



## Compiler Design

Assignment - Week 0

TYPE OF QUESTION:MCQ

Number of questions: 11

Total mark:  $11 \times 1 = 11$ 

Q1.

Task of a compiler is to

- a) Translate one statement at a time and execute it
- b) Translate the whole program to machine language
- c) Translate one statement of the program at a time
- d) None of the other options

ANS : b)

**Explanation:** A compiler is a program that translates the entire source code of a program written in a high-level programming language into machine code or an intermediate language in one go. The resulting code can then be executed by the machine.

Q2.

In a computer system, number of compilers for a particular programming language may Be

- a) Two
- b) Three
- c) Four
- d) Many

ANS: d)

**Explanation:**

There can be **many compilers** for a particular programming language in a computer system. This is because:

**Platform-specific compilers:** Different compilers are designed for different hardware architectures or operating systems. For example, compilers like GCC, Clang, and Microsoft C++ Compiler all support the C++ language but are optimized for different platforms.

**Optimization and feature differences:** Some compilers offer specific optimizations or additional features that others do not. Developers may choose a compiler based on their project's needs.

**Open-source vs. proprietary:** Both open-source compilers (like GCC or LLVM) and proprietary compilers (like Intel C++ Compiler or Oracle's Java Compiler) exist for many

languages.

**Specialized use cases:** Some compilers are tailored for education, embedded systems, or research purposes.

Thus, for a single programming language, there can be **many compilers** available.

Q3.

Natural language constructs are

- a) Ambiguous
- b) Unambiguous
- c) May be Unambiguous or ambiguous
- d) None of the other options

ANS: c)

**Explanation:**

Q4.

Suppose there is a compiler for C language that can generate code for Computer A. Which of the following statements is true

- a) It can be used for Computer A only
- b) It can be used for any computer
- c) It can be used only for computers with similar processor and operating system
- d) It can be used only for computers with similar processor, operating system and peripherals

ANS: c)

**Explanation:** A compiler generates machine code that is specific to a processor architecture (e.g., x86, ARM) and, in many cases, tailored to a specific operating system (e.g., Windows, Linux). This is because:

**Processor-specific code:** Machine code instructions are designed for specific CPU architectures. Code compiled for one processor (e.g., x86) will not run on another (e.g., ARM).

**Operating system dependencies:** Compilers often generate code that relies on system calls, libraries, and APIs provided by the operating system. Code designed for one OS may not work on another.

**Peripherals:** While peripherals (e.g., printers, external devices) may vary, they are typically abstracted through drivers and APIs, so their exact configuration is not directly relevant to the compiler.

Q5.

Which of the following data structures may be **good** if there are **frequent search** for **data** items followed by **insertion and deletion**?

- a) Array
- b) Link List
- c) Tree
- d) Hash Table

ANS: d)

**Explanation:** A Hash Table is efficient for frequent searches, insertions, and deletions because it provides  $O(1)$  average time complexity for all these operations. Data is quickly accessed, inserted, or deleted using a key and a hash function, making it highly efficient for dynamic data handling.

Q6.

Task of an interpreter is to

- a) Translate one statement of the program at a time
- b) Translate one statement at a time and execute it
- c) Translate the whole program to machine language
- d) None of the other options

ANS: b)

**Explanation:** An interpreter processes and executes a program one statement at a time. It directly translates the high-level code into machine-executable instructions without producing a separate machine code file.

Q7.

If an **Infinite language** is passed to **Machine M**, the **subsidiary** which gives a **finite solution** to the **infinite input tape** is \_\_\_\_\_

- a) Compiler
- b) Interpreter
- c) Loader and linkers
- d) None of the mentioned

ANS : a)

**Explanation:** A Compiler is used to give a finite solution to an infinite phenomenon. Example of an infinite phenomenon is Language C, etc.

Q8.

Languages of a automata is

- a) If it is accepted by automata
- b) If it halts
- c) If automata touch final state in its life time
- d) All language are language of automata

ANS: a)

**Explanation:** If a string accepted by automata it is called language of automata.

Q9.

Finite automata requires minimum \_\_\_\_\_ number of stacks.

- a) 1
- b) 0
- c) 2
- d) None of the mentioned

ANS: b)

**Explanation:** Finite automata doesn't require any stack operation .

Q10.

The basic limitation of finite automata is that

- a) It can't remember arbitrary large amount of information.
- b) It sometimes recognize grammar that are not regular.
- c) It sometimes fails to recognize regular grammar.
- d) All of the mentioned

ANS: a)

**Explanation:** Because there is no memory associated with automata.

Q11.

Which of the following languages can be recognized by finite automata?

- a) Regular languages
- b) Context-free languages
- c) Context-sensitive languages
- d) None of the mentioned

ANS: a)

**Explanation:** Finite automata are limited to recognizing regular languages, which are defined by regular expressions. They cannot handle languages requiring memory, such as context-free or context-sensitive languages.

