Theory exam test, January 10, 2024 FIXED

Due No due date **Points** 20 **Questions** 20
Available Jan 10 at 1:15pm - Jan 10 at 2:15pm about 1 hour **Time Limit** 40 Minutes

Instructions

- **You authenticate yourself for the exam by logging into Canvas with your credentials.**
- **You may browse the Internet but cannot use it to communicate with other people or chatbots.**
- **By submitting the quiz, you declare that you worked on your own, and nobody helped you.**
- **By submitting the quiz, you declare that you have not used chatbots (such as Phind, ChatGPT, Bard or Claude) when answering the questions.**
- **Please note that should we notice that you are communicating with your fellows or chatbots, your exam will be terminated immediately.**

The theory test consists of **20 single-choice questions** you must answer in **40 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 select one of the options for each question. The questions as well as the order of the possible answers are randomized. Be careful with time management and don't waste your time on searching for the answer on the Internet.

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
LATEST	Attempt 1	33 minutes	17 out of 20

ⓘ Correct answers are hidden.

Score for this quiz: **17** out of 20
Submitted Jan 10 at 1:50pm
This attempt took 33 minutes.

Question 1 1 / 1 pts

The primary role of programming language compilers is to …

- Specify/define programming languages.
- Find logic errors and bugs in programs.
- Provide language servers for programming languages.
- Analyze programs and translate them to other languages.

Question 2

1 / 1 pts

Consider the following grammar (the start symbol is `S`):

```
S → a A
A → b B
B → a b
```

Which of the following is **not** a viable prefix?

- ab
- a
- abab
- b

Question 3

1 / 1 pts

Consider the following regular expression:

```
aa*b*b*|b*
```

Which of the following regular expressions generates the same language?

- a(b*|b+)
- ab*

- a*b*
- b*

Question 4

1 / 1 pts

Which of the following is a subset of the regular language defined by the regular expression ab*|a?

- {a, ab}
- {a, aa}
- {ab, ba}
- {aba}

Question 5

1 / 1 pts

Which of the following strings is included in the regular language defined by the regular expression a*b+c*d ?

- dd
- ab
- bb
- bd

Question 6

1 / 1 pts

Which of the following is a top-down parsing technique?

- LALR(1)

- LL(1)
- LR(1)
- SLR(1)

Question 7

1 / 1 pts

Which of the following parsing techniques uses the largest number of states to represent viable prefixes?

- LR(1)
- LL(1)
- SLR(1)
- LALR(1)

Question 8

1 / 1 pts

Consider the following grammar (the start symbol is S):

```
S → a A
S → b
A → a A
A → b A
A → c A
A → d A
A → S
A → ε
```

Removing which of the rules makes the grammar LL(1)?

- A → S
- A → ε
- None
- S → b

Question 9

1 / 1 pts

Consider the following grammar (the start symbol is `S`):

```
S → x | y
```

Suppose that the LR(0) parser is in configuration `(#0, z#)`. What is the next step it takes?

- (●) error
- ( ) accept
- ( ) reduce
- ( ) shift

Incorrect

Question 10

0 / 1 pts

Suppose that a context-free grammar contains the following rule:

```
A → B
```

Which of the following holds?

- ( ) FIRST(B) contains FIRST(A)
- ( ) FOLLOW(B) contains FOLLOW(A)
- (●) FOLLOW(A) contains FOLLOW(B)
- ( ) None

Question 11

1 / 1 pts

Consider the following grammar (the start symbol is `S`):

```
S → A b
S → A c
A → a
```

Which of the following statements is true?

- The grammar is not regular.
- The grammar is not context-free.
- The grammar is not LL(1).
- The grammar's language is infinite.

Question 12

1 / 1 pts

Which of the following statements is true?

- Any context-free grammar can be converted to an equivalent deterministic finite automaton.
- Any regular expression can be converted to an equivalent nondeterministic finite automaton.
- Regular expressions have the same expressive power as context-free grammars.
- Regular expressions are strictly more expressive than regular grammars.

Question 13

1 / 1 pts

Consider the following regular expression:

```
(a)(a)(a)*
```

Which of the following regular expressions generates the same language?

- a*

- a*a*
- a+a+
- a+

Question 14

1 / 1 pts

Consider the following grammar (the start symbol is S):

```
S → a A
A → b B
B → a b
```

Which of the following LR item sequences represents the viable prefix ab?

- [B → a b .]
- [S → a . A], [B → a . b]
- [S → a . A], [A → b . B], [B → a b .]
- [S → a . A], [A → b . B]

Question 15

1 / 1 pts

Which of the following compiler phases builds the structure tree of the input program?

- Code generation
- Semantic analysis
- Syntax analysis
- Lexical analysis

Incorrect

Question 16

0 / 1 pts

Consider the following grammar (the start symbol is S):

```
S → a A
A → b B
B → a b
```

Which of the following is a maximal viable prefix?

- abab
- a
- aba
- ab

Question 17

1 / 1 pts

Which of the following statements is true?

- S-attribute grammars have no inherited attributes.
- In S-attribute grammars, a symbol can only have a single attribute.
- S-attribute grammars have no synthesised attributes.
- In S-attribute grammars, only terminal symbols can have inherited attributes.

Question 18

1 / 1 pts

In the name SLR(1), the 1 means that the parser …

- can predict the validity of the sentence based on its first symbol.

only supports grammars with at most 1 production rule for each nonterminal.

can only reduce handles of length 1.

uses 1 symbol lookahead to decide on the next action.

Incorrect

Question 19

0 / 1 pts

Consider the following grammar (the start symbol is S):

```
S → a A
A → A a
A → A b
A → a b
```

What is the handle of the sentential form aAa?

aAa is not a sentential form.

aA

aAa

Aa

Question 20

1 / 1 pts

Consider the following grammar (the start symbol is S):

```
S → A a | b S a c
A → S A S | b
```

Which of the following is a **not** subset of FOLLOW(S)?

FIRST(S)

{a,c}

FOLLOW(A)

FIRST(A)

Quiz Score: **17** out of 20