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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

Bachelor of Science in Applied Sciences
First Year - Semester I Examination – July / August 2023

COM 1407 – PRINCIPLES OF PROGRAMMING (THEORY)

Time: Three (03) hours

- There are four (04) questions in three (03) pages.
- Answer **ALL** questions.

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1. a) Define the term "Programming Language" and explain why it is needed. (04 marks)

   b) Illustrate the program development life cycle. Explain the importance of the second phase. (06 marks)

   c) "The programs written in Low Level Languages are not Portable". Write an explanation. (04 marks)

   d) "The programs written in Higher Level Languages are machine independent". Explain the statement. (04 marks)

   e) Explain the compilation process of a C program. (06 marks)

   (Total 28 marks)

2. a) Explain the importance of the statements 1, 2 and 3 in the program given below.

```
#include<stdio.h> ← 1
int main ()← 2
{
   printf("Programming is Fun\n");
return 0;← 3
}
```

(06 marks)

b) What is a variable? Explain the terms **identifier, declaration** and **initialization** of a variable. Give an example. (08 marks)

c) The following program will print the Fibonacci series up to a number given by the user. Fill in the blanks of the following code using the appropriate code segments. (08 marks)

```
int main( )
{
    int num, first = 0, second = 1, next;
    printf ("Enter the number of terms: ");
    scanf(_____); ←1
    printf("Fibonacci series: ");
    for (_____) ←2
    {
        printf("%d ", first)
        _____; ←3
        _____; ←4
        _____; ←5
    }
    return 0;
}
```

(Total 22 marks)

3. a) Write a program that calculates the grade for a group of students. The grades are determined based on their scores. The program should use two arrays to store the student names and their corresponding scores.

Requirements:

- The program should prompt the user to enter the number of students up to a maximum of 10.

- For each student, the program should prompt the user to enter the student's name and score.
- The program should also display the name, score, and letter grade for each student.

Note: The letter grades should be calculated based on the following scale:

A: 90-100
B: 80-89
C: 70-79
D: 60-69
F: Below 60

(15 marks)

b) What is a function prototype. Why it is considered as essential? (04 marks)

c) Write a C program that takes an array of integers as input and finds the sum of all the elements using a function and display the sum. Extend the program by adding another two functions that finds the maximum element and the minimum element in the array. Prompt the user to choose whether they want to find the minimum or the maximum element. Based on the user's choice, call the respective function and display the result. (15 marks)

(Total 34 marks)

4. a) What is recursion? State the essential components of a recursion algorithm, and explain its process. (06 marks)

b) Write a C program that uses a recursive function to calculate and display the power of a number base raised to an exponent. The program should prompt the user to enter the values of base and exponent and then display the result of the power calculation.

Example Output:
Enter the value of base: 2
Enter the value of exponent: 5
Result: 32 (10 marks)

(Total 16 marks)

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