

Q1 \Rightarrow CSP

Define variables:

$$\begin{array}{r} \text{FIVE} \\ + \text{THREE} \\ \hline \text{EIGHT} \end{array}$$

$\hookrightarrow \{F, I, V, E, T, H, R, G, H, T\}$

\Rightarrow Arithmetic constraint:

$$\text{FIVE} + \text{THREE} = \text{EIGHT}$$

$$= (1000\text{F} + 100\text{I} + 10\text{V} + 1\text{E}) + (10000\text{T} + 1000\text{H} + 100\text{R} + 10\text{E} + 1\text{E}) = \\ (10000\text{E} + 1000\text{I} + 100\text{G} + 10\text{H} + 1\text{T})$$

$$\Rightarrow \text{F}, \text{T}, \text{E} \neq 0$$

MCV: [E]; since it appears 3 times

MRV: [T]; assign early, since it's the leading digit and part of a 5-digit num

Solve:

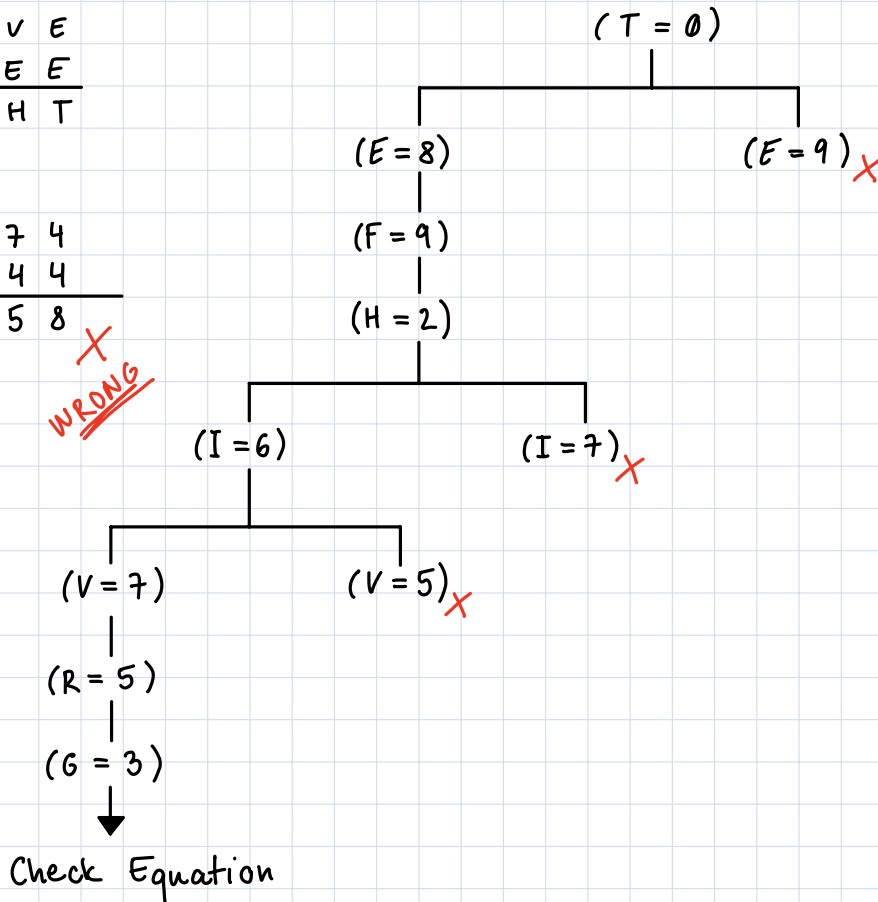
$$\begin{array}{r} \text{FIVE} \\ + \text{THREE} \\ \hline \text{EIGHT} \end{array}$$

↓

$$\begin{array}{r} 9174 \\ 85244 \\ \hline 41358 \end{array}$$

~~WRONG~~

Tree:



Trial & Error

$$\sim T=0, \sum F, H > 10$$

$$\sim E+E=T$$

$$\hookrightarrow \text{or } E+E\%10=T$$

~~{0, 1, 2, 3, 4, 5, 6, 7, 8}~~