

The following questions can be used to check your anderstanding and to prepare for the exam.

- 1 Associate the compiler tasks to the levels of language definition.
- 2 Describe the structure of compilers and the interfaces of the central phases.
- **3** Give examples for feedback between compiler phases.
- Which compiler tasks can be solved by generators? Explain generator input and output.

Questions: Lexical Analysis

- 1 Which formal methods are used to specify tokens?
- 2 How are tokens represented after the lexical analysis phase?
- Obscribe a method for the construction of finite state machines from regular expressions.
- What does the rule of the longest match mean?
- **5** Compare table-driven and directly programmed automata.
- 6 Which scanner generators do you know?



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Questions: Context-free Grammars and Syntactic Analysis

- Compare concrete and abstract syntax.
- 2 Describe the underlying principle of recursive descent parsers. Where is the stack?
- 8 How is tree construction achieved bottom-up in a recursive descent parser? How top-down?
- What is the grammar condition for recursive descent parsers?

Questions to check your Understanding

- **5** Why are bottom-up parsers in general more powerful than top-down parsers?
- 6 In which order do LR parsers construct derivations?
- **7** Which information does a state of a LR(1) automaton represent?
- **8** Describe the construction of a LR(1) automaton.
- **9** Which kinds of conflicts can an LR(1) automaton have?
- (Characterize LALR(1) automata in contrast to those for other grammar classes.
- ① Describe the hierarchy of LR and LL grammar classes.
- Which parser generators do you know?
- Explain the fundamental notions of syntax error handling.
- Describe a grammar situation where an LR parser would need unbounded lookahead.
- Explain: the syntactic structure shall reflect the semantic structure.

Questions: Attribute Grammars and Semantic Analysis

- 1 What are the fundamental notions of attribute grammars?
- 2 Which tree walk strategies are related to attribute grammar classes?
- 3 What do visit-sequences control? What do they consist of?
- What do dependence graphs represent?
- **5** What is an attribute partition; what is its role for tree walking?
- 6 Explain the LAG(k) condition.
- Ø Describe the algorithm for the LAG(k) check.
- 8 Which attribute grammar generators do you know?
- 9 How is type checking of expressions specified?
- I How is name analysis for C scope rules specified?
- I How is name analysis for Algol scope rules specified?
- Description by the creation of target trees specified?



Questions: Name Analysis

- 1 How are bindings established explicitly and implicitly?
- What are the consequences if defining occurrence before applied occurrence is required?
- 3 Explain where multiple definitions of a name could be reasonable?
- **4** Explain class hierarchies with respect to static binding.
- **5** Explain the data structure for representing bindings in the environment module.
- 6 How is the lookup of bindings efficiently implemented?
- How is name analysis for C scope rules specified by attribute computations?
- 8 How is name analysis for Algol scope rules specified by attribute computations?

Questions: Type Analysis

- 1 Which language properties are specified for a statically typed language?
- 2 Give examples of strongly and weakly typed languages
- 3 Give examples of dynamically typed languages
- What are the tasks of type analysis?
- **5** Explain the difference between monomorphism and polymorphism
- 6 Describe two different kinds of parametric polymorphism

Questions to check your Understanding

- Ø Describe the classification of polymorphism
- 8 What is coercion, and in which situations has the compiler to consider it?
- 9 Explain inclusion polymorphism

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Questions: Dynamic Semantics and Transformation

- Describe semantic domains for the denotational description of an imperative language.
- 2 Describe the definition of the functions E and C for the denotational description of an imperative language.
- 3 How is the semantics of a while loop specified in denotational semantics?
- **4** How is the creation of target trees specified by attribute computations?
- **5** PTG is a generator for creating structured texts. Explain its approach.