

**LAB EXERCISE 1 (SECJ1013)**  
**PROGRAMMING TECHNIQUE 1**  
**SEM 1, 2024/2025**

**INSTRUCTIONS TO THE STUDENTS**

- *This exercise must be done individually.*
- *Answer all questions.*
- *Your solution must follow the input and output as required in the text and shown in the examples. You must test your solution with (but not limited to) all the input given in the examples.*
- *Any form of plagiarisms is **NOT ALLOWED**. Students who copied other students' assignments will get **ZERO (0)** marks (both parties, students who copied, and students that share their work).*
- *Please insert your name, matric number, and date as a comment in your solution.*

**SUBMISSION PROCEDURE**

- *Please submit this exercise no later than **October 22, 2024, Tuesday (00:00 MYT)**.*
  - *Only one file is required for the submission which is the flow chart (the file with the extension .pdf).*
  - *Submit the assignment via the UTM's e-learning system.*
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**MATRICES NO.: A24CS0247**  
**SECTION: 01**  
**DATE: 19/10/2024**

## QUESTION 1

Construct a flow chart that reads an integer number and then calculate the sum of its digits. After that, identify whether the sum of digits for the integer is a multiple of 3, 4, and / or 5. **Hint:** You should use operator divide (/) and modulus (%) and also **post-test loop** to answer this question.

### Example 1

Enter an integer number: **5168**  
 $8 + 6 + 1 + 5 = 20$   
20 is multiples of 4 and 5

### Example 3

Enter an integer number: **51684**  
 $4 + 8 + 6 + 1 + 5 = 24$   
24 is multiples of 3 and 4

### Example 2

Enter an integer number: **9996999**  
 $9 + 9 + 9 + 6 + 9 + 9 + 9 = 60$   
60 is multiples of 3, 4 and 5

### Example 4

Enter an integer number: **2161**  
 $1 + 6 + 1 + 2 = 10$   
10 is multiples of 5

