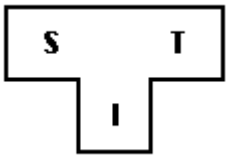
Bootstrapping

- Bootstrapping is widely used in the compilation development.
- Bootstrapping is used to produce a self-hosting compiler. Self-hosting compiler is a type of compiler that can compile its own source code.
- Bootstrap compiler is used to compile the compiler and then you can use this compiled compiler to compile everything else as well as future versions of itself.

A compiler can be characterized by three languages:

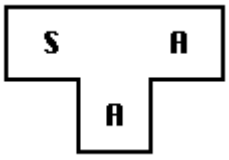
1. Source Language
2. Target Language
3. Implementation Language

The T- diagram shows a compiler ${}^{S}C_{I}{}^{T}$ for Source S, Target T, implemented in I.

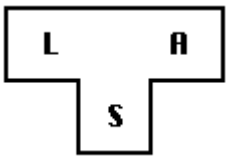


Follow some steps to produce a new language **L** for machine **A**:

1. Create a compiler ${}^{S}C_{A}{}^{A}$ for subset, S of the desired language, L using language "A" and that compiler runs on machine A.

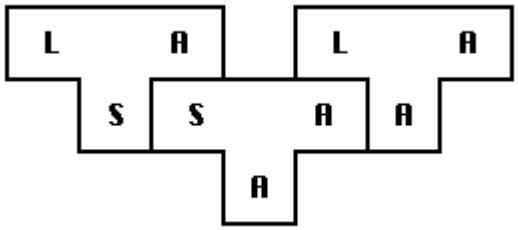


2. Create a compiler ${}^{L}C_{S}{}^{A}$ for language L written in a subset of L.



3. Compile ${}^{L}C_{S}{}^{A}$ using the compiler ${}^{S}C_{A}{}^{A}$ to obtain ${}^{L}C_{A}{}^{A}$. ${}^{L}C_{A}{}^{A}$ is a compiler for language L, which runs on machine A and produces code for machine A.

$$^{L}C_{S}^{A} \rightarrow {}^{S}C_{A}^{A} \rightarrow {}^{L}C_{A}^{A}$$



The process described by the T-diagrams is called bootstrapping.

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