1. let regex = {

canadianPostalCode: /^[ABCEGHJ-NPRSTVXY]\d[ABCEGHJ-NPRSTV-Z] \d[ABCEGHJ-NPRSTV-Z]\d$/,

visa: /^4\d{12}(\d{3})?$/,

masterCard: /^(5[1-5]\d{14}|222[1-9]\d{12}|22[3-9]\d{13}|2[3-6]\d{14}|27[01]\d{13}|2720\d{12})$/,

notThreeEndingInOO: /^(?![\p{L}]oo$)\p{L}\*$/iu,

divisibleBy16: /^(0|00|000|[01]\*0000)$/,

eightThroughThirtyTwo: /^([89]|[12]\d|3[0-2])$/,

notPythonPycharmPyc: /^(?!pyc$|python$|pycharm$)\p{L}\*$/u,

restrictedFloats: /^[+-]?(\d+\.\d\*|\d\*)([eE][+-]?\d{1,3})$/,

palindromes2358:/^(?:([abc])\1|([abc])[abc]\2|([abc])([abc])[abc]\4\3|([abc])([abc])([abc])([abc])\8\7\6\5)$/

pythonStringLiterals: /^([fF]?)((?<!\\)'([^'\\\n]\*(\\.[^'\\\n]\*)\*)'|(?<!\\)"([^"\\\n]\*(\\.[^"\\\n]\*)\*)"|'''([^'\\]\*(\\.|[^'\\])\*?)'''|"""([^"\\]\*(\\.|[^"\\])\*?)"""|'''abc\\'''')$/

}

1. WebAssembly:

f:

        local.get       0 ;; load input

     i32.const       3 ;; push 3

     i32.mul ;; 3 \* input

     i32.const       1 ;; push 1

     i32.add 3 \* input + 1

     local.get       0 ;; load input

     i32.const       1 ;; push 1

    i32.shr\_s

     local.get       0 ;; load input

        i32.const       1 ;; push 1

     i32.and ;; 1 if odd, 0 if even

     i32.select ;; return either n / 2 or 3 \* n + 1

    end\_function

x86-64:

f:

push    rbp ; save base pointer

mov     rbp, rsp ; rsp to rbp

mov     DWORD PTR [rbp-4], edi

mov     eax, DWORD PTR [rbp-4]

and     eax, 1 ; check parity

test    eax, eax

jne     .L2 ; jump if eax != 0

mov     eax, DWORD PTR [rbp-4]

mov     edx, eax ; eax to edx

shr     edx, 31

add     eax, edx

sar     eax

jmp     .L4 ; jump to end

.L2:

mov     edx, DWORD PTR [rbp-4]

mov     eax, edx ; edx into eax

add     eax, eax ; eax \* eax

add     eax, edx ; eax \* eax \* eax

add     eax, 1 ; add 1

.L4:

pop     rbp ; pop from stack

ret ; return eax

1. Assume it is decidable. Then there is a TM that decides whether L(M1)=L(M2), meaning it outputs either yes or no. Make M1 = to a machine that accepts M and w as input and M replaces its input with w if it accepts w and leaves it blank otherwise. Make M2 = to a reject machine that rejects anything. So, in some cases, L(M1)=L(M2) (when M1 doesn’t accept w) and in other cases they do not equal. This means we decided the halting problem which we know is undecidable so there is a contradiction meaning the original language is undecidable.