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**UNIVERSITY OF GHANA**

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**B.SC COMPUTER SCIENCE, FIRST SEMESTER EXAMINATIONS: 2016/2017**

CSCD 417: THEORY AND SURVEY OF PRGRAMMING LANGUAGE (3 CREDITS)

**INSTRUCTION:**

***Answer all Questions in Section A***

***Answer any two (2) Questions in Section B***

**TIME ALLOWED:**

*TWO AND A HALF (2½) HOURS*

**SECTION A:**

***Answer all questions (40 marks)***

**A1.** (a) (i) What do you understand by the term *Imperative program*? **[3 *marks*]**

(ii) Describe the architecture of *Von Neumann*. **[9 *marks*]**

(b) (i) In programming languages, two of the key concepts of case sensitivity are readabilityand writability. Explain the *disadvantages* of these two concepts in reference to Java programming language. **[6 *marks*]**

(ii) (α) Explain the concept of binding in programming language. **[3 *marks*]**

(β) Differentiate *static* binding from *dynamic* binding. **[4 *marks*]**

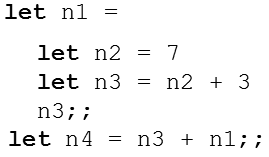
(c) (i) What is variable in programming language? **[3 *marks*]**

(ii) State two (2) advantage and two (2) disadvantage of the following categories of variables by lifetimes:

(α) Static variables. **[4 *marks*]**

(β) Stack-dynamic variable. **[4 *marks*]**

(d) The following program construct is coded in F#

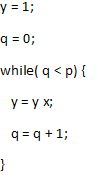


Do you see any error in respect to the fifth line? Explain your position. **[4 *marks*]**

**SECTION B:**

***Answer two* (*2*) *questions only* (*60 marks*). All questions carry equal marks (*30 marks*).**

**B1**. (a) Consider the program written in C++ to compute, :



What are the essential conditions to ensure halting? Which of these conditions stated is better and why?  **[8 *marks*]**

(b) State and explain *three* (3) factors that influence the design of a language. **[12 *marks*]**

(c) State *ten* (10) features of the first version of FORTRAN that was implemented.

**[10 *marks*]**

**B2**. (a) Give *four* (4) reasons why ALGOL 60 was not widely used.  **[8 *marks*]**

(b) Give a brief explanation of the following constituents of programming language:

1. Syntax
2. Semantics
3. Pragmatics

**[9 *marks*]**

(c) Give a brief description of the Backus-Naur Form (BNF). **[13 *marks*]**

**B3**. (a) The contents of the register can be altered by the URM in response to certain instructions that it can recognize. State and explain all the instructions.  **[12 *marks*]**

(b) State the rules to effect the computations of the Unlimited Register Machine (URM)

**[6 *marks*]**

(c) (i) What is Hoare’s logic? **[2 *marks*]**

(ii) State the condition in which the Hoare’s logic cannot be complete. **[3 *marks*]**

(iii) State and explain the if-then-else rule of the Hoare’s logic. **[7 *marks*]**