ComPiler (Come on mr. Piler)

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facts

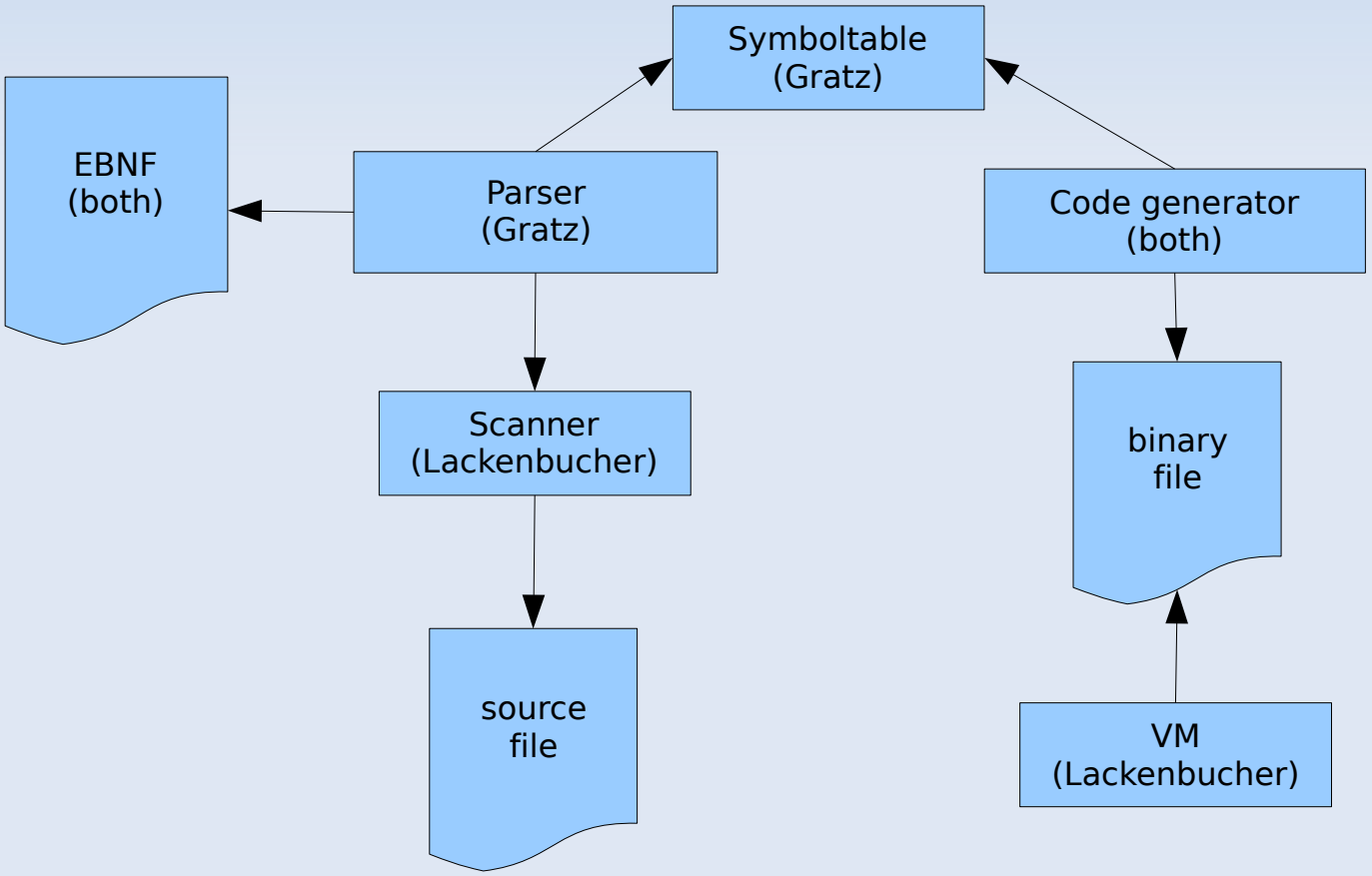
- language is subset of Java
- all components written in Java

