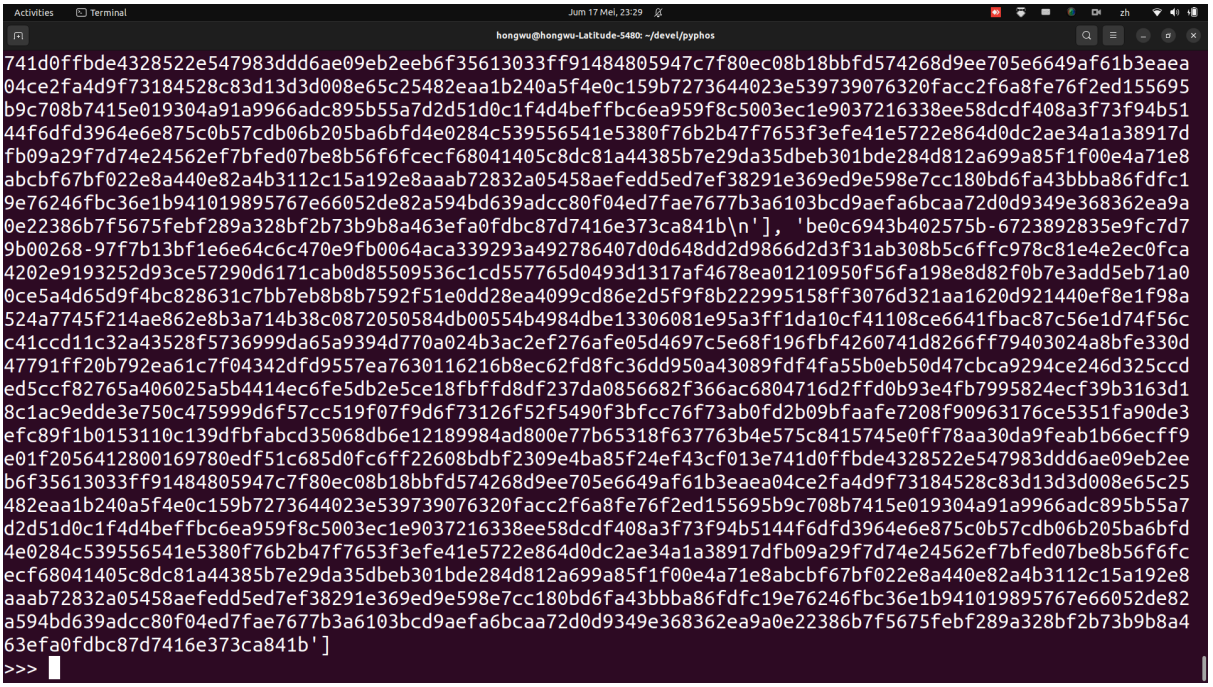

Figure 3B

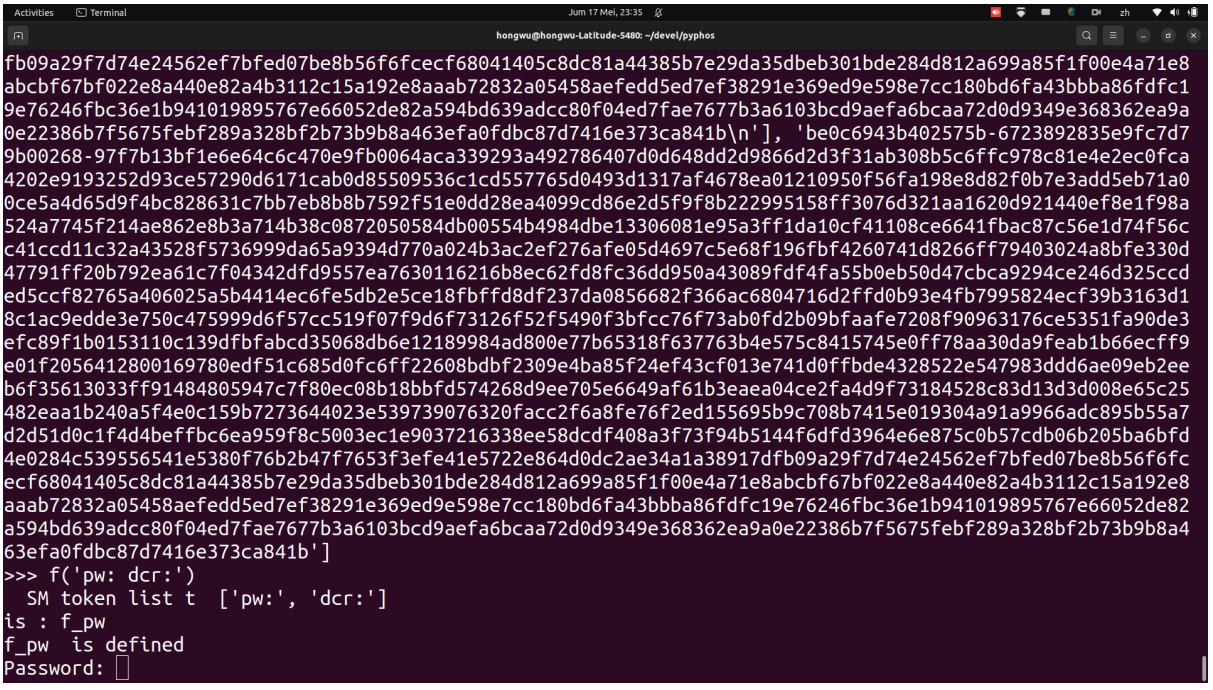

Figure 3C

>>> f('pw: dcr:')

Enter the command above as shown in figure 3C.

pw: will prompt the user for a decryption password, which should be ‘12345’ (without the quotation mark).

dcr: will map to function f_dcr in line 32 lib_aesgcm.py, as shown in figure 3D.

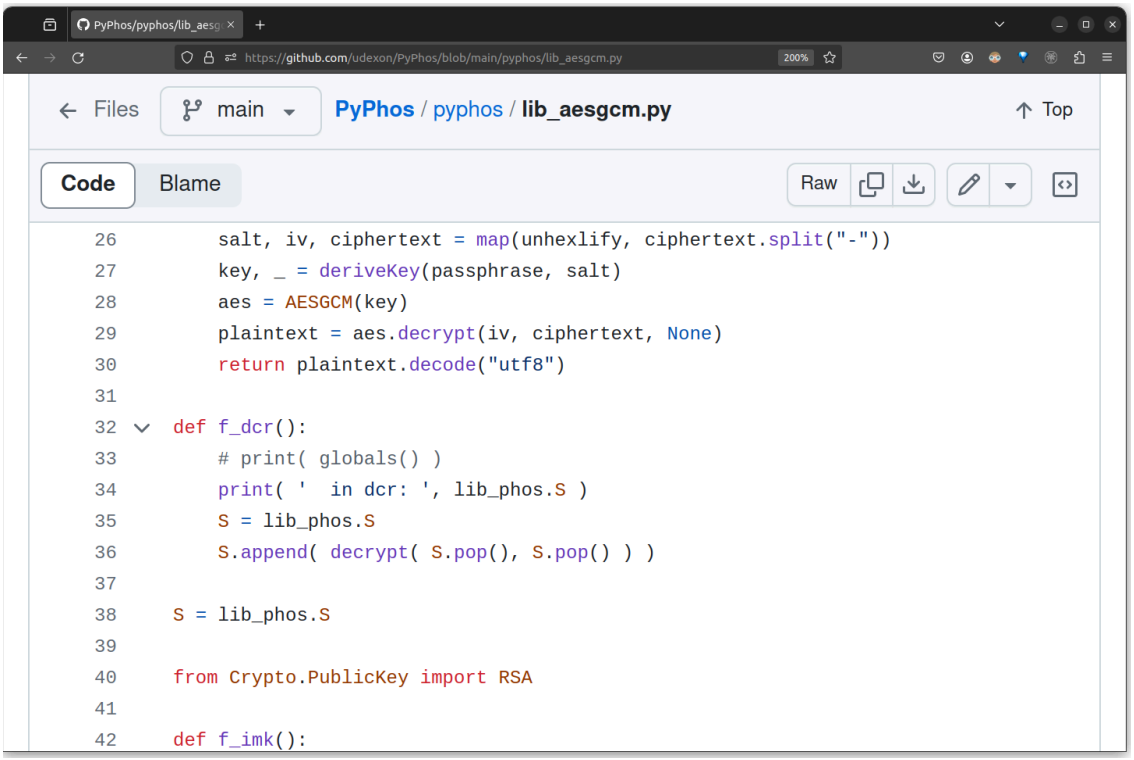

Figure 3D

Finally, entering ‘s’ will show the decrypted private key (figure 3E).

Users are encourage to read the source code and try out other functions, and also add own customised functions, as Phoscript is designed to be extensible by users themselves!!

And finally welcome to the brave new world of Metaprogramming, the best kept secret in Silicon Valley and computer science faculties around the world, the gateway into mathematics and metaphysics!!

> ***fiat lux**, Genesis 1:3 (Hebrew: "יְהִי אוֹר")*
>
> *Latin: "dixitque Deus fiat lux et facta est lux"*
> *("And said God let there be light, and there was light"),*

Greek

"και είπεν ο Θεός γενηθήτω φως και εγένετο φως"

(kai eipen ho Theos genēthētō phōs kai egeneto phōs)

Hebrew

"וַיֹּאמֶר אֱלֹהִים, יְהִי אוֹר; וַיְהִי אוֹר"

(vayo'mer 'Elohim, yehi 'or vayehi 'or)

Figure 3E