UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BCS1013
COURSE	: PROBLEM SOLVING AND COMPUTER PROGRAMMING
SEMESTER/SESSION	: 2/2024-2025
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer ALL questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Consider the following C++ program in Figure 1.

```
#include <iostream>
using namespace std;
int main()
{
    char Extinguishercode;
    cin>>Extinguishercode;
    if(Extinguishercode=='A')
        cout<<"Wood";
    else if(Extinguishercode=='B')
        cout<<"Flammable Liquids";
    else if(Extinguishercode=='C')
        cout<<"Charged Electrical Fires";
    else
        cout<<"Invalid Code";

return 0;
}
```

Figure 1

i) Write the output for the program when input is 'd'. (2 marks)

ii) Write an algorithm (either pseudocode or flowchart) for the program in Figure 1. (4 marks)

b) The following C++ program (Figure 2) uses a `switch-case` statement to input an emergency call number and prints related country names as in Table 1. Rewrite the program using an `if-else-if` statement. (8 marks)

```
#include <iostream>
using namespace std;

    int main() {
        int call_num;
        cout << "Please enter an emergency call number: ";
        cin >> call_num;

        switch (call_num) {
            case 911:
```

```
                cout << "United States";
                break;
            case 110:
                cout << "Indonesia";
                break;
            case 999:
                cout << "Malaysia";
                break;
            default:
                cout << "Unknown or other country";
        }

        return 0;
    }
```

Figure 2

Table 1

Emergency Call Number	Country Names
911	United States
110	Indonesia
999	Malaysia

QUESTION 2

a) Write the output for the following C++ Program fragments. Write 'nothing' if nothing print.

i.
```
for(int i=6;i>=1;i--){
        cout<<i;
}
```
(2 marks)

ii.
```
i=7;
while(i<=6){
  cout<<i;
  i++;
}
```
(2 marks)

```
    i=7;
    do{
        cout<<i;
        i++;
    } while(i<=6);
```

iii. (2 marks)

b) The flowcharts in Figures 3 and Figure 4 are designed to continuously input integers and print their sum. The input stops when zero is entered. Write a C++ program for each flowchart.

i. Use a 'while' statement for the flowchart in Figure 3, which illustrates a pre-test loop. (8 marks)

ii. Use a 'do-while' statement for the flowchart in Figure 4, which illustrates a post-test loop. (8 marks)

