

# Formleg mál og reiknanleiki

Pétur

November 5, 2018

1.

$$10^{n+2}$$

2.

$$f(n) = n + 1$$

3.

a)

```
Input string w
while true do
    Sweep left to right across the tape sum tape 1 and tape 2 and
    write the outcome on tape 3.
end if tape1 and tape2 have reached the end
end while
```

b)

```
Input string w
while true do
    sweep left to right accross the tape sum tape 1 and 2 to tape3
end if tape1 and tape2 has reached the end
end while
```

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*Proof:*

*Suppose that CFG R decides EQTM. Then construct a CFG S:*

*$S = S(hMi)$ , M is a CFG:*

*1. R constructs the string  $hM$ ,  $Mi$ , where CFG cant produce the string*

*2. If R can construct the string then it is in the CFG ; Otherwise it is no*

*The above S decides ETM, which is undecidable*

*A contradiction and thus EQTM must be undecidable.*