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END of Assignment

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# Week 1 : Assignment 1

The due date for submitting this assignment has passed.

**Due on 2025-02-05, 23:59 IST.**

Assignment submitted on 2025-02-03, 22:48 IST

- 1) Which phase of compiler does NOT use symbol table? 1 point

- a) Code generation
- b) Syntax Analysis
- c) Lexical Analysis
- d) None of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**d**

- 2) Which phase of compiler is Syntax Analysis? 1 point

- a) First
- b) Second
- c) Third
- d) None of the mentioned

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**b**

- 3) Output of the syntax analysis is called 1 point

- a) Parse tree
- b) Keyword tree
- c) Binary tree
- d) All of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**a**

- 4) A programming language does not allow integer division operation. This is generally detected in the phase of 1 point

- a) Lexical Analysis
- b) Syntax Analysis
- c) Semantic Analysis
- d) None of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**c**

- 5) Which of these is not true about Symbol Table 1 point

- a) All the labels of the instructions are symbols
- b) Table has entry for symbol name address value
- c) Perform the processing of the assembler directives
- d) Created during pass 1

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**c**

- 6) A compiler can check 1 point

- a) Logical error

- b) Syntax error

- c) Both logical error and syntax error

- d) Not logical and syntax error

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**b**

- 7) Error recovery helps to 1 point

- a) Report multiple errors
- b) Rectify multiple errors
- c) Both report and rectify multiple errors
- d) None of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**a**

- 8) Converting a hardware description into actual circuitry is known as 1 point

- a) Silicon Compilation
- b) HDL Compilation
- c) Circuit Compilation
- d) None of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**a**

- 9) Loops are the major targets for optimization since 1 point

- a) Loop may go to infinite execution
- b) Loop body is repeated to several times
- c) Condition check takes exceedingly large time
- d) None of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**a**

- 10) For maximum speed of execution of target code , temporary variables be best allocated to 1 point

- a) Swap space

- b) Main memory

- c) CPU registers

- d) None of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**b**

- 11) Intermediate code helps in 1 point

- a) Program Analysis
- b) Code optimization
- c) Retargeting code
- d) Code check

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**c**

- 12) Output file of Lex is \_\_\_\_ the input file is Myfile 1 point

- a) Myfile.e

- b) Myfile.yyy.c

- c) Myfile.lex

- d) Myfile.obj

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

**b**

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## Week 2 : Assignment 2

The due date for submitting this assignment has passed.

Due on 2025-02-05, 23:59 IST.

Assignment submitted on 2025-02-03, 22:57 IST

1) A regular expression represents

1 point

- a) Part of a language
- b) Cannot represent any language
- c) Constituent strings of a language
- d) None of the other options

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

2)

1 point

When expression sum=3+2 is tokenized then what is the token category of 3

- a) Identifier
- b) Assignment operator
- c) Integer literal
- d) Addition operator

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

3)

1 point

For the Fortran language statement "DO 5 I = 1.25" returns token IDENTIFIER for DO 5 I after looking upto

- a) I
- b) =
- c) .
- d) 5

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

4)

1 point

Which of the following are Lexemes?

- a) Identifiers
- b) Constants
- c) Keywords
- d) All of the mentioned

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

5)

1 point

A regular expression for accepting strings with exactly one 1 more than 0's is

- a)  $0^*1$
- b)  $(0|1)^*1(0|1)^*$
- c)  $(0|1)^*1(0|1)^*1(0|1)^*$
- d) Not Possible

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

6)

1 point

Which one of the following languages over the alphabet {0,1} is described by the regular expression:  $(0+1)^*0(0+1)^*0(0+1)^*$

- a) The set of all strings containing the substring 00.
- b) The set of all strings containing at most two 0's.
- c) The set of all strings containing at least two 0's.
- d) The set of all strings that begin and end with either 0 or 1.

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

7)

1 point

Finite automata is an implementation of

- a) Regular expression
- b) Any grammar
- c) Part of the regular expression
- d) None of the other options

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

a

8)

1 point

The automation which allows transformation to a new state without consuming any input symbols:

- a) NFA
- b) DFA
- c) Pushdown automata
- d) All of the mentioned

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

9)

1 point

The \_\_\_\_\_ of a set of states, P, of an NFA is defined as the set of states reachable from any state in P following  $\epsilon$ -transitions

- a)  $\epsilon$ -closure
- b)  $\epsilon$ -park
- c) Q in the tuple
- d) None of the mentioned

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

10)

1 point

Between NFA and DFA which one is powerful

- a) NFA
- b) DFA
- c) Equally powerful
- d) Cannot be said definitely

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

11)

1 point

Subset Construction method refers to

- a) Conversion of NFA to DFA
- b) DFA minimization
- c) Eliminating null references
- d)  $\epsilon$ -NFA to NFA

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

a

12)

1 point

Which of the following do we use to form an NFA from a regular expression

- a) Subset construction method
- b) Powerful set construction method
- c) Thompson construction method
- d) Scott construction method

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

13)

1 point

A certain compiler corrects errors like "fi" to "if" automatically. This is an example of recovery in

- a) Panic mode
- b) Delete character
- c) Replace Character
- d) Transpose character

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

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## Week 3 : Assignment 3

The due date for submitting this assignment has passed.

