



053

THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME – LEVEL 3
FINAL EXAMINATION – 2008/2009
CSU 1180: PROGRAMMING PERSPECTIVES AND LANGUAGES
DURATION: TWO HOURS

Date: 03.01.2009

Time: 9.30 am – 11.30 am

Answer four (04) questions only selecting two questions from each part.

Part A

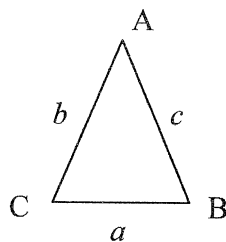
Question 1

Write a Pascal program to do the following tasks:

- To input the lengths of the three sides of a triangle.
- To print a message starting whether the sides represent a valid triangle or not.
- If the triangle is valid, to print the cosine values of each angles of the triangle.
- If the triangle is valid, to find and print the area of the triangle.

Help:

- The sides represent a valid triangle if the sum of the lengths of any two sides is greater than the length of the remaining side.
- Consider the triangle given below.



Then the cosine value of angle A, B and C are $\cos(A) = (b^2 + c^2 - a^2) / 2bc$, $\cos(B) = (a^2 + c^2 - b^2) / 2ac$, $\cos(C) = (a^2 + b^2 - c^2) / 2ab$ respectively

The area of an arbitrary triangle can be computed using the formula

$$\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$$

Where a , b and c are the lengths of the sides and $s = (a + b + c) / 2$ is the semi perimeter.

Note: You may use the standard arithmetic functions $sqr(x)$ and $sqrt(x)$ to calculate the square of x and square root of x respectively.

Question 2

- (i) Discuss the advantages of using sub programs to develop a program.
- (ii) Write Pascal functions/procedures to do the following tasks:
 - a. **checkvowel(*ch*)** - this function receives a character variable parameter '*ch*' as the input and returns a letter '*v*' when the input parameter is a vowel, or returns '*c*' otherwise.
 - b. **modulus(*x,y*)** - this function receives two integer parameters '*x*' and '*y*' as input, and returns the remainder of x divided by y .
 - c. **print(*n*)** - this procedure receives a positive 5-digit integer '*n*'. Separate the integer into its individual digits and print each digit separated by 3 spaces.

For example: if you input 42339, the function should print 4 2 3 3 9

Question 3

- (i) State whether the following statements are True or False:
 - a. The array **int num[26]** has twenty-six elements.
 - b. An array is a collection of the same data type scattered throughout memory.
 - c. It is necessary to initialize an array at the time of declaration.
 - d. The expression **num[27]** designates the twenty-eighth element of the array.
- (ii) Write a Pascal program to carry out the following tasks:
 - a. Define an array to store 25 integer numbers.
 - b. To input twenty-five numbers from the keyboard and assign into an array.
 - c. To find out how many of them are positive and how many are negative.
 - d. To print positive and negative numbers.
 - e. To find out how many are even and how many odd.
 - f. To print even and odd numbers.

Part B

Question 1

- (i) Describe the syntax of the **FOR** loop in C Language.
- (ii) Describe the '*continue*' statement in **FOR** loop and **DO -WHILE** loop.
- (iii) Write a C program to print the multiples of 7; that lies within a given range.
- (iv) Write down the output of the following program.

```
#include<stdio.h>
main()
{
    int num, total = 0;
    do
    {
        printf("Enter a number( 0 to quit ) : \n");
        scanf("%d", &num);

        if ( num == 0 )
        {
            printf(" End of data entry");
            break;
        }
        if ( num < 0 )
        {
            printf(" Skipping this number \n");
            continue;
        }
        total = total + num ;
    }while (num != 0);

    printf ( " Total of all +ve numbers is : %d", total);
}
```

- (v) The natural logarithm can be approximated by the following series.

$$\frac{x-1}{x} + \frac{1}{2}\left(\frac{x-1}{x}\right)^2 + \frac{1}{2}\left(\frac{x-1}{x}\right)^3 + \frac{1}{2}\left(\frac{x-1}{x}\right)^4 + \dots$$

If x is input through the keyboard, write a C program to calculate and print the sum of first seven terms of this series.

Note: You may use the functions $\text{pow}(x,y)$ to calculate the x^y (y^{th} power of x) and it is included in `math.h` header file.

Question 2

- (i) Write the syntax of two-dimensional array in C language.
- (ii) Write a C program to achieve the following objectives.
 - a. To read elements of two matrices, A and B of dimension 2×2 .
 - b. To add the two matrices and print it.
 - c. To multiply the two matrices and print it.

Hint:

$$\text{If } A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, B = \begin{bmatrix} p & q \\ r & s \end{bmatrix},$$

$$A+B = \begin{bmatrix} a+p & b+q \\ c+r & d+s \end{bmatrix} \quad A \times B = \begin{bmatrix} ap+br & aq+bs \\ cp+dr & cq+ds \end{bmatrix}$$

Question 3

- (i) Write down three built-in input and output functions in C language and describe their syntaxes.
- (ii) Write the appropriate input/output function statement for each of the following requirements.
 - a. To display the first word of "Hello World" on the VDU.
 - b. To read a value for x , where x is a floating-point number.
 - c. To display your grade for a given subject.
 - d. To read your full name from the keyboard.
 - e. To read a value for ch , where ch is a single character.
- (iii) Write a C program to print the following menu:

Menu:

- (a) *Add Results*
- (b) *Amend Results*
- (c) *Delete Results*
- (d) *Exit*

Enter Your Option:

After entering the option 'a', 'b', 'c', and 'd', the program should print "Addition of Results", "Amendments of Results", "Deletion of Results" and "Go out from the program" respectively.

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