- HW 1

- Modelling
- Algorithmic problem solving by 1. trivializing
- Reductions
- Know what you don't know.

Q: Thus 125 sheep and 5 dogs in a flock. How old is the shepherd?

2.5 horses. Every horse runs the race in the same time.
A race can have at most 3 horses.
Q: in a row, figure out how many horses can race.

sort all the horses using minimum number of races.

Subject sum problem
\[ S = \{s_1, s_2, \ldots, s_n\} \]
\[ T \subset S \]
\[ \sum_{x \in T} x = t \]
\[ x_{\min} \ldots x_{\max}, \theta \]
\[ x_i = 0 \Leftrightarrow \text{pick } x_i \text{ to } T. \]
\[ x_i = 1 \Leftrightarrow \text{pick } x_i \text{ to } T. \]

Solve the following
\[
\begin{align*}
\max & \sum_{x \in S} \theta \cdot x_i \\
\text{s.t.} & \sum_{x \in S} x_i = t \\
& x_i \leq \theta, \quad i = 1, \ldots, n
\end{align*}
\]

Integer program

Harting problem

\[ P \text{ program I want} \]

Q: Does \( P \) stop on the input \( I \)?