Problem: prove that for any \( n \geq 12 \), we can change \( n \) cents of postage using 4/5 cents stamps.

**pf.**

*Base Case:* \( n = 12 = 4 + 4 + 4 \), \( 13, 14, 15 \checkmark \)

*IH:* We can change \( n \) cents using 4/5 cent stamps for \( n-1 \geq 15 \), any amount \( 12 \leq k \leq n-1 \)

*IS:* Goal make a change for \( n \).

Start with a 4-cent stamp then use IH to change…

**Strong Induction**

\[ n \]

\[ n - 4 \]

\[ n - 1 \]

\[ n - 4 \leq n - 4 \leq n-1 \]

\[ n - 1 \geq 15 \Rightarrow n - 4 \geq 12 \]

Therefore by IH, \( p(n-4) \) holds and \( n \) is done.

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**G-S Alg example**

\[ m_1 \]
\[ w_1 \]
\[ w_2 \]
\[ w_3 \]

\[ m_2 \]
\[ w_1 \]
\[ w_3 \]
\[ w_2 \]

\[ m_3 \]
\[ w_3 \]
\[ w_1 \]
\[ w_2 \]

Claim: All men and women gets matched.

**pf.** Pf by contradiction
Claim: There is no unstable pair.

Proof: By contradiction!

Suppose $m_1, w_1$ is unstable.

Case 1: $m_1$ proposed to $w_1$.

$m_1$ not matched $\Rightarrow$ $w_1$ has rejected $m_1$.

$\Rightarrow$ By OBS $w_1$ prefers her match to $m_1$, contradiction!

Case 2: $m_1$ never proposed to $w_1$.

By OBS $m_1$ goes down his list.

$\Rightarrow$ he is matched to someone he likes more than $w_1$.

So $m_1, w_1$ is stable, contradiction!