



Review Test Submission: Midterm 1

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Course	PROGRAMMING_LANGUAGES
Test	Midterm 1
Started	9/23/20 4:01 PM
Submitted	9/23/20 5:15 PM LATE
Due Date	9/23/20 5:15 PM
Status	Completed
Attempt Score	59.5 out of 100 points
Time Elapsed	1 hour, 13 minutes out of 1 hour and 15 minutes
Instructions	Login to Zoom before beginning the test. Prof. Kraft will be available to answer questions submitted through Chat .
There are 30 questions : 20 Multiple Choice, 8 Short Answer/Essay, 1 ordering, 1 C program.	
C Program: Allow yourself 20 minutes for the program. You may use edoras or an IDE for the program if you choose. If you do run it, please provide a sample of the input./output when you paste your code into the essay question.	
The test is not open book, but you may have notes (along the lines of the equivalent of an 8.5"x11" piece of paper front and back).	
To begin test, use Password: 923m120	
Results Displayed	All Answers, Submitted Answers, Correct Answers

Question 1

6 out of 6 points

Given an infix expression and a set of productions such that:

E → E + T | E - T | T
T → T * F | T / F | F
F → (E) | num
num → 0 | 1 | ... | 9

Show left-derivation of the expression: 3 * (4 + 5) **OR** you may show the parse tree instead

Selected Answer:

```
E -> T  
-> T * F  
-> F * F  
-> num * F  
-> 3 * F  
-> 3 * (E)  
-> 3 * (E + T)  
-> 3 * (T + T)  
-> 3 * (F + T)  
-> 3 * (num + T)  
-> 3 * (4 + T)  
-> 3 * (4 + F)  
-> 3 * (4 + num)  
-> 3 * (4 + 5)
```

Correct Answer: [None]

Question 2

2.5 out of 4 points

Put the following compiler steps in the correct sequence from first to last.

- | Answers | Selected Answer |
|--|--|
| <input checked="" type="checkbox"/> 1. Source program | <input checked="" type="checkbox"/> 1. Lexical analyzer |
| <input checked="" type="checkbox"/> 2. Lexical analyzer | <input checked="" type="checkbox"/> 2. Syntax analyzer |
| <input checked="" type="checkbox"/> 3. Syntax analyzer | <input checked="" type="checkbox"/> 3. Semantic analyzer |
| <input checked="" type="checkbox"/> 4. Semantic analyzer | <input checked="" type="checkbox"/> 4. Intermediate code |
| <input checked="" type="checkbox"/> 5. Intermediate code | <input checked="" type="checkbox"/> 5. Code optimizer |
| <input checked="" type="checkbox"/> 6. Code optimizer | <input checked="" type="checkbox"/> 6. Code generator |
| <input checked="" type="checkbox"/> 7. Code generator | <input checked="" type="checkbox"/> 7. Machine language |
| <input checked="" type="checkbox"/> 8. Machine language | <input checked="" type="checkbox"/> 8. Source program |

Question 3

0 out of 2 points

Orthogonality in a programming language means that a very large set of primitive constructs can be combined in a large number of ways to build control & data structures.

Selected Answer: True

Answers: True

False

Question 4

2 out of 2 points

A lexical analyzer is essentially a pattern matcher.

Selected Answer: True

Answers: True

False

Question 5

3 out of 3 points

Describe three differences between C and Java.

Selected Answer: 1. C doesn't have classes
2. C has pointers
3. C doesn't have type checking or handling
Correct Answer: [None]

Question 6

4 out of 4 points

Which of the following expressions can be derived from the following grammar?