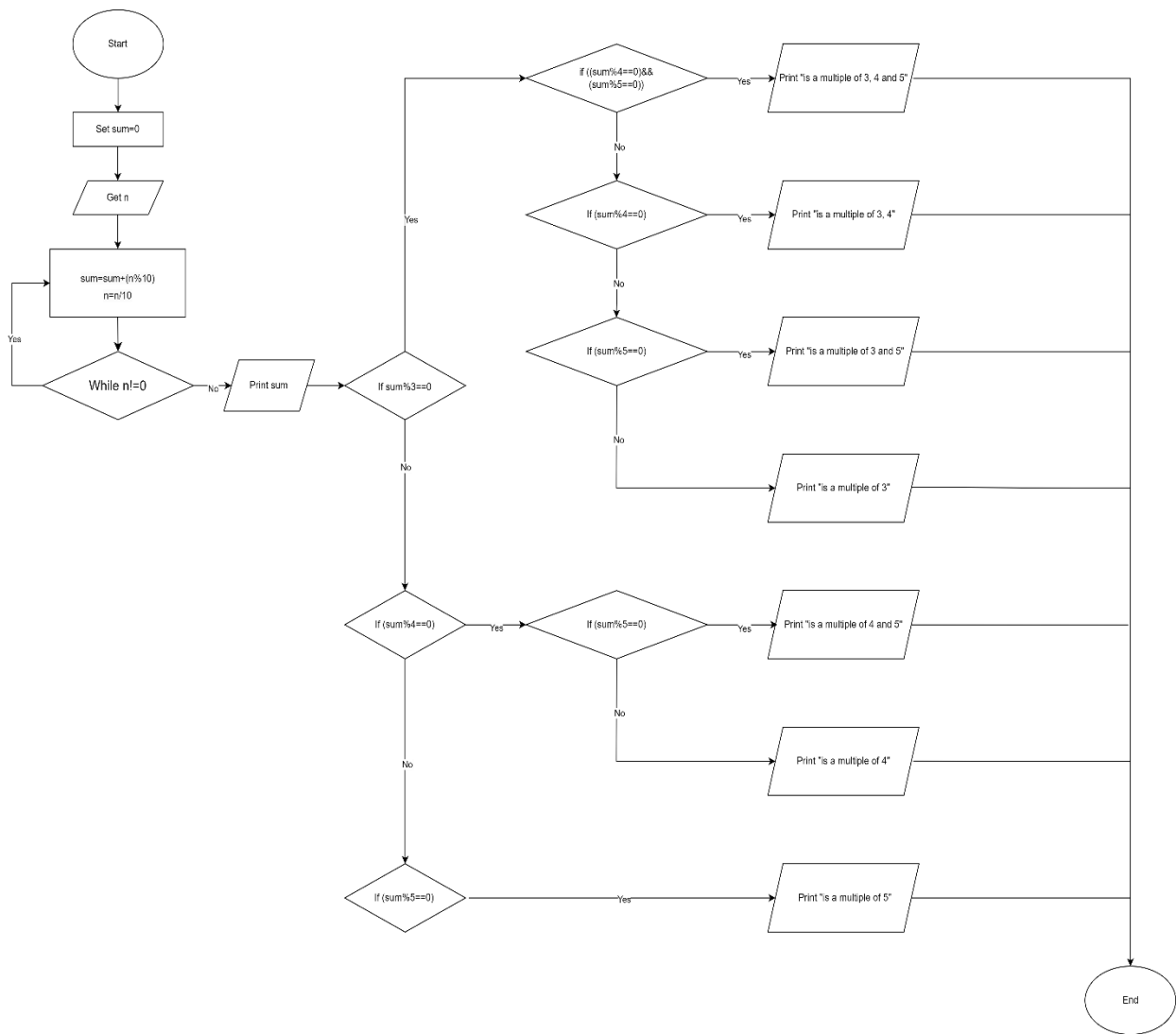
**Note:** The number in **bold** indicates input entered by the user.

Draw your flow chart using any appropriate drawing tools such as Microsoft Visio, Lucid chart (<https://www.lucidchart.com/pages/examples/flowchart-maker>), and draw.io (<https://app.diagrams.net/>).

### Pseudo code

1. Start
2. Set sum=0
3. Get n
4. Do
  - 4.1 sum=sum+(n%10)
  - 4.2 n=n/2
5. While (n!=0)
6. End While
7. Print sum
8. If (sum%3==0)
  - 8.1 If ((sum%4==0)&&(sum%5==0))
    - 8.1.1 Print "is a multiple of 3, 4 and 5"
  - 8.2 Else If (sum%4==0)
    - 8.2.1 Print "is a multiple of 3 and 4"
  - 8.3 Else If (sum%5==0)
    - 8.3.1 Print "is a multiple of 3 and 5"
  - 8.4 Else
    - 8.4.1 Print "is a multiple of 3"
  - 8.5 End If
9. Else If (sum%4==0)
  - 9.1 If (sum%5==0)
    - 9.1.1 Print "is a multiple of 4 and 5"
  - 9.2 Else
    - 9.2.1 Print "is a multiple of 4"
  - 9.3 End If
10. Else
  - 10.1 If (sum%5==0)
    - 10.1.1 Print "is a multiple of 5"
  - 10.2 End If
11. End If
12. End

## Flow Chart



## QUESTION 2

Construct a flow chart that reads an integer number and then calculate the sum of its digits. After that, identify whether the sum of digits for the integer is an even or odd number, and a multiple of 4, and/ or 5. **Hint:** You should use operator divide (/) and modulus (%) and also **pre-test loop** to answer this question.

