More About Turing Machines
Supplement for Preparatory Viewing

Language To Be Considered

Let $\Sigma = \{\mathtt{a}, \mathtt{b}\}$ and let

$$L = \{\omega \in \Sigma^\star \mid \omega \text{ has the same number of } \mathtt{a}\text{'s as } \mathtt{b}\text{'s}\}$$

A High-Level Description for a Solution

On input $\omega \in \Sigma^\star$:

1. Consider all symbols in ω to be ***unmarked***.
2. `while` (there is at least one unmarked symbol) `{`
3. `if` (the leftmost unmarked symbol is "`a`") `{`
4. Mark this "leftmost unmarked symbol".
5. `if` (there is also an unmarked copy of "`b`") `{`
6. Mark the leftmost copy of "`b`"
   `} else {`
7. ***reject*** ω
   `}`
   `} else {`
8. Mark the leftmost symbol (which must be "`b`")
9. `if` (there is also an unmarked copy of "`a`") `{`
10. Mark the leftmost copy of "`a`"
    `} else {`
11. ***reject*** ω
    `}`
    `}`
    `}`
12. ***accept*** ω