$\langle S \rangle \rightarrow y \langle B \rangle$
 $\langle A \rangle \rightarrow \langle A \rangle y \mid a$
 $\langle B \rangle \rightarrow \langle A \rangle \langle B \rangle \mid b$

Selected Answer: yayb

Answers: yyab

yaya

ybayb

yayb

Question 7

0 out of 2 points

Which of the following are nonterminal symbols in the grammar rule:
 $\langle \text{factor} \rangle \rightarrow (\text{++} \mid \text{--}) \langle \text{val} \rangle \mid (+ \mid -) (\langle \text{val} \rangle \mid \text{int_literal}) \mid (\langle \text{expr} \rangle)$

Selected Answers: $\langle \text{factor} \rangle$

Answers: $\langle \text{factor} \rangle$

++

$\langle \text{val} \rangle$

int_literal

Question 8

2 out of 2 points

A top-down parser traces or builds a parse tree in preorder, corresponding to a leftmost derivation.

Selected Answer: True

Answers: True

False

Question 9

3 out of 3 points

Briefly explain three different aspects that affect cost in evaluating programming languages.

Selected Answer: 1. One thing that affects the cost in evaluating programming languages is the ability to teach the program. It takes time and money to teach someone the program.
2. The way the compilers handle the programming languages. If not optimized, it could be very expensive especially for companies that deal with a lot of data.
3. Another thing that affects the cost is its error checking.

Correct Answer: [None]

Question 10

2 out of 2 points

The semantics of a programming language is the form of its expressions, statements and program units.

Selected Answer: False

Answers: True

False

Question 11

2 out of 2 points

A struct is one way in which an alias can be utilized in C.

Selected Answer: True

Answers: True

False

Question 12

5 out of 5 points

RegEx (regular expression) is the basis for the Unix command grep. For example, the command: grep -E '^a-zA-Z0-9]+@[a-zA-Z0-9]+\.\com' emailList

will match the following email addresses in the file emailList that have the form Letters

misterrogers@gmail.com

jtimberlake007@yahoo.com

1dayin1000@company9.com

Given that '^' means "starts with", '+' means "matches 0 or more repetitions of the preceding sub-group", and "[.]" lists a sub-group, and "a-z" means "any character 'a' through 'z', write a grep expression that matches SDSU email that begins with the users initial and lastname, and may or may not be followed by numbers, then end with @sdsu.edu

Your command should begin with:

grep -E

Selected Answer:

grep -E ^[a-zA-Z][a-zA-Z]+[0-9]+ @sdsu\.\edu

Correct Answer: [None]

Question 13

0 out of 4 points

Which of the following could be a grammar rule for a branching statement in C? The rule doesn't have to be all-encompassing, it just has to result in a valid C statement. Note: a symbol in single quotes denotes a literal character (e.g., '(' is a left-parenthesis).

Selected Answers: if '()' expr ')' stmt { else stmt }

Answers: if '()' expr ')' stmt { else stmt }

if '()' expr ')' stmt else stmt

if '()' expr ')' stmt [else stmt]

if '()' expr ')' '{' stmt '}' [else '{' stmt '}']

Question 14

0 out of 2 points

Keywords are synonymous with reserved words in programming languages.

Selected Answer: True

Answers: True

False

Question 15

2 out of 2 points

What programming language has dominated artificial intelligence over the past 40 years?

Selected Answer:  LISP

Answers: COBOL

 LISP

Fortran

FLOWMATIC

Question 16

3 out of 3 points

Briefly define syntax in terms of programming languages.

Selected Answer: The syntax of a programming language is the form of its expressions, statements and program units.

Correct Answer: [None]

Question 17

2 out of 2 points

What is the name of the category of programming languages whose structure is dictated by the von Neumann computer architecture?

Selected Answer:  Imperative

Answers: Systems

 Imperative

Functional

Scientific

Question 18

2 out of 2 points

What construct of a programming language provides process abstraction?

Selected Answer:  subprograms

Answers: classes

 subprograms

arrays

pointers

Question 19

0 out of 3 points

Which of the following are terminal symbols in the grammar rule: <factor> → (++ | --) <val> | (+ | -) (<val> | int_literal) | (<expr>)

Selected Answers:  int_literal

Answers:

- <expr>
- ++
-
- int_literal

Question 20

0 out of 4 points

Which two of the following are goals of a syntax analyzer?