### Example 1

Enter an integer number: **1235**  
5 + 3 + 2 + 1 = 11  
11 is odd number

### Example 2

Enter an integer number: **6545**  
5 + 4 + 5 + 6 = 20  
20 is even number & multiples of  
4 and 5

### Example 3

Enter an integer number: **89251**  
1 + 5 + 2 + 9 + 8 = 25  
25 is odd number & multiples of 5

### Example 4

Enter an integer number: **98762**  
2 + 6 + 7 + 8 + 9 = 32  
32 is even number & multiples of 4

**Note:** The number in **bold** indicates input entered by the user.

Draw your flow chart using any appropriate drawing tools such as Microsoft Visio, Lucid chart (<https://www.lucidchart.com/pages/examples/flowchart-maker>), and draw.io (<https://app.diagrams.net/>).

### Pseudo Code

1. Start
2. Set sum = 0
3. Read number
4. While (number != 0)
  - 4.1. sum = sum + (number % 10)
  - 4.2. number = number / 10
5. End While
6. Print sum
7. If (sum % 2 == 0)
  - 7.1. If ((sum % 4 == 0) && (sum % 5 == 0))
    - 7.1.1. Print "is even number & multiples of 4 and 5"
  - 7.2. Else If (sum % 4 == 0)
    - 7.2.1. Print "is even number & multiples of 4"
  - 7.3. Else If (sum % 5 == 0)
    - 7.3.1. Print "is even number & multiples of 5"
  - 7.4. Else
    - 7.4.1. Print "is even number"
    - 7.4.2. Go to step 9
  - 7.5. End If
8. Else
  - 8.1. If (sum % 5 == 0)
    - 8.1.1. Print "is odd number & multiples of 5"
  - 8.2. Else
    - 8.2.1. Print "is odd number"

