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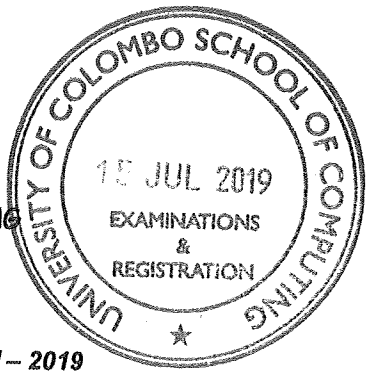
UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING



BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Academic Year 2017/2018 – Second Year Examination – Semester I – 2019

SCS 2207 – Programming Language Concepts

TWO (2) HOURS

To be completed by the candidate

Examination Index No: .....

Important Instructions to candidates:

1. The medium of instruction and questions is **English**.
2. If a page or a part of this question paper is not printed, please inform the supervisor immediately.
3. Note that questions appear on both sides of the paper. If a page is not printed, please inform the supervisor immediately.
4. Write your index number on each and every page of the answer paper.
5. This paper has **4** questions and **15** pages.
6. Answer **ALL** questions. All questions carry equal marks (**25** marks).
7. Any electronic device capable of storing and retrieving text including electronic dictionaries and mobile phones are **not allowed**.

For Examiner's use only	
Question No	**Marks**
1	
2	
3	
4	
Total	

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1.

a) What is the l-value and r-value of a variable?

(3 marks)

b) State two advantages and two disadvantages of using case sensitive variable names.

(6 marks)

c) Explain the difference between 'static variables' and 'stack-dynamic variables'.

(6 marks)

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d) Consider the following program.

```
function f1()
{
      function f2()
      {
          var x = 10;
          f3();
      }
      function f3()
      {
           print ( x );
      }
      var x = 20;
      f2();
}
```

i) What is the output of this program if it uses dynamic scoping rules? Explain why you get such an output.

(8 marks)

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ii) What is the static parent of the f3 function? Write the output of this program if it uses static scoping rules.

(2 marks)

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2.

a) In the single precision IEEE floating point representation, 32 bits are used to represent a floating point real number. Of that 32 bits, 1 bit is allocated for the sign (0 for positive and 1 for negative), 8 bits for the exponents and 23 bits for the mantissa. The exponent field contains 127 plus the true exponent.

Represent -29.375 in IEEE single precision floating point representation.

(6 marks)

b) File is one of the data types used in programming languages. What is the main difference between direct access files and indexed sequential files?

(3 marks)

c) Give an advantage and a disadvantage of using relative addresses for pointer variables.

(4 marks)

d) What does the term 'garbage' refer to in programming languages? Explain how garbage is created using an example.

(6 marks)

e) How do the following data types in Python differ from each other?

i) List and Dictionary

(3 marks)

ii) List and Set

(3 marks)

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3.

a) What are the three common flow control structures found in programming languages? Give an example for the implementation of each of those control structures in the Python programming language.

(6 marks)

b) Draw a flow chart to depict the behavior of the ***for*** control structure in the Java programming language.

(4 marks)

c) What is the main difference between the ***for*** and ***while*** flow control structures in the Python programming language?

(4 marks)

d) Show by using suitable code segments, how the ***switch*** statement in the programming language Java is implemented in the Python programming language.

(5 marks)

e) In some old programming languages such as Fortran 4 there was no facility to construct statement blocks. Explain how the following Python code could be implemented in such a programming language.

```
if x > 0:
  a = a + 1
  b = b *10

c = a+b
```

(6 marks)

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4.

a) Explain the following terms with respect to operators in programming languages by using suitable examples.

i) Operator Precedence

ii) Associativity

(4 marks)

b) Explain why you need variables in imperative programming languages.

(4 marks)

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c) Explain why a **Java Virtual Machine** is needed to execute Java Programs?

(6 marks)

d) Give an example for an ambiguous grammar. Justify your answer.

(5 marks)

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e) Explain the following terms with respect to functions by using suitable examples from the Python programming language.

i) Default parameters

ii) Recursive functions

iii) High ordered functions

(6 marks)

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