

ELIZADE UNIVERSITY, ILARA MOKIN

DEPARTMENT OF COMPUTER SCIENCE AND MATHEMATICS

CSC 317 (SURVEY OF PROGRAMMING LANGUAGES) HARMATTAN 2020/2021

EXAMINATION QUESTIONS

INSTRUCTION: ANSWER FOUR QUESTIONS IN ALL.

TIME ALLOWED: 2½ HRS

Question 1:

(a) Formally define a language.

HOD's SIGNATURE



(b) Suppose a certain language is made up of the following productions

$S \longrightarrow AX$

$A \longrightarrow V$

$A \longrightarrow B$

$B \longrightarrow VW$

i. what are the alphabets of this grammar?

ii. what are the terminal and non-terminal symbols?

(c) Distinguish the following: expression, statement and command

Question 2:

(a) Briefly explain the distinctive characteristics of each of these major language paradigms:

i. Procedural ii. Imperative iii. Declarative iv. Object-oriented v. Functional

(b) What is the minimum number of control structures for programming languages and what are these controls

(c) Give a BNF specification for the language that consists of even number of a's followed by odd number of b's

Question 3:

(a) Explain briefly lexicon, syntax and semantic of a language. Consider the grammar below

$\langle \text{cout} \rangle \longrightarrow \text{cout} \langle \langle ; / \text{cout} \langle \langle \langle \text{expression} \rangle \rangle ;$

$\langle \text{expression} \rangle \longrightarrow \langle \text{variable} \rangle ;$

$\langle \text{variable} \rangle \longrightarrow \langle \text{Letter} \rangle ; / \langle \text{letter} \rangle \langle \text{digit} \rangle ;$

$\langle \text{Letter} \rangle \longrightarrow \text{a/b/...../y/z}$

$\langle \text{digit} \rangle \longrightarrow \text{0/1/2...../8/9}$

Show that the following are derivable from the grammar:

(i) $\text{cout} \langle \langle \text{i};$ (ii) $\text{cout} \langle \langle \langle ;$ (iii) $\text{cout} \langle \langle \text{y4};$

(b) Differentiate between static and dynamic binding concepts in programming languages

(c) Briefly write on : i. Scope of a variable ii. literal and iii. keyword

Question 4:

(a) What is the formal definition of a grammar?

(b) Describe recursion. Implement n! using C/C++/java to demonstrate recursion.

(c) What is the difference between function's declaration and its definition?

Question 5:

- (a) Explain Purity Analysis in Programming Languages
- (b) What purpose do types serve in a programming language?
- (c) What is *referential transparency* in programming languages?

Question 6:

- (a) Explain why programming languages evolve?
- (b) A conditional branching statement in a simple programming language contains one expression which has two single letter (alphabet) operands, separated by one of the operators EQ, NE, AND or OR. Write production rules which will generate legal expressions.
- (c) Why is parameter passed by value referred to as “read-only” and parameter passed by reference referred to as “read-write”?