UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BCS1013
COURSE	: PROBLEM SOLVING AND COMPUTER PROGRAMMING
SEMESTER/SESSION	: 1/2023-2024
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 8 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

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

```
#include <iostream>
using namespace std;
int main()
{
    char code;
    cin>>code;
    if(code=='M')
        cout<<"Military Grade";
    else if(code=='S')
        cout<<"Space Exploration Grade";
    else if(code=='C')
        cout<<"Commercial Grade";
    else
        cout<<"Invalid Code";

return 0;
 }
```

Figure 1

i) Write the output for the program when input is 'C'. (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 an `if-else-if` statement to input an emergency call number and prints related country names as in Table 1. Rewrite the program using a `switch-case` statement. (8 marks)

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

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

    if (call_num == 911)
        cout << "United States";
    else if (call_num == 110)
```

```
        cout << "Indonesia";
    else if (call_num == 999)
        cout << "Malaysia";
    else
        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 fragment. Write 'nothing' if nothing print. (2 marks)

```
for(int i=1;i<=6;i++){
     cout<<i<< " ";
}
```

b) Write the output for the following C++ Program fragment. Write 'nothing' if nothing print. (2 marks)

```
i=10;
while(i<=6){
          cout<<i<< " ";
          i++;
}
```

c) Write the output for the following C++ Program fragment. Write 'nothing' if nothing print. (2 marks)

```
i=10;
do{
    cout<<i<< " ";
    i++;
} while(i<=6);
```

d) The flowcharts in Figure 3 and Figure 4 are designed to continuously input an integer and print the sum. The input process stops when zero is entered. Write a C++ program for each flowchart. Use a '`while`' statement for the flowchart that illustrates a pre-test loop and use a '`do-while`' statement for the flowchart that illustrates a post-test loop. (16 marks)