Due on 2025-02-12, 23:59 IST.

Assignment submitted on 2025-02-11, 21:46 IST

1) Which of the following is a lexical analysis tool 1 point

- a) Lex
- b) Flex
- c) Jflex
- d) All of the other options

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

2) In a lex specification file "?" stands for 1 point

- a) 0 or more occurrences of preceding regular expression
- b) One or more occurrences of preceding regular expression
- c) Exactly one occurrences of preceding regular expression
- d) None of the other options

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

3) Between NFA and DFA which an has the potential to have more states in it 1 point

- a) DFA
- b) NFA
- c) Cannot be said deterministically
- d) Both of same number of sets

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

4) Which of the following has more expressive power 1 point

- a) DFA
- b) NFA
- c) Regular expression
- d) All of the mentioned

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

5) Lex specification file sections are demarcated by 1 point

- a) %
- b) {%
- c) %}
- d) %%

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

6)  $\epsilon$ -closure of a state includes 1 point

- a) All states reachable from it by  $\epsilon$  transitions only
- b) All states reachable from it by single  $\epsilon$  transitions only
- c) All states from which this state can be reached using  $\epsilon$  transitions
- d) All states from which this state can be reached using  $\epsilon$  transitions and all states reachable from it by  $\epsilon$  transitions only

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

a

7) Which among the following is false? 1 point

$\epsilon$ -closure of a subset S of Q is:

- a) Every element of S
- b) For any  $q \in \epsilon$ -closure, every element of  $\delta(q, \epsilon)$  is in  $\epsilon$ -closure.
- c) No other element is in  $\epsilon(S)$
- d) None of the mentioned

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

8) Output of lex program is available in a file named 1 point

- a) Lex.c
- b) Lex.yy.c
- c) Lex.l
- d) Lex.yy.l

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

9) All the regular languages can have one or more of the following descriptions: 1 point

- i) DFA
- ii) NFA
- iii) Regular Expressions

Which of the following are correct?

- a) i only
- b) ii, iii
- c) i, ii
- d) iii only

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

10) Number of sections in a lex program is 1 point

- a) 1
- b) 2
- c) 3
- d) 4

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

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## Week 4 : Assignment 4

The due date for submitting this assignment has passed.

**Due on 2025-02-19, 23:59 IST.**

Assignment submitted on 2025-02-11, 21:45 IST

1) Words of a language constitute

1 point

- a) Set of terminals
- b) Set of non terminals
- c) Set of both terminals and non terminals
- d) None of the other options

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

A

2) The grammar  $\{E \rightarrow E + E \mid E * E \mid id\}$  is

1 point

- a) Ambiguous
- b) Unambiguous
- c) Partially ambiguous
- d) None of the other options

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

A

3) Which of the following are always unambiguous

1 point

- a) Producing one left-most and one right-most derivation
- b) Producing one left-most but may be multiple right-most
- c) Producing one right-most but may be multiple left-most
- d) None of the other options

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

A

4) A language that admits only ambiguous grammar:

1 point

- a) Inherent Ambiguous language
- b) Inherent Unambiguous language
- c) Context free language
- d) Context Sensitive language

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

A

5) A grammar with production rules  $\{A \rightarrow Ba \mid Cb, B \rightarrow CA, C \rightarrow c \mid \epsilon\}$  contains

1 point

- a) Left factor
- b) Left recursion
- c) Both left factor and left recursion
- d) None of the other options

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

B

6) For the grammar rules  $\{S \rightarrow Aa \mid bB, A \rightarrow c \mid \epsilon\}$ , FIRST(S) is

1 point

- a) {b, c}
- b) {a, b}
- c) {a,b, c}
- d) {a,b, c, ε}

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

C

7) The grammar  $\{E \rightarrow E + T \mid T, T \rightarrow T^* F \mid F, F \rightarrow id\}$  is

1 point

- a) Ambiguous
- b) Unambiguous
- c) Partially ambiguous
- d) None of the other options

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

B

8) Derivation produced by a top-down parser is

1 point

- a) Leftmost
- b) Rightmost
- c) Either leftmost and rightmost
- d) None of the other options

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

A

9) For top-down parsing left recursion removal is

1 point

- a) Mandatory
- b) Desirable
- c) Too complex
- d) Not needed

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

A

10) A grammar is ambiguous if

1 point

- a) It's left most and right most derivations are different
- b) More than one left most derivations exist
- c) There is no left most derivation
- d) There is no rightmost derivation

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 1

Accepted Answers:

B

11) A predictive parser

0 points

- (A) Needs backtracking
- (B) Does not need backtracking
- (C) May not terminate
- (D) None of the other options

 A  
 B  
 C  
 D

Yes, the answer is correct.

