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3 (Sem–5/CBCS) STA HC 2

2022

STATISTICS

(Honours)

Paper : STA–HC–5026

(Statistical Computing using C / C++ Programming)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer **any seven** questions from the following :   1×7=7

   (a) Use of more than one main ( ) function in a C programme is illegal.

   *(State True **or** False)*

   (b) _____ is a sequence of instructions written to perform a specific task in the computer.   *(Fill in the blank)*

(c) Every programme statement in C must end with a

(i) dot

(ii) colon

(iii) semicolon

(iv) comma

(*Choose the correct option*)

(d) What is a scanf function ?

(e) All variables must be initialized before they are used in the programme.

(*State True or False*)

(f) Which of the following is an assignment operator ?

(i) %

(ii) !=

(iii) =

(iv) None of the above

(*Choose the correct option*)

(g) To print the data left justified, we must use _____ in the field specification.

(*Fill in the blank*)

(h) It is an error to place a semicolon after the 'if' expression.

(*State True or False*)

(i) What is an algorithm ?

(j) Which of the following statements can be used to immediately exit from the program ?

(i) exit ( )

(ii) break

(iii) goto

(iv) Both (i) and (ii)

(*Choose the correct option*)

(k) An array $N[3]=\{1, 2, 3\}$ has been declared and initialized in a C programme. What will be the output of the following statement ?

    printf("%d", $N[3]$);

(l) The declaration int $x[2]=\{1, 2, 3\}$; is illegal.

(*State True or False*)

2. Answer **any four** of the following questions briefly :   2×4=8

(a) Write about CPU.

(b) Define global variable and local variable.

(c) Write down the relational operators available in C.

(d) Consider the following statements :

$m = 8;$

$y = m{+}{+};$

What will be the values of m and y after execution of the given statements ?

(e) Write down the equivalent C expressions of the arithmetic expressions—

(i) $3x^2 - 9x + 4$

(ii) $\dfrac{x + y + z}{c + d}$

(f) What are the functions you will use for reading a character and writing a character in C programming ?

(g) Evaluate the following expressions assuming that k is a float variable :

(i) $k = 3/2 * 4 + 3/8$

(ii) $k = 2 * 3/4 + 4/4 + 8 - 2 + 5/8$

(h) Briefly describe the simple IF statement.

3. Answer *any three* questions from the following : 5×3=15

(a) Explain the nested 'IF...ELSE' statement with the help of a flowchart.

(b) Write an algorithm to find the standard deviation of n observations.

(c) Write briefly on input and output of integer numbers in C/C++.

(d) (i) Explain briefly the WHILE statement available in C/C++. 3

(ii) Write about declaration of variables in C/C++. 2

(e) Explain the DO statement of C/C++.

(f) Describe how to 'jump out' of a loop in C/C++.

(g) Discuss initialization of one-dimensional array in C/C++.

(h) The income tax rates of a country are as follows :

IT = 0 if income is below 3,00,000/-

IT = 10% of the income above 3,00,000/- if 3,00,000/- ≤ income < 5,00,000/-

IT = 20% of the income above 5,00,000/- + 20,000/- if income ≥ 5,00,000/-

Draw a flowchart which would print the income tax to be paid by a tax payer as per the above rule.

4. Answer *any three* questions from the following :   10×3=30

(a) (i) Elaborate on the basic structure of C.   5

   (ii) Explain briefly the conditional operator statement available in C.   2

   (iii) Write a note on 'FOR statement' as one of the loop structure.   3

(b) (i) Write a brief note on flowchart.   6

   (ii) If the three sides of a triangle are given, write a C/C++ programming to find the area of the triangle.   4

(c) (i) Write a detail note on arithmetic operators in C.   4

   (ii) Write a C/C++ programming to find the regression coefficients of Y on X and X on Y.   6

(d) (i) Write a note on declaration and initialization of two-dimensional array.   2+2=4

   (ii) State the importance of C.   2

(iii) A shopping mall is offering the following discount scheme :

   Let x be the total bill of a customer, then

   if $x < 3,000/-$ — no discount

   if $3,000/- \leq x < 5,000/-$ — print x–Rs. 50/-

   if $x \geq 5,000/-$ — print x–Rs. 150/-

   Write down the algorithm.   4

(e) (i) What is keyword in C ?   1

   (ii) Define Trigraph characters.   2

   (iii) Write a programme in C/C++ to find the median of n observations.   7

(f) (i) Why and when do we use the #include directive ?   2

   (ii) Write briefly on backslash character constants.   2

   (iii) Distinguish between the following pairs :   2+2+2=6

   getchar and scanf functions

   %S and %C specifications for reading

   %f and %e specifications for printing

(g) *(i)* Explain different data types available in C. 5

(ii) Write a programme in C/C++ to read the values of x and y and print the results of the following expressions in one line—

$$\frac{x+y}{x-y}, \frac{x+y}{2} \text{ and } (x+y)(x-y)$$

5

(h) *(i)* Write a note on reading strings from terminal and writing strings to screen. $1\frac{1}{2}+1\frac{1}{2}=3$

(ii) Write a program in C/C++ to multiply matrix A of order $m \times n$ with matrix B of order $n \times l$ and store the result in a matrix C of order $m \times l$. 7