Selected Answers: To ensure that the numeric literals in a program are syntactically correct

To produce a parse tree or a trace of a parse tree

Answers: To ensure that the numeric literals in a program are syntactically correct

To produce a parse tree or a trace of a parse tree

To recognize the identifiers in a program

To determine whether a given string is a sentence in the language

Question 21

2 out of 2 points

Increased capacity to express ideas, better background for choosing appropriate languages, increased ability to learn new languages, and better understanding of implementation issues are all reasons for studying PLs.

Selected Answer: True

Answers: True

False

Question 22

2 out of 2 points

von Neumann computer architecture has played a very minor role in programming languages design.

Selected Answer: False

Answers: True

False

Question 23

1 out of 5 points

Assume the architecture stores variables in 8 byte boundaries, and a pointer or a double variable requires 8 bytes, an int or a float requires 4 bytes, and a char requires 1 byte.

Given a **struct** that contains five variables: **char a, char b, int i, double f, char* p**, what is the minimum and the maximum memory required for this struct? Support your answer.

Selected Answer: minimum - 22
maximum - 26

Correct Answer: [None]

Question 24

8 out of 15 points

Write a complete C program that reads from the command line three arguments in this order: a double, a string, an int. Your program should report: "Invalid arguments" for any infraction of the expected input, and terminate the program. If the arguments are valid, the string should be passed to a function called "printA" where it is printed to standard out. The double and int should be passed to a function called "average" that returns the average of the two numbers; the main function should print the average value returned.

Selected Answer: #include stdio.h

```
void printA(char[] str) {
    int i = 0;
    while (str[i] == null) {
        printf(str[i]);
        i = i + 1;
    }
}
int average(double x, int y) {
    return( (x+y) / 2 );
}

int main(int argc, char *argv[]) {
    if ( // not valid) {
        return(1);
    }
    printA(argv[1]);
    printf( average(argv[0], argv[2]) );
    return(0);
}
```

Correct Answer: [None]

Question 25

4 out of 4 points

Describe the difference in programming languages that utilize compiler implementation and those that have a pure interpretation implementation.

Selected Answer: compiler implementation converts the language into its own machine code after reading it.

pure interpretation implementation reads it by the interpreter.

Correct Answer: [None]

Question 26

2 out of 2 points

Which set of words best completes the sentence: "In computer science, lexical analysis is the process of converting a sequence of _____ into a sequence of _____."

Selected Answer: characters; tokens or lexemes

Answers: statements; bytecode

statements; text

characters; tokens or lexemes

tokens; characters

Question 27

0 out of 2 points

Which of the following languages belongs to the category of a functional language?

Selected Answer: Java

Answers: C#

FORTRAN

Java

Question 28

0 out of 2 points

The difference between pass by value and pass by reference as it relates to subprograms is that:

Selected Answer:  pass by reference can change the address of the passed parameter in the calling function.

Answers: pass by value can change the value of the passed parameter in the calling function.

pass by reference can change the address of the passed parameter in the calling function.

pass by value can change the address of the passed parameter in the calling function.

 pass by reference can change the value of the passed parameter in the calling function.

Question 29

0 out of 2 points

If more than one distinct parse tree can be produced from a grammar it is said to be ambiguous.

Selected Answer:  False

Answers:  True

False

Question 30

0 out of 5 points

Early in this class, we looked at "Hello, World" programs in several languages and found a wide variance in form. Briefly describe two arguments in favor of a single programming language for all programming domains.

Selected Answer: Hello world in python is best because

1. it is very easy to read and write as it is a simple print() function.
2. there doesn't need any libraries or header files to include.

Correct Answer: [None]

Sunday, December 13, 2020 6:46:57 PM PST

← OK