Score: 0

Accepted Answers:

A

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## Week 5 : Assignment 5

The due date for submitting this assignment has passed.

**Due on 2025-02-26, 23:59 IST.**

Assignment submitted on 2025-02-18, 20:19 IST

1) In shift-reduce parsing, handle is at 1 point

- a) Top of the stack
- b) bottom of the stack
- c) Anywhere in the stack
- d) Nowhere in the stack

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

a

2) Which of the following conflicts is not possible in shift-reduce parsing 1 point

- a) Reduce-reduce conflict
- b) Shift-reduce conflict
- c) Shift-shift conflict
- d) None of the other options

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

3) Which one of the following is true at any valid state in shift-reduce parsing 1 point

- a) At the bottom we find the prefixes
- b) None of the mentioned
- c) Stack contains only viable prefixes
- d) Stack consists of viable prefixes

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

4) For the grammar 1 point

$$\begin{aligned} S &\rightarrow AB \mid C \\ A &\rightarrow bA \mid a \\ B &\rightarrow abbS \mid bS \mid \epsilon \\ C &\rightarrow bC \mid \epsilon \end{aligned}$$

Follow(A) is

- a) a, \$
- b) a, b, \$
- c) a, b
- d) b, \$

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

5) Shift reduce parsers are 1 point

- a) Top down Parser
- b) Bottom up Parser
- c) May be top down or bottom up
- d) None of the mentioned

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

6) Shift reduce parsers are 1 point

- a) Top down Parser
- b) Bottom up Parser
- c) May be top down or bottom up
- d) None of the mentioned

a  
 b  
 c  
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

a

7) In Operator Precedence parsing handle is 1 point

- a) Before <·
- b) After ·>
- c) Between <· and ·>
- d) None of the other options

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

8) By considering the rule B → abbS, which of the precedence relations between a and b can be inferred? 1 point

(A) a ≈ b only

(B) a ≈ b and b ≈ b

(C) b ≈ a and a ≈ b

(D) b ≈ a and b ≈ b

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

9) An operator-precedence parser is a 1 point

- a) Shift-reduce parser
- b) Bottom-up parser
- c) Parser constructing derivation in the reverse
- d) All the other options

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

10) Bottom up parsing involves 1 point

- a) Shift reduce
- b) Handle pruning
- c) None of the mentioned
- d) Both shift reduce and handle pruning

a  
 b  
 c  
 d

Yes, the answer is correct.

Score: 1

Accepted Answers:

d

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## Week 6 : Assignment 6

The due date for submitting this assignment has passed.

Due on 2025-03-05, 23:59 IST.

Assignment submitted on 2025-02-22, 00:17 IST

- 1) For the grammar

$$S' \rightarrow S$$

$$S \rightarrow CC$$

$$C \rightarrow cC \mid d$$

In state 0 of LR(1) parser, an item included is

- a)  $C \rightarrow .cC; c$
- b)  $C \rightarrow .cC; d$
- c)  $C \rightarrow .cC; c, d$
- d)  $C \rightarrow .cC; c, \$$

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

- 2) For the grammar

$$S' \rightarrow S$$

$$S \rightarrow CC$$

$$C \rightarrow cC \mid d$$

In state 0 of LR(1) parser, an item included is

- a)  $C \rightarrow .d; c$
- b)  $C \rightarrow .d; d$
- c)  $C \rightarrow .d; c, d$
- d)  $C \rightarrow .d; c, \$$

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

- 3)

1 point

In SLR parsing to get a shift-reduce conflict for state I on terminal symbol 'a',

- a)  $A \rightarrow \alpha. \beta$  with  $\text{First}(\beta)$  containing 'a' should be in I
- b)  $A \rightarrow \delta.$  be in I with  $\text{Follow}(A)$  having 'a'
- c)  $A \rightarrow \alpha. \beta$  with  $\text{First}(\beta)$  containing 'a' should be in I and  $A \rightarrow \delta.$  be in I with  $\text{Follow}(A)$  having 'a'
- d) None of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

- 4)

1 point

In state I we have the items  $A \rightarrow \alpha.$  and  $B \rightarrow \delta.$ ,  $\text{First}(A)$ ,  $\text{Follow}(A)$  and  $\text{Follow}(B)$  contains the symbol 'a'. This leads to

- a) Shift-reduce conflict
- b) Reduce – reduce conflict
- c) Both shift-reduce and reduce – reduce conflicts
- d) No conflicts

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

- 5)

1 point

Which of the following statements is true regarding LR parsers?

- a) SLR and Canonical LR have the same number of states.
- b) LALR and Canonical LR have the same number of states.
- c) SLR and LALR have the same number of states.
- d) All three have the same number of states.

