

# Theory exam test, December 16, 2021

**Due** No due date      **Points** 20      **Questions** 20

**Available** Dec 16 at 9am - Dec 16 at 11:59am about 3 hours

**Time Limit** 45 Minutes

## Instructions

### Instructions for the quiz

Your quiz activity is being logged, please do not change to other windows while filling the quiz. Upon suspicious activities in your log, we may decide to ignore some of your answers.

**You are authenticating yourself for the exam by logging into Canvas with your own credentials. Please note that the exam is closed-book, using external material during the test is strictly forbidden. By submitting the quiz, you declare that you worked on your own, nobody helped you and you have not used any external material while filling the quiz.**

The theory test consists of **20 multiple-choice questions** which you need to answer in **45 minutes**. You have to solve them in order, one at a time. Please note that you cannot postpone questions or navigate back to previous questions, so do select one of the options for each question. The questions as well as the order of the possible answers are randomized.

## Grading scale

### Percentage Points Grade

90-100	18-20	5
75-89	15-17	4
60-74	12-14	3
45-59	9-11	2
0-44	0-8	1

## Attempt History

	Attempt	Time	Score
<b>LATEST</b>	<a href="#">Attempt 1</a>	21 minutes	20 out of 20

❗ Correct answers are hidden.

Score for this quiz: **20** out of 20

Submitted Dec 16 at 9:23am

This attempt took 21 minutes.

**Question 1**

**1 / 1 pts**

Under what restrictions can Chomsky-2 grammars express regular languages?

- ☐ The regular language has to be deterministic.
- ☐ The regular language has to be finite.
- ☒ No restrictions are needed, any regular language can be defined by means of context-free grammars.
- ☐ Under no restrictions can Chomsky-2 grammars define regular languages.

## Question 2

1 / 1 pts

In compilers, the role of the *input handler* is to...

- ☒ Read the contents of the source code from a file into a character buffer.
- ☐ Drop comments from the source code.
- ☐ Drop whitespace characters from the source code.
- ☐ Preprocess the source code.

## Question 3

1 / 1 pts

Which of the following regular expressions matches the string "abc"?

- ☐  $a^*b^{**}$
- ☐ All of them.
- ☐  $a^*|b^*|c^*$
- ☒  $ab^*c$

**Question 4****1 / 1 pts**

Which of the following regular expressions generates the same language as: **ab<sup>+</sup>**

- ☐ ab<sup>\*</sup>b<sup>\*</sup>
- ☐ (ab)<sup>+</sup>
- ☒ None of them.
- ☐ a(bb)<sup>\*</sup>

**Question 5****1 / 1 pts**

Which of the following is a subset of the regular language defined by the regular expression **ab<sup>\*</sup>c<sup>\*</sup>**?

- ☐ {aa, ab, ac}
- ☐ {a, aa, aaa}
- ☒ {a, ab, abc}
- ☐ {ab, abab}

**Question 6****1 / 1 pts**

Which of the following regular expression defines a finite language?

- ☐ None of them.
- ☐ a+b<sup>+</sup>
- ☒ a?b?

☐  $a^*b^*$

**Question 7****1 / 1 pts**

Which of the following is a subset of the regular language defined by the regular expression:  $a^*b^*c^*$

☐ None of them.

☐ {abc, abcabc}

☐ {a, ab, abab}

☒ {a, ab, abc}

**Question 8****1 / 1 pts**

Which of the following is false? Lexical analysis...

☒ always drops whitespaces.

☐ is performed by a deterministic automaton.

☐ is performed prior to parsing.

☐ turns text into tokens.

**Question 9****1 / 1 pts**

Successful predictive top-down parsing yields the...

☐ Non-linear derivation.

- ☐ Rightmost derivation.
- ☒ Leftmost derivation.
- ☐ Minimal derivation.

**Question 10****1 / 1 pts**

Bottom-up parsing is based on the idea of viable prefixes and handles of sentential forms. Which of the following is true?

- ☐ Maximal viable prefixes are always handles.
- ☒ Maximal viable prefixes always contain handles.
- ☐ All viable prefixes contain at least one handle.
- ☐ The handle is the rightmost simple phrase of the sentential form.

**Question 11****1 / 1 pts**

Parsing yields a syntax tree. Which of the following is true regarding this tree?

- ☒ The root is labeled with a non-terminal symbol.
- ☐ The leaves are labeled with non-terminal symbols.
- ☐ None of the other answers are true.
- ☐ The syntax tree is independent of the syntax grammar.

**Question 12****1 / 1 pts**

Syntactic analyzers (parsers) produce the syntax tree for programs based on a Chomsky-2 grammar defining the language syntax. What is the input of parsing?

- ☒ A list of tokens.
- ☐ A list of characters.
- ☐ A set of tokens.
- ☐ A set of characters.

### Question 13

1 / 1 pts

Syntax of programming languages is usually defined with a...

- ☐ Chomsky-0 formal grammar.
- ☐ Chomsky-3 formal grammar.
- ☒ Chomsky-2 formal grammar.
- ☐ Chomsky-1 formal grammar.

### Question 14

1 / 1 pts

Shift-reduce parsing maintains the prefix of the sentential form in a stack, which may contain either terminal or non-terminal symbols. On **shift** action, ...

- ☒ A terminal symbol is moved from the input to the stack.
- ☐ A non-terminal symbol is moved from the input to the stack.
- ☐ A terminal symbol is removed from the stack.

- ☐ A non-terminal symbol is removed from the stack.

**Question 15****1 / 1 pts**

Which of the following is true regarding synthesized attributes?

- ☐ They are always computed based on attributes of terminal symbols.
- ☐ Non-terminal symbols cannot have synthesised attributes.
- ☒ They carry information bottom-up in the syntax tree.
- ☐ They carry information top-down in the syntax tree.

**Question 16****1 / 1 pts**

Semantic analysis, among other properties, checks type-correctness. Which of the following is true regarding typing of programming languages?

- ☐ In statically typed languages, types are checked in compilation-time.
- ☐ In dynamically typed languages, automatic type conversions may happen.
- ☒ All the answers are correct.
- ☐ In dynamically typed languages, types are checked in run-time.

**Question 17****1 / 1 pts**

BisonC++ implements semantic analysers with a special class of attributed grammars. In particular, it only supports...

- ☐ Inherited attributes.
- ☐ Code attributes.
- ☒ Synthesised attributes.
- ☐ String attributes.

**Question 18****1 / 1 pts**

Assembly is a family of low-level programming languages. In such languages, program control is obtained by...

- ☐ Goto statements with line numbers.
- ☒ Conditional and unconditional jump instructions.
- ☐ Cyclic evaluation of function definitions.
- ☐ Only using while loops and simple branching statements.

**Question 19****1 / 1 pts**

Which of the following instructions is guaranteed to zero the value of the EAX register?

- ☒ `xor eax, eax`
- ☐ `add eax, eax`
- ☐ `and eax, eax`
- ☐ `or eax, eax`



**Question 20****1 / 1 pts**

Which of the following instructions does not change the value of the **esp** register?

- ☐ call eax
- ☐ push eax
- ☐ pop eax
- ☒ mov eax, esp

Quiz Score: **20** out of 20