- design concepts
  - single-pass compiler
  - recursive descent parser
  - vm based on DLX-Architecture

features

- basic data types (boolean, int, char)
- extended data type (String, Objects)
- global hiding (classes)
- local hiding (methods with return values)
- conditionals, loops
- one-dimensional arrays (primitive, extended)
- Syntax checking (weak and strong errorlevels)
- type safety
- basic I/O

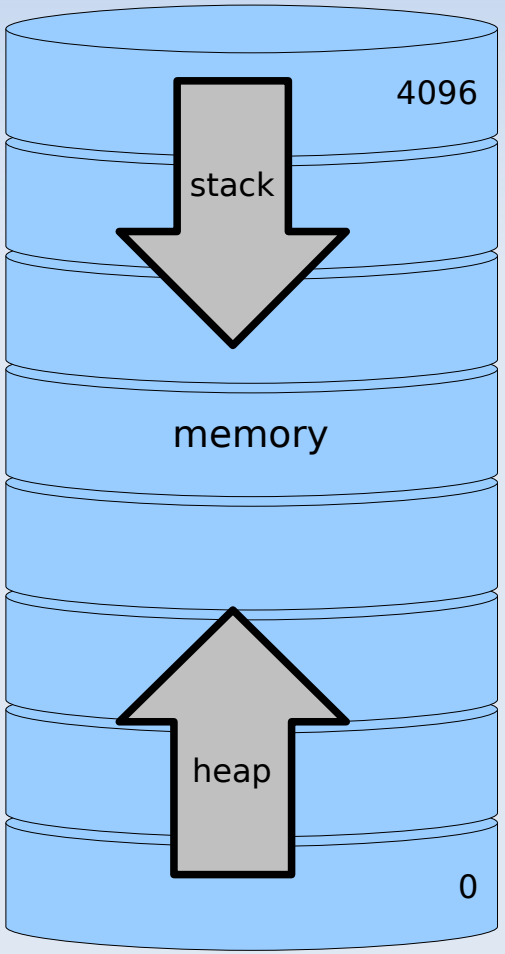
components

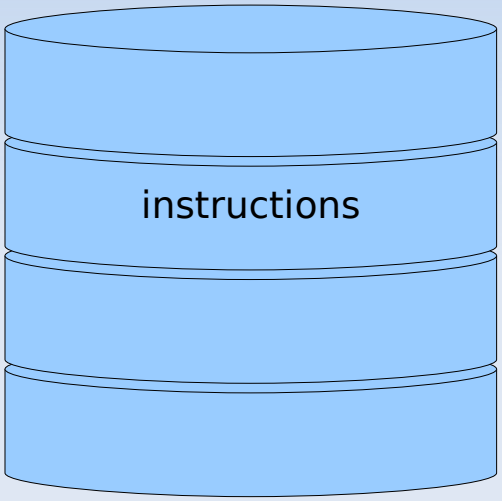

Symboltable
(Gratz)
EBNF
(both)
Parser
(Gratz)
Code generator
(both)
Scanner
(Lackenbucher)
binary
file
source
file
VM
(Lackenbucher)

Input - Output language

- Input-Language
  - LL(1) compliant subset of Java
- OutputLanguage
  - Based on DLX Architecture
  - Wirth's opCode-Format
  - binary outputfile starting with a magic-word
  - additional io commands: PRNI, PRNC

data storage





0 register
FP register
SP register
LNK register
28 general purpose registers
PC
IR (instruction register)

special feature

- Code optimization
  - delayed code generation (demo)
  - constant folding (demo)

demo

$$4195 = 2 + (3 + 4) * (a + 3 * ((3*b) * (4+c)))$$

without delayed cg

- ADDI 1, 0, 2
- ADDI 2, 0, 3
- ADDI 3, 0, 4
- LDW 4, FP, a
- ADDI 5, 0, 3
- ADDI 6, 0, 3
- LDW 7, 0, b
- MUL 6, 6, 7
- ADDI 7, 0, 4
- LDW 8, FP, c
- ADD 7, 7, 8
- ...

delayed cg

- LDW 1, 4086, b
- MULI 1, 6, 3
- LDW 2, 4086, c
- ADDI 2, 7, 4
- ...