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

c

- 6)

1 point

Construction of parsing table in which strategies do not need the Follow set?

- a) SLR and canonical LR
- b) Canonical LR and LALR
- c) SLR and LALR
- d) None of the given options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

- 7)

1 point

In SLR parsing for the grammar

$$E' \rightarrow E$$

$$E \rightarrow aEbE \mid bEaE \mid \epsilon$$

In state 0, for inputs 'a' and 'b'

- a) Both will have shift-reduce conflict
- b) Only 'a' will have shift-reduce conflict
- c) Only 'b' will have shift-reduce conflict
- d) Neither of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

- 8)

1 point

Amount of look ahead in LALR parser is

- a) 1
- b) 2
- c) 3
- d) None

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

- 9)

1 point

In SLR parsing for the grammar

$$S \rightarrow B \mid SabS$$

$$B \rightarrow bB \mid \epsilon$$

In state 0, for inputs 'a' and 'b'

- a) Both will have shift-reduce conflict
- b) Only 'a' will have shift-reduce conflict
- c) Only 'b' will have shift-reduce conflict
- d) Neither of the other options

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

- 10)

1 point

Which of the following parser types is the most powerful in terms of recognizing a broader class of grammars?

- a) LL(1)
- b) SLR(1)
- c) LALR(1)
- d) LR(1)

a

b

c

d

Yes, the answer is correct.

Score: 1

Accepted Answers:

b

- 11)

1 point

What is the similarity between LR, LALR and SLR

- a) Use same algorithm, but different parsing table.
- b) Same parsing table, but different algorithm.
- c) Their Parsing tables and algorithm are similar but uses top down approach.
- d) Both Parsing tables and algorithm are different.

a

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## Week 7 : Assignment 7

The due date for submitting this assignment has passed.

Due on 2025-03-12, 23:59 IST.

Assignment submitted on 2025-03-11, 01:08 IST

1) Full form of YACC is 1 point

- a) Yes Another Compiler Constructor
- b) Yet Another Compiler Constructor
- c) Yet Another Compiler Compiler
- d) Neither of the other options

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

2) File produced by YACC and used by Lex is SLR 1 point

- a) y.tab.c
- b) y.tab.h
- c) y.parse.c
- d) y.parse.h

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

b)

3) Number of sections in YACC specification file is 1 point

- a) 1
- b) 2
- c) 3
- d) 4

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

4) In YACC rules section \$\$ refers to 1 point

- a) First symbol on right hand side
- b) Last symbol on right hand side
- c) Symbol on the left hand side
- d) Any of them

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

5) Annotated parse tree means 1 point

- a) Parse tree with attributes
- b) Code generated
- c) Correct parse tree
- d) None of the given options

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

a)

6) For a rule "A → B b C" the symbol C will be referred to by 1 point

- a) \$1
- b) \$2
- c) \$3
- d) \$4

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

7) Syntax directed translation helps in 1 point

- a) Creating parse tree
- b) Check syntactical correctness of input
- c) Check if the input has foreign symbols
- d) None of the other options

  
  
  

No, the answer is incorrect.

Score: 0

Accepted Answers:

a)

8) Files generated by YACC are 1 point

- a) y.tab.c, y.token.h
- b) y.parse.c, y.tab.h
- c) y.tab.c, y.tab.h
- d) None of the other options

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

9) Token attributes are returned by 1 point

- a) yytext
- b) yylen
- c) yyval
- d) yylval

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

d)

10) YYSTYPE defines the type for 1 point

- a) Stack
- b) Token
- c) Input
- d) Queue

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

a)

11) Which of the following statements about YACC is true? 1 point

- a) YACC generates a lexical analyzer
- b) YACC is used for syntax analysis
- c) YACC does not support semantic actions
- d) YACC does not require grammar rules

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

b)

12) Which of the following correctly describes the role of yyparse() in YACC? 1 point

- a) It performs lexical analysis
- b) It calls the scanner (Lex) and parses tokens
- c) It generates the final executable code
- d) It stores token attributes

  
  
  

Yes, the answer is correct.

Score: 1

Accepted Answers:

b)

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## Week 8 : Assignment 8

The due date for submitting this assignment has passed.

Due on 2025-03-19, 23:59 IST.