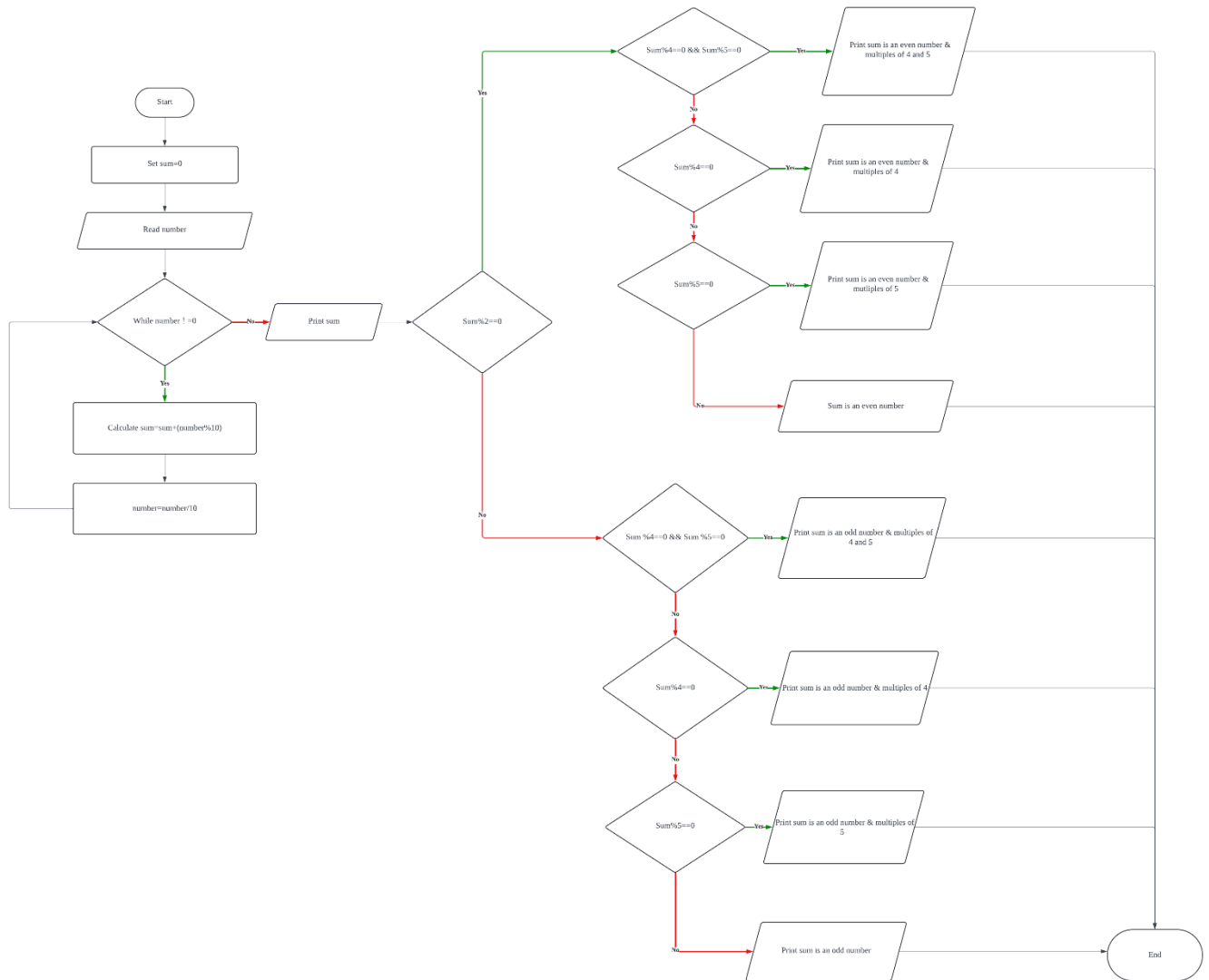
8.2.2. Go to step 9

8.3. End If

9. End If

10. End

## Flow Chart



## Coding:

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int sum = 0;
6     int number;
7
8     cout << "Enter an integer number: ";
9     cin >> number;
10
11     // Input validation
12     if (cin.fail()) {
13         cout << "Invalid input. Please enter an integer." << endl;
14         return 1; // Exit with an error code
15     }
16
17     while (number != 0) {
18         sum = sum + (number % 10); // Sum the digits
19         number = number / 10;      // Remove the last digit
20     }
21
22     cout << "The sum of digits is: " << sum << endl;
23
24     // Check if sum is even or odd
25     if (sum % 2 == 0) {
26         if ((sum % 4 == 0) && (sum % 5 == 0)) {
27             cout << sum << " is an even number & multiples of 4 and 5" << endl;
28         } else if (sum % 4 == 0) {
29             cout << sum << " is an even number & multiples of 4" << endl;
30         } else if (sum % 5 == 0) {
31             cout << sum << " is an even number & multiples of 5" << endl;
32         } else {
33             cout << sum << " is an even number" << endl;
34         }
35     } else {
36         if ((sum % 4 == 0) && (sum % 5 == 0)) {
37             cout << sum << " is an odd number & multiples of 4 and 5" << endl;
38         } else if (sum % 4 == 0) {
39             cout << sum << " is an odd number & multiples of 4" << endl;
40         } else if (sum % 5 == 0) {
41             cout << sum << " is an odd number & multiples of 5" << endl;
42         } else {
43             cout << sum << " is an odd number" << endl;
44         }
45     }
46
47     return 0;
48 }
```

## Test value:

```
Enter an integer number: 1235
The sum of digits is: 11
11 is an odd number
```

```
-----
Process exited after 2.506 seconds with return value 0
Press any key to continue . . .
```

```
Enter an integer number: 89251
The sum of digits is: 25
25 is an odd number of multiples of 5
```

```
-----
Process exited after 3.478 seconds with return value 0
Press any key to continue . . . |
```

```
Enter an integer number: 6545
The sum of digits is: 20
20 is an even number & multiples of 4 and 5

-----
Process exited after 3.566 seconds with return value 0
Press any key to continue . . . |
```

```
Enter an integer number: 98762
The sum of digits is: 32
32 is an even number & multiples of 4

-----
Process exited after 4.113 seconds with return value 0
Press any key to continue . . . |
```