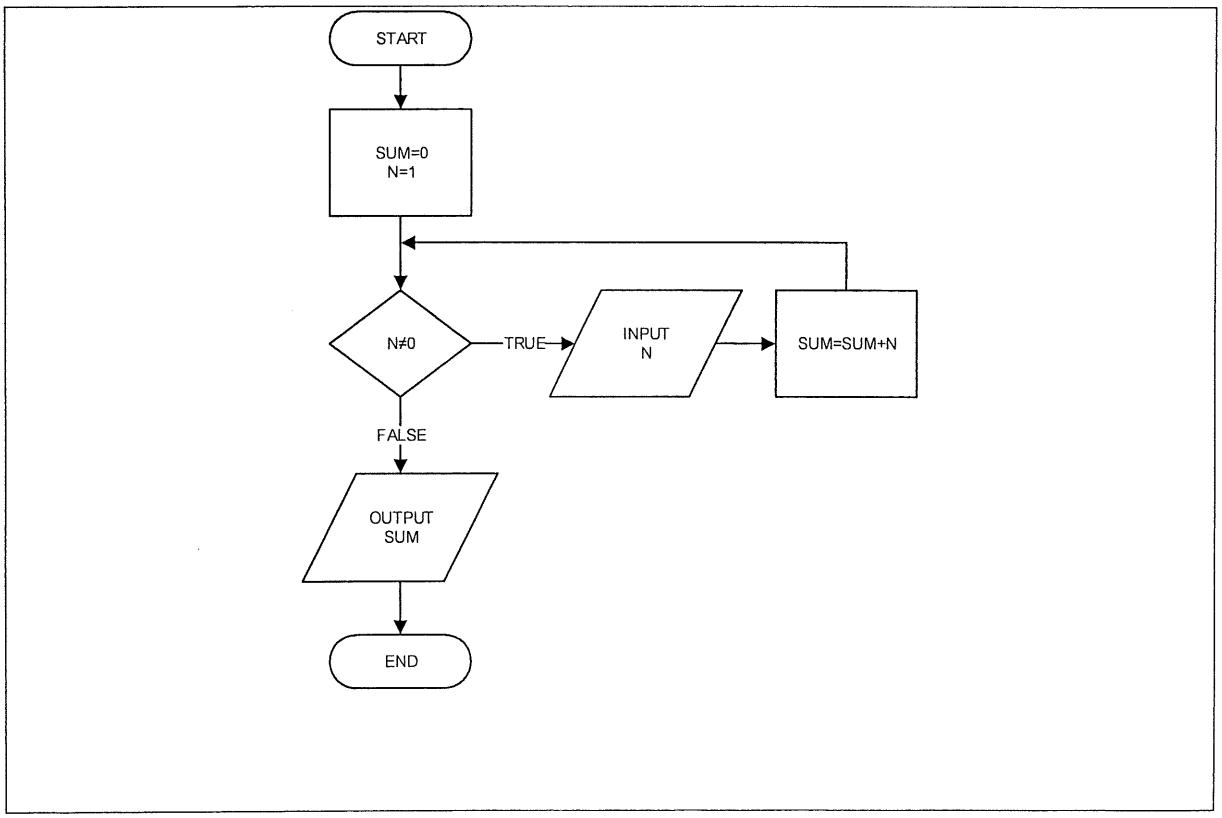

Figure 3

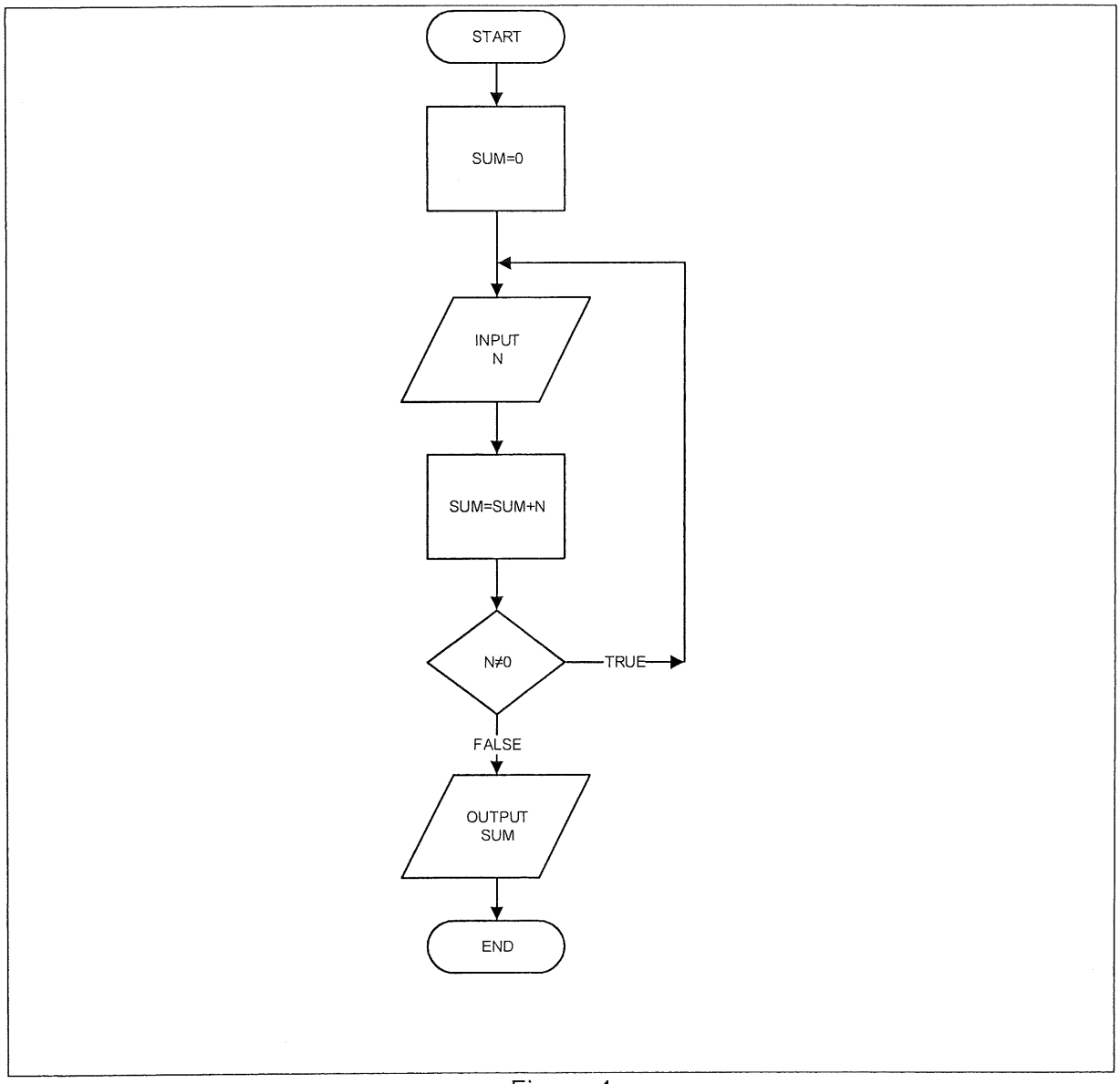

Figure 4

QUESTION 3

a) What is a 'function' in a computer program? (3 marks)

b) What is the difference between a function declaration and a function definition? (5 marks)

c) Consider the following function header and answer the following questions.

```
int sum(int N1, int N2)
```

i) What is the return type of the function sum? (2 marks)

ii) How many parameters does the function sum take? (2 marks)

iii) What are the data types of the parameters in the function sum? (2 marks)

d) Write a function call to the function sum with arguments 5 and 10. (2 marks)

e) Write a C++ function header for a function that takes two integers and returns their average of type double. (3 marks)

f) Write a function named `terbesar` that takes two integers as input and return the bigger of the two. (6 marks)

g) Identify and describe one error in the program shown in Figure 5, and then correct it. (4 marks)

```
#include <iostream>
using namespace std;

void darab(int a, int b) {
    return a * b;
}

int main() {
    cout << "The product is: " << darab(3,2) << endl;
    return 0;
}
```

Figure 5

QUESTION 4

a) A program that reads an integer and prints 'positive' if the integer is greater than 0, 'negative' if the integer is less than 0, and 'zero' if the integer is 0.

Expected Output:

```
Please enter a score: 7 <enter>
positive
```

i) Draw a flowchart representing the logic of the program. (7 marks)

ii) Write a C++ program based on the flowchart in i). (8 marks)

QUESTION 5

a) A C++ program prompts the user to enter the sales amounts for each of the 12 months. The program should then display the number of months that achieved a sales target of one thousand or more. Use selection and repetition statements, and do not use an array. Here is a sample of the expected output (see Figure 6).

```
Enter the sales amount for month 1: 1500
Enter the sales amount for month 2: 2000
Enter the sales amount for month 3: 3000
Enter the sales amount for month 4: 2500
Enter the sales amount for month 5: 1200
Enter the sales amount for month 6: 1300
Enter the sales amount for month 7: 2100
Enter the sales amount for month 8: 2900
Enter the sales amount for month 9: 4000
Enter the sales amount for month 10: 900
Enter the sales amount for month 11: 800
Enter the sales amount for month 12: 950
Number of month that achieved the target: 9
```

Figure 6

i) Write an algorithm (pseudocode or flowchart). (10 marks)

ii) Write a C++ program based on the algorithm in i). (10 marks)

----------**End of question**----------