Assignment submitted on 2025-03-11, 01:14 IST

1) Type checking checks the input 1 point

- a) Lexically
- b) Semantically
- c) Syntactically
- d) All the other options

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

b)

2)

If the arguments passed to a function call are such that the first and the third arguments are integers while the second one is real, the type expression for the argument list can be

- a) Integer X Integer X Real
- b) Real X Integer X Integer
- c) Integer X Real X Integer
- d) None of the other options

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

3) Array bound check can be done 1 point

- a) Statically
- b) Dynamically
- c) Both statically and dynamically
- d) None of the other options

a)  
 b)  
 c)  
 d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

c)

4) Type equivalence checks whether 1 point

- a) Two types expressions are same or not
- b) Two expressions are same or not
- c) Two statements are same or not
- d) All of the other options

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

a)

5)

Type of a statement is 1 point

- a) Void
- b) Type error
- c) Void or type error
- d) None of the other options

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

6) Type checking done by the compiler is 1 point

- a) Static
- b) Dynamic
- c) Both static and dynamic
- d) None of the other options

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

a)

7)

Most programming languages are weakly typed since 1 point

- a) Such languages put less constraints on the programmer
- b) Some type errors can be caught dynamically
- c) Both of the other options
- d) None of the other options

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

8) For strongly-typed languages 1 point

- a) Only static type checking is done
- b) Only dynamic checking is done
- c) Both static and dynamic checking are done
- d) No type of checking is done

a)  
 b)  
 c)  
 d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

c)

9)

Type casting available in many programming languages is an example of 1 point

- a) Type checking
- b) Type coercing
- c) Type manipulation
- d) None of the given options

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

10) The type expression (Integer X Real) → (Integer → Real) corresponds to 1 point

- a) A function that takes an integer and a real as arguments and returns an integer and a real
- b) A function that takes an integer and a real as arguments and returns a real
- c) A function that takes an integer and a real as arguments and returns an integer
- d) A function that takes an integer and a real as arguments and returns a function that takes an integer and returns a real

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

a)

11)

Type inference in programming languages refers to: 1 point

- a) Explicitly specifying types for all variables
- b) Automatically deducing the type of an expression at compile-time
- c) Checking types dynamically during runtime
- d) Ignoring type checking in a program

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

b)

12)

Which of the following statements about type conversion is TRUE? 1 point

- a) Implicit type conversion always results in data loss
- b) Explicit type conversion is also called type coercion
- c) Implicit type conversion is performed automatically by the compiler
- d) Both (b) and (c)

a)  
 b)  
 c)  
 d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

c)

13)

Dynamic type checking is necessary in languages that: 1 point

- a) Perform all type checking at compile-time
- b) Allow variables to change their type during execution
- c) Do not support type inference
- d) Have a very strict static type system

a)  
 b)  
 c)  
 d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

b)

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## Week 9 : Assignment 9

The due date for submitting this assignment has passed.

Due on 2025-03-26, 23:59 IST.

Assignment submitted on 2025-03-26, 22:14 IST

- 1) Self-organizing list-based symbol tables improve performance primarily due to: 1 point

- a) Locality of reference in the input program
- b) Locality of reference in the compiler's symbol access patterns
- c) Both (a) and (b)
- d) None of the above

a)

b)

c)

d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

c)

- 2) Most frequent operation on a symbol table is 1 point

- a) Insert
- b) Delete
- c) Modify
- d) Lookup

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

d)

- 3) Motivation behind using self-organizing list for symbol table is 1 point

- a) Ease of implementation
- b) Program locality
- c) Insertion of symbols
- d) None of the other options

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

- 4) To minimize access time, symbol table should be organized as 1 point

- a) Linear table
- b) Tree
- c) Hash table
- d) Circular list

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

- 5) Activation record stores 1 point

- a) Parameters
- b) Local variables
- c) Parameters and local variables
- d) Parameters , local variables and code for procedures

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

- 6) Which of the following phases of compiler does NOT use symbol table? 1 point

- a) Semantic analysis
- b) Code generation
- c) Code optimization
- d) None of the given options

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

d)

- 7) If two types have same name they can be 1 point

- a) Name equivalent
- b) Structurally equivalent
- c) Both name and structurally equivalent
- d) May not be name equivalent

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

- 8) Which type of compiler typically benefits from using a separate symbol table for each scope? 1 point

- a) Single-pass compilers
- b) Multi-pass compilers
- c) Both single and multi-pass compilers
- d) None of the given options

a)

b)

c)

d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

a)

- 9) Symbol table data is filled by 1 point

- a) Lexical analyzer
- b) Parser
- c) Both lexical analyzer and parser
- d) Neither lexical analyzer nor parser

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

- 10) Which of the following is NOT likely to be kept in a symbol table? 1 point

- a) Name
- b) Location
- c) Scope
- d) None of the other options

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

d)

- 11) What is the primary purpose of a symbol table in a compiler? 1 point

- a) To store machine code instructions
- b) To optimize runtime performance
- c) To store and retrieve identifier-related information efficiently
- d) To generate intermediate code

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

c)

- 12) Which of the following data structures is best suited for managing scope information in a symbol table? 1 point

- a) Stack
- b) Queue
- c) Linked List
- d) Heap

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

a)

- 13) Which optimization technique benefits the most from information stored in a symbol table? 1 point

- a) Constant propagation
- b) Loop unrolling
- c) Dead code elimination
- d) Instruction pipelining

a)

b)

c)

d)

Yes, the answer is correct.

