



University of Vavuniya

First Examination in Information Technology - 2022

First Semester - January/February - 2024

IT1134 - Fundamentals of Programming (Theory)

Answer Four Questions Only

Time Allowed: Two hours

1. (a) Define each of the following terms in the context of programming:
 - i. Pseudo code
 - ii. Algorithm

[10%]
- (b) Write an algorithm that takes the heights of three children as input and, outputs the height of the tallest child. [25%]
- (c) Briefly describe each of the following operations used in flowchart with the aid of symbols:
 - i. input a value
 - ii. termination
 - iii. decision making
 - iv. calculation

[20%]
- (d) Describe the structure of a C++ program. [25%]
- (e) You are required to read a number and display whether the number is divisible by 10 or not. Draw a flowchart to solve the problem. [20%]

2. (a) What is meant by variables in C++? Discuss the difference between variable declaration and initialization using suitable examples. [15%]
- (b) Write a short note on each of the following C++ data types:
- char
 - bool
 - float
- [15%]
- (c) What are the differences between Local and Global variables? Describe each type with the aid of examples. [20%]
- (d) Explain the purpose of the Input/Output streams in C++. [15%]
- (e) Define what is meant by an Assignment operator used in programming languages. [10%]
- (f) Briefly describe the Arithmetic operators in C++ with the aid of examples. [25%]

3. (a) Write C++ program segments for each of the following looping structures to print the pattern given in Figure 1:

- for
- while

*
**

Figure 1: Right Triangle

[12+13=25]

[This question is continued on the next page]

(b) Write down the output for the following program segment:

```
int i, j, k=1;  
for(i=1; i<=5; i++)  
{  
    for(j=1; j<=i; j++)  
        cout<< k++ << " ";  
    cout<< endl;  
}
```

[20%]

(c) Compare and contrast the *switch* and *if...else* structures with suitable examples.

[25%]

(d) 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 the *switch* structure:

- i. Read the four-digit number of a vehicle.
- ii. Calculate the remainder of the four-digit number divided by 7.
- iii. Display the week from Monday to Sunday according to the remainder (0 to 6) respectively.
(0-Monday; 1-Tuesday; 2-Wednesday; 3-Thursday; 4-Friday; 5-Saturday; 6-Sunday)

Sample output:

Enter the four-digit vehicle number: 2543

The remainder is: 2

Your vehicle can get the fuel on: Wednesday

[30%]

4. (a) What is meant by *Arrays* in C++? [15%]

(b) Explain how one-dimensional arrays are declared and initialized in C++. [20%]

[This question is continued on the next page]

(c) Distinguish a *multi-dimensional array* from a *one dimensional array*. [20%]

(d) Let *A* be an array that holds integers as shown in Figure 2.

2	3	5	7	11	13	17	19	23	29
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Figure 2: Array *A*

Now consider the following code:

```
int j=20; int i=0; intA[10];  
.while (A[i]<j)  
{  
    i=i+1;  
    cout<<i<<" ";  
}  
cout<< "Stop";
```

Write down the output of the above code on execution.

What will happen if *j*>29?

[15%]

(e) Write a C++ program to continuously prompt the user for integer values (both positive and negative) until they enter 0 or a maximum 15 values. Utilize an array to store the input values and display the sum of the negative values. [30%]

5. (a) State the importance of *Functions* in a computer program, and explain how they are defined in C++ programs. [25%]

(b) Discuss the difference between arguments passed by value and passed by reference. [25%]

(c) Write a C++ program to read an integer and display the absolute value of the integer using a function. [Hint: The absolute value of (-x) is x]

[This question is continued on the next page]

Sample output:

Enter the value: -10

The absolute value is: 10

[30%]

(d) Briefly describe what is meant by recursive programming technique.

[20%]