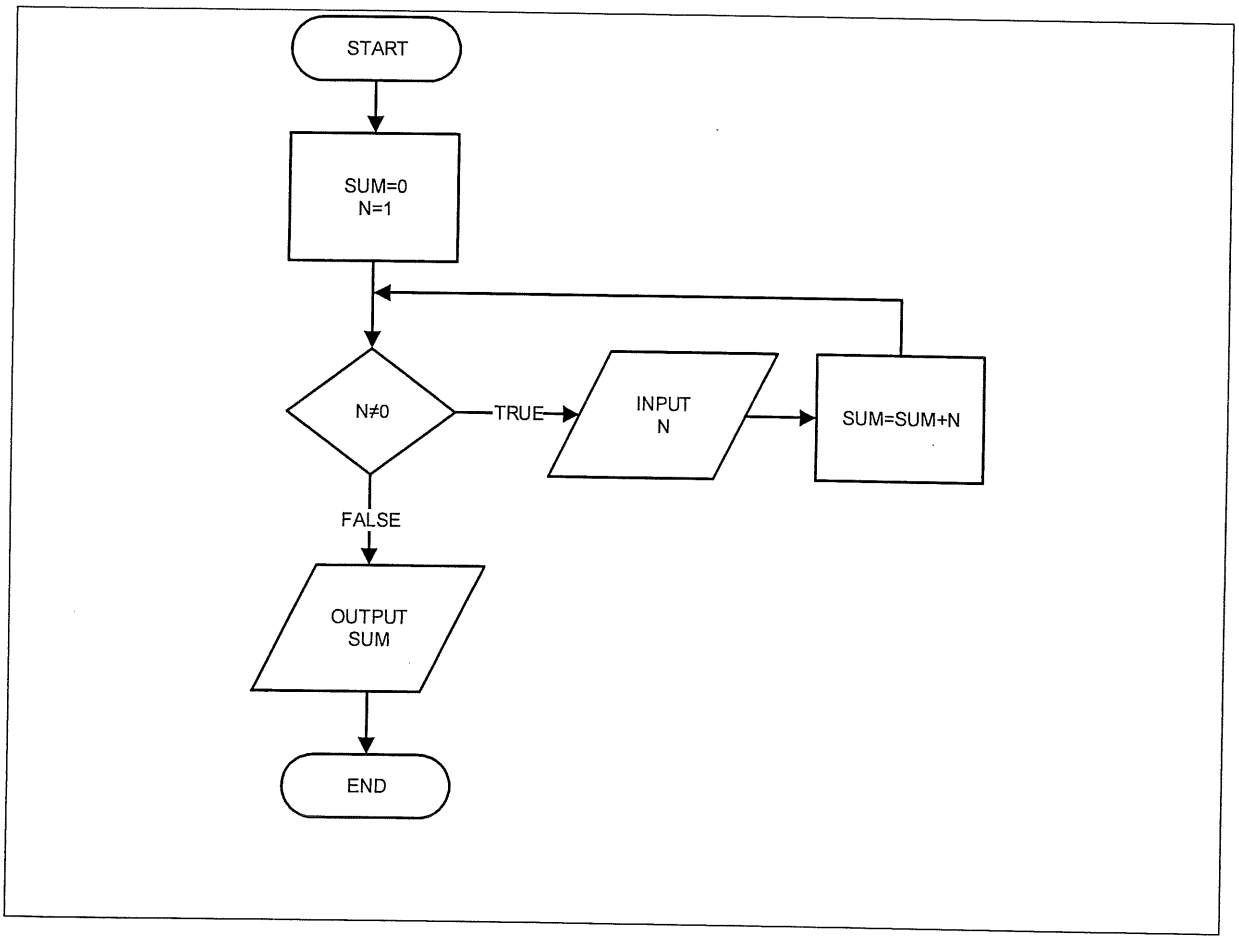

FIGURE 3

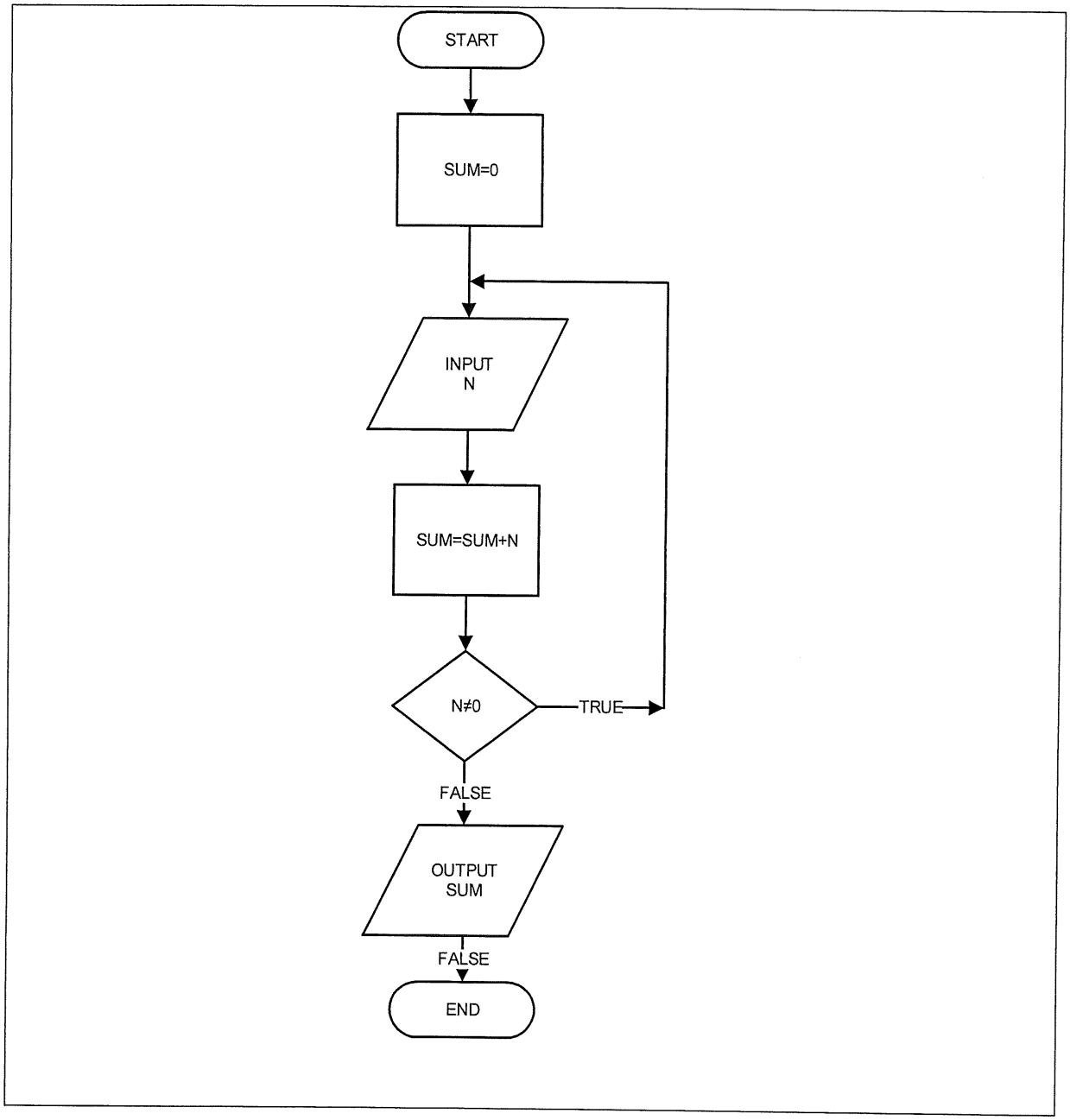
START
SUM=0
INPUT
N
SUM=SUM+N
N≠0
TRUE
FALSE
OUTPUT
SUM
FALSE
END

FIGURE 4

QUESTION 3

a) Write a C++ function header for a function that verifies whether a given integer is a prime number. It should take an integer as a parameter and return a Boolean value (true if prime, false if not). (3 marks)

b) Write a C++ function header for a function that takes two integers as parameters and returns their sum. (3 marks)

c) Identify and describe one error in the program shown in Figure 5, then proceed to correct it. (3 marks)

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

int main() {
    int x = 3;
    int y = 5;
    int result = calculateProduct(x, y);
    cout << "The product is: " << result << endl;
    return 0;
}

// Define the function
int calculateProduct(int a, int b) {
    return a * b;
}
```

Figure 5

d) Consider the following program in Figure 6.

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

int functionX(double N1, double N2){
    return N1+N2;
    }

int functionX(int N1, int N2){
    return N1* N2;
    }
```

```
int main()
{
    cout<<functionX(3.0,2.0);
    return 0;
}
```

Figure 6

i) What is the expected output when the program is executed? (2 marks)

ii) How many functions are named "`functionX`" in this program? (2 marks)

iii) In the "functionX" overloads, how does the program determine which one to use when you call it in the main function? (4 marks)

iv) Identify wheter the following function call is valid. Give a reason. (4 marks)

```
cout<<functionX(1,2,3);
```

e) Write a function named `terkecil` that takes two integers as input and return the smaller of the two. (8 marks)

QUESTION 4

Write a C++ program that reads a month number and print month name based on the following Table 2. Print "invalid month" if month number entered by the user is not in range of 1 to 12. (15 marks)

Table 2

Month Number	Month Name
1	Jan
2	Feb
3	Mar
4	Apr
5	May
6	Jun
7	Jul
8	Aug
9	Sep
10	Oct
11	Nov
12	Dec

QUESTION 5

Write an algorithm (either pseudocode or flowchart) and C++ program that prompts the user to enter 30 student's score, and finally displays the number of student that passed and failed, passing marks is forty and above. Do not use an array.

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

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

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