Score: 1

Accepted Answers:

a)

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## Week 10 : Assignment 10

The due date for submitting this assignment has passed.

Due on 2025-04-02, 23:59 IST.

Assignment submitted on 2025-03-27, 21:36 IST

- 1) Which of the following is NOT possible to realize if activation record is static

1 point

- (A) Passing parameters
- (B) Creating local variables
- (C) Supporting recursion
- (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(C) Supporting recursion

- 2) Control link points to the

1 point

- (A) Current activation record
- (B) Parent activation record
- (C) Child activation record
- (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Parent activation record

- 3) Intermediate code generation for a compiler is

1 point

- (A) Must
- (B) Optional
- (C) Depends on language
- (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Optional

- 4) P-code is used for

1 point

- (A) Stack-based machine
- (B) Accumulator based machine
- (C) Two operand addresses
- (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(A) Stack-based machine

- 5) In the activation record, local variables can be accessed from frame pointer with offset value

1 point

- (A) Positive
- (B) Negative
- (C) May be positive or negative
- (D) Cannot be accessed

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Negative

- 6) Access link points to the

1 point

- (A) Current activation record
- (B) Parent activation record
- (C) Child activation record
- (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Parent activation record

- 7) If pointer is supported in the high-level language,

1 point

- (A) Must also be supported in the intermediate language
- (B) May not be supported in the intermediate language
- (C) Depends on language
- (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) May not be supported in the intermediate language

- 8) Frame pointer points to the

1 point

- (A) Current activation record
- (B) Parent activation record
- (C) Child activation record
- (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(A) Current activation record

- 9) "Display" helps to locate easily

1 point

- (A) Local variables
- (B) Global variables
- (C) Non-local variables
- (D) All of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(C) Non-local variables

- 10) An intermediate language should be

1 point

- (A) Close to target machine
- (B) Machine independent
- (C) All operators of high-level language supported
- (D) All of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Machine independent

- 11) Which of the following is a key purpose of the stack pointer in an activation record?

1 point

- (A) To store the base address of the current function

- (B) To manage dynamic memory allocation

- (C) To track the top of the runtime stack

- (D) To store global variables

(C)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(C)

- 12) What happens if recursion is attempted in a system with a static activation record?

1 point

- (A) It executes successfully but inefficiently

- (B) It results in incorrect execution since previous function calls get overwritten

- (C) It executes normally without issues

- (D) It leads to infinite recursion by default

(B)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)

- 13) What is the primary advantage of using intermediate code in a compiler?

1 point

- (A) It simplifies code generation for multiple target machines

- (B) It improves the execution speed of the compiled program

- (C) It eliminates the need for optimization

- (D) It ensures that all high-level language features are directly mapped to assembly

(B)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)

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## Week 11 : Assignment 11

The due date for submitting this assignment has passed.

Due on 2025-04-09, 23:59 IST.

Assignment submitted on 2025-04-03, 09:51 IST

1) For the rule  $S \rightarrow L := E$ , if L is a single variable, L.place is equal to 1 point

- (A) Null  
(B) Some value  
(C) Constant  
(D) None of the other options

(A)

(B)

(C)

(D)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)

2) For Boolean variable B, B.truelist contains 1 point

- (A) List of locations at which B is true  
(B) List of locations to jump to if B is true  
(C) List of locations at which B is true and the locations to branch to  
(D) None of the other options

No, the answer is incorrect.

Score: 0

Accepted Answers:

(A) List of locations at which B is true

3) When generating code for the Boolean expression " $x \geq y$  AND  $(p \neq q)$ ", which locations are left for back patching? 1 point

- a) Falselist of  $x \geq y$   
b) Falselist of  $x \geq y$  and falselist of  $p \neq q$   
c) Falselist of  $x \geq y$ , falselist of  $p \neq q$ , truelist of  $p \neq q$   
d) Truelist of  $x \geq y$ , falselist of  $x \geq y$ , truelist of  $p \neq q$ , falselist of  $p \neq q$

(A)

(B)

(C)

(D)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)

4) In three-address code, arrays are 1 point

- (A) Not supported  
(B) One dimensional  
(C) More than one dimensional  
(D) Supported via pointers

(A)

(B)

(C)

(D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(C)

5) For three address code generation of " $B \rightarrow B_1 \text{ or } M B_2$ ", M.quad is used to backpatch 1 point

- (A)  $B_1.\text{truelist}$   
 (B)  $B_1.\text{falselist}$   
 (C)  $B_2.\text{truelist}$   
 (D)  $B_2.\text{falselist}$

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)  $B_1.\text{falselist}$

6) For the rule  $B \rightarrow B_1 \text{ and } B_2$ , the operation " $B_1.\text{false} = B.\text{false}$ " requires two passes as 1 point

