THE OPEN UNIVERSITY OF SRI LANKA B.Sc DEGREE PROGRAM: LEVEL 03 FINAL EXAMINATION: 2009/2010

CPU 1141/CSU1180: INTRODUCTION TO COMPUTER PROGRAMMING / PROGRAMMING PERSPECTIVES & LANGUAGES

DURATION: TWO HOURS (2 HOURS)

Date: 2nd February, 2010

Time: 9.30 am - 11.30 am

Answer FOUR questions ONLY, selecting two questions from each part. Each question carries equal marks.

PART - A

Q1).

- What are the advantages of using sub programs to develop a computer program? (i)
- (ii) Write Pascal functions/procedures to carry out the following tasks:
 - (a) character(a) - This function receives a character 'a' as the input and returns a relevant character 'C', 'L', 'D' or 'S', depending on whether the character received is an upper case letter, a lower case letter, a digit or a special symbol respectively.

Hint: The following table shows the range of ASCII values for various characters.

Characters	ASCII Values
A-Z	65 – 90
a-z	97 – 122
0 – 9	48 – 57
Special symbols	0 - 47, 58 - 64, 91 - 96,
	123 _ 127

(b) swap(a, b) - This procedure receives two integer parameters, 'a' and 'b', and it interchanges these two integers.

Q2).

- (i) What Pascal data types would you use to represent the following data? Briefly explain why you selected that data type for each of them.
 - Weight of an exercise book. (a)
 - To store the number of bytes of a data of float data type. (b)
 - (c) A constant to hold the value of π (3.14159).
 - (d) To store your grade for a mark of a given subject.

- (ii) Point out the errors, if any, in the following Pascal assignment statements:
 - (a) int := 314.562 * 150;

(b) name := 'Ajay';

(c) $3.14 * r * r * h := vol_of_cyl;$

(d) a := b := 3 := 4;

- (iii) State whether the following Pascal identifiers are valid or invalid. If invalid, give reasons.
 - (a) do while
- (b) continue
- (c) case
- (d) tot+1



Explain the term "user defined data types" in Pascal.

What are the user defined data types in Pascal? Briefly explain.

Using an appropriate user defined data type technique, write a Pascal program to read the number of rainy days in each of the years from 2000 to 2009 and print these values of each year. The Total no. of rainy days should also be printed.

PART - B

- Q4).
- (i) Distinguish between "do while" and "for" loops in C language by giving suitable examples.
- (ii) The Fibonacci numbers form an interesting sequence in which each number is equal to the sum of the previous two numbers. In other words $F_i = F_{i-1} + F_{i-2}$, where F_i refers to the ith Fibonacci number. The first two Fibonacci numbers are, by definition, equal to 1 (i.e, $F_1 = F_2 = 1$.)

Hence
$$F_3 = F_2 + F_1 = 1 + 1 = 2$$

 $F_4 = F_3 + F_2 = 2 + 1 = 3$
 $F_5 = F_4 + F_3 = 3 + 2 = 5$

Write a C program to print the nth Fibonacci number using a do while loop.

(iii) Write necessary C statements to produce the mathematical multiplication table as shown below using for loops.

	.		12
2	3 - 1 - 3		$12 \times 1 = 12$
$2 \times 1 = 2$	$3 \times 1 = 3$	*****************	$12 \times 2 = 24$
$2 \times 2 = 4$	$3 \times 2 = 6$	***********	

		*************	10 10 144
$2 \times 12 = 24$	$3 \times 12 = 36$		$12 \times 12 = 144$

ilid,

Q5).

- (i) Write down the "input" functions in C language and describe their syntaxes using examples.
- (ii) Write a C program to identify the behavior of the functions "gets" and "scanf".
- (iii) Write the appropriate input/output function statements in C language for the following requirements.
 - (a) To read a string (student_name) from the keyboard with spaces.

(b) To display a character (person_sex).

(c) To read a floating number (x) from the keyboard.

(d) To display a string (identicard_no) and height of the person (H)

rson (H)

Q6).

- (i) State whether the following C statements are True or False:
 - (a) The array declared as int num[26] has twenty-six elements.
 - (b) The expression num[1] refers the first element in the array.
 - (c) It is necessary to initialize the array at the time of declaration.
 - (d) The expression num[27] refers the twenty-eighth element in the array.
- (ii) Convert the following Pascal program to a C program.

PROGRAM StudentMarks(INPUT,OUTPUT); VAR

score: Array [1..5] of Real; index: Integer;

BEGIN

(*Read the marks*)
FOR index :=1 TO 5 DO

BEGIN

WRITELN ('Enter score for student number', index ,':'); READLN (score [index]);

END;

END.

(iii) Write a C program for computing mean (m), variance (v), and standard deviation (s) of a given set of ten (10) numbers.

Hint: Use the following formulas:

$$m = \frac{1}{n} \sum_{i=1}^{n} x_i, \quad v = \frac{1}{n} \sum_{i=1}^{n} (x_i - m)^2, s = \sqrt{v}$$

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