University of Vavuniya

First Examination in Information Technology 2021

First Semester - March 2023

IT1134 Fundamentals of Programming (Theory)

Answer Four Questions Only

Time Allowed: Two hours

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1. (a) Describe each of the following concepts in the context of program design:

   i. Algorithm

   ii. Flowchart [20%]

   (b) Define what is meant by a computer program. [10%]

   (c) List three programming paradigms with suitable examples. Procedural [15%]

   (d) Give two programming methodologies and briefly describe one of them. [20%]

   (e) Briefly describe how a program is executed using interpreters and compilers with the aid of diagrams. [20%]

   (f) Compare and contrast low-level and high-level languages. [15%]

2. (a) Discuss the structure of a C++ program. [20%]

   (b) Briefly describe the three kinds of errors with the aid of examples in the context of programming. [20%]

[This question is continued on the next page]

(c) Define each of the following:

i. Bug

ii. Debug [10%]

(d) Find the error(s) in the following code segment and rewrite the correct code:

```
#include <iostream>
using namespace std
int main ()
        int n;
        cout << "Enter the starting number<<endl;
        cin << n;
        return 0;
}
```

[20%]

(e) Write the output of the following program:

```
#include <iostream>
using namespace std;
int main ()
{
        string s1 = "Wood";
        string s2=" is my world";
        cout << s1 << endl;
        s1[0] = 'F';
        cout << s1 << endl;
        string s3=s1+s2;
        cout << s3 << endl;
        return 0;
}
```

[15%]

(f) Describe the purpose of using the bool data type in C++. [15%]

3. (a) Briefly describe each of the following control structures with suitable examples:

i. if

ii. Nested if...else [20%]

(b) Write an algorithm and draw a flowchart to perform the following tasks:

The program prompts the user to enter four subjects' marks for a student.

[*This question is continued on the next page*]

The average marks for a student's four subjects is to be calculated. If the average marks is greater than 50, then the student has passed; otherwise, the student has failed. Finally, the student's result is to be printed Pass or Fail accordingly: [25%]

(c) Differentiate the while loop from the do-while loop. [10%]

(d) Give the output of the following codes:

i.

```
#include <iostream>
using namespace std;
int main() {
        int i = 0;
        do {
        cout << "Hello"+i << "\n";
        i++;
        }
        while (i < 5);
        return 0;
}
```

ii.

```
#include <iostream>
using namespace std;
int main() {
        for (int i = 0; i <= 10; i = i + 2) {
        cout << i << "\n";
        }
        return 0;
}
```

[20%]

(e) You are requested to write a program to assign a week for a vehicle to get fuel, based on the four-digit vehicle number. Write a C++ program to perform the following tasks using switch..case structure:

i. Read the four-digit number of a vehicle.

ii. Find the remainder when dividing the four-digit number by 7.

[*This question is continued on the next page*]

iii. Display the week from Monday to Sunday according to the remainders 0 to 6, respectively.

(0-Monday; 1-Tuesday; 2-Wednesday; 3-Thursday; 4-Friday; 5-Saturday; 6-Sunday)

[Hint: You may use *modulo* operator]

Sample input and output:

Enter the four-digit vehicle number: 2543

The remainder is: 2

Your vehicle can get the fuel on: Wednesday [25%]

4. (a) Define what is meant by array as used in C++. [15%]

(b) Explain how a one-dimensional array is declared and initialized in C++ using an example. [25%]

(c) State whether each of the following initialisation is valid or not in C++.

i. int age [3];

age = 23,45,29,19;

ii. int age [4] = 23,45,29,19;

iii. int age [4] = 23,45; [25%]

(d) Consider the following dress sales details of ACL Garments (Pvt) Ltd.:

	Blue	Black	Pink	Green
Shirt	10	8	5	6
Skirt	20	24	35	10
Frock	26	12	23	4
Top	27	23	16	12
Blouse	24	15	20	24
T-shirt	30	23	3	3

[*This question is continued on the next page*]

Write C++ code segments to perform each of the following tasks:

i. Store the above sales information in an array.

ii. Find the largest sale for each color and print the dress type and sales.

iii. Find the largest sale for each dress type and print the color and sales.

iv. Find the total sales by dress type.

v. Find the sum of sales for each dress color and print it. [35%]

5. (a) State the importance of functions in C++. [15%]

(b) What is the difference between Local and Global variables? Describe with suitable examples. [25%]

(c) Briefly describe the two types of user-defined functions. [20%]

(d) What is a function prototype? Give an example for it. [15%]

(e) Get a three-digit integer as a user input, write a function to find whether that number is an Armstrong number or not.
(eg: 371, $3^3 + 7^3 + 1^3 = 371$) [25%]