- (A)  $B_1.\text{false}$  is not known  
 (B)  $B.\text{false}$  is not known  
 (C) Both  $B_1.\text{false}$  and  $B.\text{false}$  are unknown  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)  $B.\text{false}$  is not known

7) In the rule  $C \rightarrow C_1 \text{ AND } NC_2$  the non terminal N is used to remember the start address of: 1 point

- (A) C  
 (B)  $C_1$   
 (C) Both  $C_1$  and C  
 (D) None of the other options

(A)

(B)

(C)

(D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(B)

8) In the rule  $S \rightarrow \text{if } B \text{ then } M S \text{ N else } M S$ , N is used to generate a jump after 1 point

- (A) then-part  
 (B) else-part  
 (C) both then- and else-part  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(A) then-part

9) In the rule  $S \rightarrow \text{if } B \text{ then } M S_1$ , M holds the start address for 1 point

- (A)  $S_1$   
 (B) S  
 (C) B  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(A)  $S_1$

10) For three address code generation of rule " $S \rightarrow \text{while } M_1 B \text{ do } M_2 S_1$ ", B.falselist is backpatched with 1 point

- (A)  $M_1.\text{quad}$   
 (B)  $M_2.\text{quad}$   
 (C) Cannot be backpatched at this point  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(C) Cannot be backpatched at this point

11) In three-address code (TAC), accessing an array element typically requires: 1 point

- (A) Direct assignment without indexing  
 (B) Computing an address using the base address and an offset  
 (C) Using only registers without memory references  
 (D) None of the other options

(A)

(B)

(C)

(D)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)

12) In the rule  $S \rightarrow \text{while } M_1 B \text{ do } M_2 S_1$ , the non-terminal M2 is used to remember the start address of: 1 point

- (A) S  
 (B) B  
 (C)  $S_1$   
 (D) None of the other options

(A)

(B)

(C)

(D)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(C)

13) For a Boolean expression B, the attribute B.falselist contains: 1 point

- (A) List of locations where B evaluates to false  
 (B) List of locations to jump to if B is false  
 (C) List of locations where B is false and the locations to branch to  
 (D) None of the other options

(A)

(B)

(C)

(D)

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)

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## Week 12 : Assignment 12

The due date for submitting this assignment has passed.

**Due on 2025-04-16, 23:59 IST.**

Assignment submitted on 2025-04-16, 22:02 IST

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1) Backpatching is needed to generate intermediate code using 1 point

- (A) Single pass  
 (B) Two passes  
 (C) Multiple passes  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(A) Single pass

2) Jump table is suitable for 1 point

- (A) Small number of cases  
 (B) Large number of cases  
 (C) Any number of cases  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Large number of cases

3) If case values are widely spaced, it is better to use 1 point

- (A) Jump table  
 (B) Table search  
 (C) Either jump table or simple table  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Table search

4) Function call actions are divided into sequences 1 point

- (A) Calling and return  
 (B) Calling and composition  
 (C) Return and composition  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(A) Calling and return

5) Evaluation of actual parameters is done by 1 point

- (A) Callee  
 (B) Caller  
 (C) Both Caller and Callee  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Caller

6) "In a callee-save register convention, who is responsible for saving registers?" 1 point

- (A) Caller  
 (B) Callee  
 (C) Both Caller and Callee  
 (D) None of the above

"In a callee-save register convention, who is responsible for saving registers?"

- 

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)

7) Local storage is created by 1 point

- (A) Callee  
 (B) Caller  
 (C) Both Caller and Callee  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(A) Callee

8) For a switch statement, the expression can result into values in the range -5 to +6. Number of entries in the jump table should be 1 point

- (A) 5  
 (B) 6  
 (C) 11  
 (D) 12

Yes, the answer is correct.

Score: 1

Accepted Answers:

(D) 12

9) For a switch statement implemented as a jump table, default\_case is 1 point

- (A) A part of jump table  
 (B) Not a part of jump table  
 (C) in the middle of the jump table  
 (D) at the beginning of the jump table

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Not a part of jump table

10) For pair of goto based storage allocation for functions, the second goto statement transfers control to the beginning of 1 point

- (A) Storage space  
 (B) Function code  
 (C) Program  
 (D) None of the other options

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B) Function code

11) In a jump table-based switch statement, how is the index for the jump table calculated when the case values include negative numbers? 1 point

- (A) Using the case value directly as the index  
 (B) By shifting all case values so that the smallest value maps to index 0  
 (C) By skipping negative case values in the jump table  
 (D) By using absolute values of case numbers

- 

Yes, the answer is correct.

Score: 1

Accepted Answers:

(B)

12) Which of the following occurs during the calling sequence of a function call? 1 point

- (A) Saving the return address and passing arguments  
 (B) Restoring registers and returning control to the caller  
 (C) Freeing allocated memory and clearing local variables  
 (D) None of the above

- 

Yes, the answer is correct.

Score: 1

Accepted Answers:

(A)